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Employment System Mental Models in Organisation Building: Founder’s Mental Models of Employment in New Zealand Biotechnology Start-ups

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ABSTRACT

The majority of biotechnology firms are founded by scientists and the organisations are characterized by high human capital density. The existing research has focused on these founders and their impact on the human and social capital within their firms (Powell, 1996; Murray, 2004). However, there are significant gaps in understanding the unique requirements and employment demands of biotechnology start-ups. While there have been several studies investigating the organisation and building of the employment system of entrepreneurial firms (e.g., Burton, 1995), our understanding of the role founders play in building of the employment system still remains limited particularly in the context of biotechnology. The focus of this study is how founders of biotechnology companies organise and build the employment system in their start-up ventures.

Based on a study of three biotechnology firms and their founders, this thesis adopts an integrative cognitive methodology in studying the founder’s role in the employment system creation within their new ventures. This study builds on an in-depth multi-method case study approach in examining founders’ mental models of the employment system and the organisations that they have built. The findings suggest that founders approach the human capital systems within their firm with a specific mental model of human capital organisation. These mental models of the employment system emphasise informal and formal managerial practices that are designed to achieve various aspects of the organisation’s culture and goals. The findings also suggest that founders’ mental models of employment systems are influenced by a variety of determining factors that include strategic choice, environmental influences and individual backgrounds that shape the nature and content of the employment system they form.
To my parents, See Nam and Saw Aye
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CHAPTER ONE

The Age of Biology

There are so many definitions of biotechnology that we do not feel inclined to add to them. Often they are rather noble in character, expressing lofty aspirations like biology in the service of mankind or providing products and services for industry. Not that such descriptions are wrong but they do not (in our view) convey very realistically the idea that biotechnology is not some academic activity, a consequence of innovative laboratory experimentation or a kind of social crusade, but is itself an intensely industrial and commercial matter (Moses & Cape, 1991, p. 1).

INTRODUCTION

New biotechnology firms are thought to have an important role in fostering the growth and development of industries and technologies (Freeman, Clark, & Soete, 1982; Zucker, Darby, & Brewer, 1998b). Individual bio-entrepreneurs face many responsibilities and challenges. Aside from the ability to identify commercial value for their intellectual property (IP), the bio-entrepreneur needs to have the ability to raise financing, form unique research and development (R&D) synergies with other companies, and manage the demands of venture capitalists, stakeholders and the R&D staff. These processes are among the strongest determinants of their company’s survival and growth. Driving these strategic efforts are regulatory uncertainties, weak patent positions, limited resources, lack of products, and insufficient financing. Some of the issues that the bio-entrepreneur need to take into account are the need to control and manage the business issues of licensing, research contracts, mergers, acquisitions, or equity participation, joint ventures alliances and participation in consortium. The size of some of these activities may be huge. The roles of the bio-entrepreneur can be many: the founder scientist, the science advisory board member, the investor, and the manager. Bio-entrepreneurship begins with the discovery of a novel molecule of biochemical process, but that is only the beginning of a complicated and dynamic road to commercialisation.

The interest in the biotechnology industry has risen sharply over the past few decades as the new millennium was heralded as the “century of biology”¹. Since then, there has been

¹ From Robert F. Curl, Nobel Laureate in Chemistry, when he heralded the coming of the biotechnology age by proclaiming that “if the 20th century was the century of physics and chemistry, it is clear that the next century will be a century of biology” (Rifkin, 1998)
an unprecedented interest in the biotechnology industry, and the formation of biotechnology companies itself.

Science-based entrepreneurial firms are a key feature of the modern knowledge economy, contributing to the development of regional high tech clusters and the transformation of investments in basic science into economic growth, employment and competitive advantage. However, our insights into their organization, scientific productivity, and competitiveness remain limited (Murray, 2004, p.643).

Because biotechnology impacts everyday life (in practice, health, safety, supply and quality of natural resources; in principle, implications for creation and re-creation), its applications are subject to intensive debate and heavy scrutiny by public authorities. Biotechnology’s progress as an economic activity cannot therefore be only a ‘technical fix’, but will also depend heavily on the balance society manages to strike between the interests of producers, scientists, the concerns of citizens and interest groups, and regulatory requirements (Van Vliet, 1998).

Although entrepreneurship has recently become an established discipline, the number of researchers, theorists, practitioners, and managers that have formed an interest in biotechnology new ventures represent a small but growing community. This growing interest in biotechnology companies is congruent with the emergence of the biotechnology industry as the fastest growing industry in the world. A quick look at the statistics around this industry show an increasing number of growth in all sectors of the industry. For example, biopharmaceuticals, drugs that are made from proteins and other organics substances, are the fastest-growing segments of the drug industry, increasing to 7 percent in 1998 (Fumento, 2003). Biopharmaceuticals represent approximately one-third of drugs being tested in patient trials. Of the total number of new medicines approved in the US in the 1990s, thirteen percent were biopharmaceuticals. The growth in the number of drugs in clinical trials continues to climb, from 81 in 1998, to 371 in 2002 (Biotechnology Industrial Organization, 2002; Walsh, 2000). Estimates are that this number could eventually grow to 10,000 drugs per annum (Walsh, 2000). Worldwide, this trend can be seen by the fact that there are more than 350 biotechnology drug products and vaccines in clinical trials targeting more than 200 diseases ranging from Alzheimer’s disease, cardiovascular disease, diabetes, AIDS and arthritis (Biotechnology Industrial Organization, 2002). The increasing emphasis on biotechnology research is
evident as global biotechnology R&D increased by 262 percent between the years of 1992 and 1999 (Kermani & Bonacossa, 2003). Aside from the direct therapeutic products of the industry, there is also the advent of medical diagnostic tests for the successful early detection and treatment of medical conditions. Biotechnology globally is still in the early stages of development similar to where the software or telecommunications industries were 15 to 20 years ago. Its influence and impact is expected to be pervasive. Worldwide figures suggest that approximately 15 to 20 billion dollars (US) worth of biotechnology products were sold in 1994 and this is a trend that is expected to grow (Biotechnology Industrial Organization, 2002).

Considering the immense economic and social impact biotechnology has, the mechanisms of this industry will be of vital importance to most organisations, economies and nations. This has led many countries in the developed world (and some developing countries) to set up policy-making strategies for biotechnology to harness the potential economic, social and political benefits of this technology (Senker, 1998). In this chapter, the question of why biotechnology organisations represent an important area for research is explored. Issues of how biotechnology organisations have been studied will be highlighted. In addition, a number of gaps in the existing literature that warrant further examination will be outlined as a means of highlighting the focus of this research. Finally an overview of the chapters in this thesis will be presented.

**BIOTECHNOLOGY ORGANISATIONS**

The global lead in biotechnology, if not in terms of scientific performance, then certainly in terms of industrial élan, is clearly being taken by the United States of America (Van Vliet, 1998, p.1).

Small medium enterprises/Dedicated biotechnology firms (SMEs/DBFs) in the United States are seen to have an important role in the commercial development of biotechnology (Grabowsky & Vernon, 1994; Kenney, 1986; Oakey, Faulkner, Cooper, & Walsh, 1990; Orsenigo, 1989). In the United States, these small firms have contributed greatly to the early product development. This was prompted by the emerging technology from the academic sector and the ability of these small firms to adapt them for large-scale production (Galhardi, 1994). The flexibility and unique characteristics of these

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2 Appendix A highlights further description and history of the biotechnology industry.
SMEs/DBFs prompted the development of the industry by its forming linkages with large corporations in the latter stages of product development. The interdependent nature of these organisations lead many to postulate that these SMEs/DBFs are the catalyst that allowed the emergence and growth of the biotechnology sector to be developed (Galhardi, 1994). This is a view that is shared by many commentators of the industry (Kenney, 1986; McKelvey, 1994; Saviotti, 1998). To this day, the biotechnology firms in the US remain relatively small with approximately two thirds employing fewer than 150 people and located within a cluster of biotechnology companies in areas such as Boston, North Carolina, San Diego and the Bay Area in San Francisco (Muller, Fujiwara, & Herstatt, 2004).

The pattern of industrial development in biotechnology has been particularly well documented in the United States\(^3\). These analyses have often been conducted from an economic viewpoint that establishes the role of these small firms in the industry, as well as, the particular conditions of entry. Researchers have commented on the unique growth of the biotechnology sector in the US, citing economic theories of innovation and growth as explanatory frameworks for their development and prosperity (Oakey et al., 1990; Saviotti, Joly, Estades, Ramani, & de Looze, 1998). Dodgson (1991) related the emergence of SMEs/DBFs in the USA to a number of interrelated factors. These included the development of the above-mentioned novel scientific techniques, the ready availability of SMEs/DBFs as intermediaries between research institutes and industry, and the synergistic relationships between SMEs/DBFs and large firms. The role of these SMEs/DBFs was thought to be as a transferor of technology. The plentiful supply of venture capital and tax incentives by the United States government encouraged capital formation and stimulated R&D in the private sector (Galhardi, 1994).

The United States government played a defining role in creating the private sector R&D in biotechnology by funding basic biotechnology R&D and creating an environment conducive to biotechnology commercialisation (Acharya, 1999). This has been described as a major determinant for the success of SMEs/DBFs in obtaining financing in (what was then) a risky area. The funding mechanisms for SMEs/DBFs in the USA were through

\(^3\) This thesis provides a contextual overview of the importance of SMEs/DBFs and is not meant to be an exhaustive review of the analysis of biotechnology in the USA. Readers are directed to books by Kenney (1986), McKelvey (1996) and Bud (1993) for a description of the history of biotechnology in the USA.
research contracts with established companies (Faibas & Rangel, 1986; Reisch; 1988), venture capital (Daly, 1985; Hacking, 1986), the public stock market (Daly, 1985; Kenney, 1986), and research and development limited partnerships (Daly, 1985). The economic environment, although conducive to the advent of SMEs/DBFs, was only part of the story. These SMEs/DBFs were thought to have characteristics (such as their size and human capital) that were made to exploit the potential of biotechnology.

SMEs/DBFs have been described as being created with the specific objectives of commercialising innovations in biotechnology (Office of Technology Assessment, 1988). The growth of these firms was the result of influential scientific and technological breakthroughs beginning in the early 1980s. Following an explosive growth of these firms (sometimes described as ‘swarming’ (Dodgson, 1991)), these firms began to find investments, often made with large corporations for both in-house biotechnology R&D, and forming collaborative ventures (Galhardi, 1994). The linkages between the private sector and the venture capital markets led to the formation of many SMEs/DBFs which had the advantages of size (being small, they were able to be flexible and cost effective), a strong background in basic research (consisting of high level scientific expertise), and the explicit goal for applied research and commercialisation. These early conditions gave the US a head start in building relationships between research and industry in biotechnology. Furthermore, the structure of university contract research was accessible to academics in the US because of the close relationship between university and industry, which developed during the early 1970s. This allowed for entrepreneurial activities to be encouraged among private companies and scientists (Acharya, 1999).

Radical new technologies like biotechnology, with the potential profoundly to alter existing structures and systems, put a premium on firms with the ability to learn rapidly about new scientific and market possibilities, and the personnel and organisational structures to take quick advantage of these lessons for commercial benefit. It was the dedicated biotechnology firm which, being new, had the opportunity to create novel management systems and practices and organisational arrangements in order to take advantage of the opportunities biotechnology provided (Dodgson, 1991, p. 5).

According to Freeman (1982), the role of SMEs/DBFs in the US fits with Schumpeterian (1934) ideas of innovation and entrepreneurship. In this view, new small firms play a relevant role in innovation and the birth of an industry. This argument has been applied
to the biotechnology industry. In this theory, Freeman et al (1982) describe that decades of scientific and technological work culminate in a burst of new industries and technologies that generate both new investment and employment on a large scale. This premise stresses the importance of clusters of inter-related inventions and innovations and their diffusion over the growth cycle of new industries, as well as the role played by small firms in this process.

The ability and initiative of entrepreneurs...created new opportunities for profits, which in turn attracted a ‘swarm’ of imitators and improvers to exploit the new opening with a wave of new investment, generating boom conditions (Freeman et al., 1982, p. 19).

The flourishing of SMEs/DBFs was characterised by the initiative of the scientists (or bio-entrepreneurs) that approached venture capitalists or capital funds with a business plan. This characterised the main method of new venture creation in the biotech revolution in the US. The environment in the US was conducive to entrepreneurial activities that allowed bio-entrepreneurs to exploit the commercialisation of these technologies. The literature on the biotechnology industry emphasises the role of SMEs/DBFs and bio-entrepreneurs in the emergence and evolution of the biotech industry there (Bud, 1993; McKelvey, 1996). However, while there remain many participants in the industry such as the government, research institutes, large companies and venture capitalists, it is well accepted that this may be a uniquely American phenomenon. The role bio-entrepreneurs and the SMEs/DBFs they create play in other countries remain an area for exploration. The conditions in which the American biotechnology phenomenon has evolved are not duplicated outside of the United States, at least not at the same intensity (Galhardi, 1994). The business competencies in the biotech sector include access to technology, availability of high-risk finance, and human resource development. The development of entrepreneurial business strategies is strongly influenced by the orientation of key national institutional frameworks affecting technology transfer, finance, labour markets, and company law (Casper & Kettler, 2001).

Large pharmaceutical and chemical companies lead the majority of biotechnology commercialisation in Japan and Germany. In the United Kingdom and France, however, SMEs/DBFs have accounted for only some of the commercialisation of biotechnology (Acharya, 1999). The discontinuity in the history of the development of SMEs/DBFs in
France is deeply affected by the availability of venture or risk capital (Laurent, 1985). This, exacerbated by the lack of expert personnel, has made it a smaller impact than in the other countries (Sharp, 1985). The development in the United Kingdom is somewhat more advanced whereby a number of small firms were founded at the beginning of the 1980s especially to exploit the results of basic research in the biotechnology related area. The British government’s commitment to the area and changes in tax law and the venture capital market (more so than in other European countries) were factors that have helped the biotechnology industry in the UK. However, Faulkner (1986) argues that the development in the UK is different to the US in that it is mainly the intervention of government that supported the proliferation of SMEs/DBFs as opposed to availability of funding agencies as is found in the United States.

In Asian countries, South Korea, Taiwan and Singapore are also promoting biotechnology (Yanchinski, 1987). These countries have set up generous bank loans, tax incentives and development grants to support companies restructuring and commercial start-ups. The Asian experience has shown that the lack of indigenous expertise in biotechnology-related areas makes these countries heavily dependent on research partnership with multinational corporations (Galhardi, 1994). However, the scale at which SMEs/DBFs flourish in these industries is small (Randall, 2001). Biotechnology firms in these countries appear to be engineered through the intervention of governments and maintain linkages with large multinationals and countries where the development of expertise has been prevalent. For example, Yanchinski’s (1987) analysis of the Korea experience observed that the commercialisation of biotechnological products funded research from the United Kingdom and the US in order to buy a window on advanced technology and bypass the problems of the lack of expertise in the country. Similarly, while Singapore has a small pool of microbiologists and process engineers, it has comprehensive government-supported biotechnology programmes that support small start-up biotech firms (Yanchinski, 1987). This support involved tax write-offs for equipment, and small technical investments in new equipment. Singapore looks for multi-national corporations’ collaboration as part of the development to circumvent the lack of expertise.

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4 Although, this again is somewhat smaller in proportion to the USA, the UK biotechnology industry is characterised by a mixture of larger pharmaceutical companies and university spin offs and their relations to these commercial and research institutions (Faulkner, 1986; Owen-Smith, Ricaboni, Pammolli, & Powell, 2002).

5 Empirical works on these regions (and of other smaller countries) are still scarce although archival information and government reports are much more widely available.
experience in scientists and process engineers (Randall, 2001). The need for biotechnology by many countries has evolved a number of imperatives in order to stimulate the rise of a biotechnology industry. These imperatives rely primarily on larger companies and the development of regional governmental support.

When contrasted to the other countries above, New Zealand follows the US biotechnology industry model to a certain extent in its replication of SMEs/DBFs as the primary means of utilising biotechnology processes. The US biotechnology industry is characterised by its large number of SMEs/DBFs, while in Europe and other countries the biotechnology industry is characterised by the involvement of larger multinational pharmaceutical companies and research institutes rather than SMEs/DBFs. This has led to at least one researcher to comment that “the New Zealand biotechnology sector may be expected develop along a different trajectory as a consequence of a markedly different set of initial and framework conditions” (Marsh, 2001, p. 2). However, recognising the potential that these SMEs/DBFs offer; many countries have attempted to emulate the success of the US in creating an industry that is characterised by these firms. Successful biotechnology companies typically identify a molecule that has commercial potential and leverage this science by assembling a prominent professional team with complimentary scientific and business skills that lend credibility to the enterprise. Key success variables identified by industry analysts include the need for strong science, ensuring that the knowledge is not only part of the stable of related products, good patents and a solid management and scientific team (Faulkner, 1986). However, there are a host of complications that emerge for the biotech firm that are related to the strategic choices of the firm. These include balancing the need to pursue research at the cost of accelerating commercialisation of the product, participation in research consortia or collaborations with other pharmaceutical or biotechnology companies, and managing the cash flow of the new biotechnology firm. These choices will be influenced by the type of biotechnology, type and strength of patents, and market exclusivity of its patents. These strategic decisions most often rely on the founder of biotech companies to depend on the human capital they have assembled.
BIOTECHNOLOGY FOUNDERS AND THEIR ORGANISATION BUILDING

Founders of biotechnology firms have long been of interest in the literature (Calabrese, Baum, & Silverman, 2000; Gittelman & Kogut, 2003; Pisano, Shan, & Teece, 1988; Shan, Walker, & Kogut, 1994; Stuart, Hoang, & Hybels, 1999; Zucker et al., 1998b). This is not surprising considering the important role that the bio-entrepreneur plays in the advent of SMEs/DBFs in the biotechnology industry. As mentioned above, SMEs/DBFs are founded by scientists or teams of scientists. In fact, Werth (1994) describes an anecdotal account of how a biotechnology start-up firm pursued its goal of marketing immunosuppressant drug for AIDS through the activities of the founder. The book recognised the founder as an important driver for these activities, not only through his interactions with other scientists, but also through the competitive business environment. The difficulties that arise out of combining business and science are an important dynamic in the quest for commercialisation. Zucker and Darby (1996) propose that the role of the scientist as a source of intellectual capital is inherently important in the commercialisation of science. They postulate that these “star scientists” become the key for invention and innovation that helped form the biotechnology industry (Zucker & Darby, 1997).

The biotechnology industry is one that is knowledge-based and dominated by new small firms that have close ties with university-based scientists (Corolleur, Carrere, & Mangematin, 2004). The entrepreneurial nature of university-based scientists and the knowledge-intensive nature of biotechnology firms represent an area for fertile theoretical and practical development. Knowledge transfer between universities and firms occurs when university-based scientists found a firm with the explicit goal of commercialising intellectual property (IP) created in their university lab. These scientist entrepreneurs drive the transformation of scientific knowledge into commercial applications and have been described as being a key factor in the development of the biotechnology industry (Audretsch & Stephan, 1996). It is now understood that basic scientific ideas for commercialisation are of critical importance for the founding and on-going development of the firm (Kenney, 1986; McMillan, Narin, & Deeds, 2000).

The literature on scientific entrepreneurs or founders has mostly centred on a macro perspective that emphasises the economic or institutional environments (Autant-Bernard,
Massard, & Mangematin, 2002; Cohen, Nelson, & Walsh, 2002; Colyvas, Crow, Gelijns, Mazzoleni, Nelson, Rosenberg, & Sampat, 2002; Corolleur et al., 2004). Nelsen (2005) for example, stressed the importance of governmental funding, legal and business infrastructure, and the community in promoting the advent and growth of a biotechnology cluster. However, in investigating the role of biotech founders in the building of their firms, the majority of these studies have often centred on the human capital or social capital of their founders (Murray, 2004; Pisano et al., 1988; Stuart et al., 1999; Zucker, Darby, & Armstrong, 1998a), scientific collaborations (Oliver, 2004; Oliver & Liebeskind, 2003), strategic alliances (Calabrese et al., 2000; Fiol, 1990), and founders’ networks (Jardine, 1999; Kohler, 1976; Lenoir, 1995; Merton, 1957). The above studies demonstrate the crucial importance of relationships, alliances and networks in the activities of the biotechnology firm. However, insights into the organisation, scientific productivity and competitiveness remain “largely unexamined” (Murray, 2004, p. 644).

This paucity of theoretical and empirical investigation provides an opportunity to investigate the bio-entrepreneur’s organisation building process. While the specifics of the bio-entrepreneur’s activities and contributions are yet to be unravelled, the entrepreneurship literature provides some compelling insight into this issue. Several authors agree that the organising process includes information processing and cognitions to guide entrepreneurial and organisation building activities (Aldrich & Von Glinow, 1992; Arrow, 1974; Harper, 1996; Katz, Aldrich, & Welbourne, 2000; Klepper, 2001). Aldrich (1999) commented that prior information may influence the approaches to building their new ventures and thus, some approaches may be better than others in their successful exploitation of the opportunity. Azoulay and Shane (2001) found empirical support for this assessment. Recent findings suggest that past experiences or knowledge of founders were often used to better organise their firms (Baron, Burton, & Hannan, 1999a; Cooper, Dunkelberg, & Woo, 1990; Hannan, Burton, & Baron, 1996)\(^6\). This suggests the role of founder’s cognitions in the organising process. The idea that founders may utilise their previous knowledge and understanding of the environment may have very important implications for the contributions that bio-entrepreneurs have on their firms. Founders are of great importance, not only for the identification of opportunities (Kirzner, 1979), or the exploitation of these opportunities for profit

\(^6\) These studies will be discussed in greater detail in Chapter Two.
(Venkataraman, 1997), but also because they are the organisation builders. The decision to start a company not only starts with identifying an opportunity but also on the organisation building activities that recombine and utilise the resources at the entrepreneur’s disposal.

Applying this perspective to biotechnology founders, the literature suggests that bio-entrepreneur’s organising process is predicated on key cognitive functions and decision-making (Burton, 2001; Crane, 1965), particularly with regard to the key resource for knowledge firms, people. The application of entrepreneurship theories to the organisation building activities of founders would benefit from understanding the resource requirements of bio-entrepreneurs. A key requirement of biotechnology firms, and one of fundamental importance for founders commercialising their science, is to identify potential employees or workers for the new start-up firm. The majority of biotechnology firms are founded by scientists and this represents a unique population of highly qualified human capital (Bullock & Dibner, 1995). However, much remains to be done in order to elucidate the unique requirements and employment demands in the biotechnology industry. The area of employment systems in the biotechnology industry is both strategically important and largely unresearched.

Management of biotechnology needs to become as leading edge as its science if it is to attract and retain the best people in the industry. This will mean management being seen as an investment in the same way as the science and not just a cost centre. And unless the skills of this touchy, feely, icky stuff called ‘management’ are improved, then biotechnology companies will continue to make-do with an unsatisfactory level and calibre of staff (Larbey, 2002, p. 303).

It would appear that knowledge, expertise and technology are not the only required resources, the building and organisation of founders’ laboratories and staffing are challenges in maintaining a viable new firm in the biotechnology area. The importance of organising people and building the employment system is central to the success of science-based or knowledge intensive firms (Alvesson, 2000; Robertson & O'Malley Hammersley, 2000). The organisation of work and employees in a biotechnology firm become important. However, the literature on employment systems (and specifically the human resource management (HRM) literature) in new ventures is sparse despite calls for more empirical studies (Baron, 2003).
Cardon and Stevens (2004) suggest that “human resource (HR) decisions made early in a venture’s creation process profoundly impact downstream success of businesses…our scholarship concerning human issues in entrepreneurial ventures include a more careful and comprehensive understanding of the evolving and dynamic nature of HR management in small and emerging enterprises” (p.320). This is supported by empirical studies on the impact of early decisions around the employment system (Baron et al., 1999a; Baron, Hannan, & Burton, 1999b, 1999c, 2001; Baron, Hannan, Hsu, & Kocak, 2002; Burton, 2001; Hannan et al., 1996). Given the importance of building the employment system and the crucial role of founders as organisation builders and decision makers, this thesis examines the organisation building activities of bio-entrepreneurs around the employment system of emergent biotechnology firms. The research question of this thesis examines whether biotechnology founders have distinct mental models of employment systems and the influence of these mental models on the employment system of their firms.

This study will extend the literature on the emergence of the employment system (Baron, Burton, & Hannan, 1996; Fligstein & Byrkjeflot, 1996; Marsden, 1999), the institutional and organisational conditions and impacts on the employment system (Aldrich, 1990; Aldrich & Wiedenmayer, 1993; Bull & Willard, 1993; Freeman, 1986; Gartner, 1988; Romanelli, 1989, 1991), and the founder’s cognitions (Mitchell, Busenitz, Lant, McDougall, Morse, & Brock Smith, 2004), and their organisation building activities (Baron et al., 1999b). The preceding sections highlight the important contexts of the biotechnology industry and examined the important role of founders and their cognitions in the organising process. It is argued that our knowledge of founders’ (and especially bio-entrepreneurs’) organisation activities and choices are still limited. This potentially rich area for investigation is particularly incomplete with regards to the understanding of how bio-entrepreneurs organise and manage the important knowledge assets of the organisation: the human capital of their firms. The entrepreneurial cognition perspective offers a valuable insight into the founder’s choice and decision around the employment system. It forms the bridge between understanding founder’s understanding of the organising process (in this case, of the employment system) and their activities (building the employment system). The next chapter will explore the extant literature on founders’ cognitions and their employment system building.
SUMMARY AND CONCLUSION

This chapter provides an introduction to biotechnology firms and highlights the fundamental role that founders of biotechnology firms or bio-entrepreneurs have on the development of their firms. Biotechnology start-ups are formed by individuals who originally come from research institutions such as universities and public laboratories or from industrial firms (Mahar & Coddington, 1965). This has led to a focus on bio-entrepreneurs or founders of biotechnology SMEs/DBFs and how they form organisations. Currently, the literature on the role of these bio-entrepreneurs is very limited. While many economic and organisational analyses of SMEs/DBFs have articulated a theoretical role for entrepreneurs and founders in the biotechnology industry, there is no extant theory on how founders form companies in the biotechnology industry. While some work has been done examining the human and social capital of founders (Murray, 2004), how these founders manage the organisation building process and build the employment system which captures and organises the human and social capital for their firms is an area that will be explored further in the ensuing chapters. I adopt a cognitive perspective to understand the ways in which founders view and understand their environments, to understand founders’ organisation building efforts. The thesis sets out to answer the question: Do biotechnology founders have distinct mental models of employment systems and what is the influence of these mental models on the employment system of their firms?

AN OVERVIEW OF THE REMAINING CHAPTERS

Chapter Two focuses on the multi-disciplinary nature of the employment system and how founders are able to conceptualise their employment system building efforts. This chapter also examines the concept of cognition in the building of employment systems by founders and establishes some of the major contributions from the field of management and organisational cognition. It provides an overview of the important and unresolved issues within the literature as well as justifying the use of a cognitive approach in founder’s organisation building efforts. A number of epistemological, theoretical and methodological concerns within the field will be addressed.
Chapter Three summarises the aims and objectives of the current study. The case studies from which the data was collected are introduced and an explanation of how data were analysed and interpreted will be offered. In addition, methodological concerns within the field of cognition are explored and the emergent methodology for data collection is discussed.

Chapters Four, Five and Six describe, in detail, the three case studies separately and explore the key findings arising from the research in each organisation. For each of these organisations, the founder’s mental model of the employment system is examined, with data from case study evidence, in order to understand the complexity of organisation building in each organisation. The results are presented for each case study. These chapters also analyse the employment system mental models that case company founders hold. It contrasts the results of the research with the literature and suggests a cognitive framework for the content and process of founders’ cognitions of the employment system.

Chapter Seven undertakes cross case analysis to examine the similarities and differences in data and what this means to the organisations. In particular, it presents the results of the comparative causal mapping as well as the case study evidence across the case studies.

Chapter Eight analyses the implications of the study for the conceptualisation of the employment system, and the organisation building efforts of the founders. It proposes the dynamics and processes of organisation building from the founders’ cognitive viewpoint and theorises about the implications for organisation building for the organisation and industry. This chapter also discusses the theoretical and practical implications for research, including the limitations of the research, as well as suggesting ideas for future research.
CHAPTER TWO

Employment System Mental Models

In starting a company, entrepreneurs pursue courses of action that, intentionally or unintentionally, embody different assumptions about the nature of work, the nature of people, the appropriate bases for attaching people to organisations, and the best methods for controlling and coordinating work (Burton, 2001, p.13)

INTRODUCTION

There is a consensus that early employment related choices are important in the development and subsequent viability of the firm. Empirical evidence exists to suggest that decisions about employment and the organisation of work are related to the viability of firms (Boeker, 1988; Cooper, Gimena-Gascon, & Woo, 1994; Eisenhardt & Schoonhoven, 1990; MacMillan, Siegel, & Subba Narasimha, 1985; Stinchcombe, 1965; Swaminathan, 1996). This is particularly true for the biotechnology industry as founders need to create an employment system that will function as an organisational mechanism to combine the capabilities of scientists within and outside the boundaries of the firm; and to manage the selection of scientific ideas to produce valuable technical innovations (Gittelman & Kogut, 2003). The importance of the employment system and how founders create these features of the organisation is tied up with the literature on the emergence and evolution of organisations at founding. Ideas from this stream of research lend a perspective that elucidates the importance of early employment decisions in organisation building and the consequent evolution of the firm.

Yet despite consensus that these early employment-related choices are important, there has been little systematic research on the factors that influence founders’ decisions. Instead, most research on how founders launch new ventures has emphasised the entrepreneurs’ strategies for products, markets, technology, operations and finance (Burton, 2001, p. 13)

From this premise, Burton (2001) asserts that a focus on founders and the employment system requires further attention. However, work has begun on understanding the dynamics of these decisions in the literature. If we were to examine the literature on organisational founding, we would find a research stream that examines the impact of initial conditions at the time of founding on the subsequent evolution of the organisation
It would appear that conditions at the time of founding often have lasting consequences for the characteristics of the organisation. Such research and scholarship on the effects of early decision making on the organisation has given rise to many concepts of path dependency and historical importance (Boeker, 1988; Romanelli, 1993; Tucker, Singh, & Meinhard, 1990). The notion of “imprinting” that illustrates the lasting impact of founding conditions on the structure and form of the organisation in later years is also one that is important (Mueller, 1997). Scholars have suggested that, wittingly or unwittingly, the developmental path of a nascent organisation is indelibly imprinted by a variety of forces including those acting on the founders’ choices (Hannan & Freeman, 1977, 1984). The study of start-up organisations is an important area for research and study as it has lasting impacts the development and performance of firms (Romanelli, 1993).

The emphasis on founding conditions and its impact on subsequent organisational forms has sparked interest in theoretical and empirical research on organisation building particularly at the time of founding. In short, early decisions by founders about the organisation may have a significant impact on subsequent outcomes for the organisation including strategy (Boeker, 1989; Romanelli, 1993), structure (Baron et al., 1999a; Baron et al., 1999b; Hannan & Freeman, 1984; Kimberly, 1975), and organisational change (Tucker et al., 1990). Understanding the role of founders in organisation building is imperative and has emerged as a key area for entrepreneurship research (Schoonhoven & Romanelli, 2001b). With this theoretical focus, it is crucial to understand how founders organise work and the employment system in the organisations they have founded. Burton (2001) suggest that employment systems are not only an important feature of organisations, but in many cases represent the essence of the organisations.

Aside from these key theoretical themes on the importance of studying start-ups and the emergence and evolution of their organisational structures, the literature on entrepreneurship should encourage a focus on the founder and their organisation building efforts as the focus of study. Not only is this an important imperative that is beginning to

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7 It is important to acknowledge the research stream on founding conditions that have sparked this interest in start-ups and the factors that impact on the organisation. However, the focus of this thesis is on the founders and their organisation building efforts and thus, an in-depth literature review on founding conditions is beyond the scope of the thesis. However, the study of employment system mental models do trace their impetus from this line of research (Burton, 1995). Interested readers are also directed to works by Boeker (1988), Hannan (1996), and Aldrich (1999) as a starting point for the key arguments.
be addressed in the literature, but in order to understand how founders in the biotechnology industry build organisations, it is important to understand the founders themselves. Studies into the new venture or organisation building literature have looked at various aspects of the organisation rather than specifically at the founder. The literature from sociology for example, has focused on founders or entrepreneurs ‘cultural’ environments and societies in order to explicate social norms and societies in legitimising individual and collective activities (Geertz, 1963; Waldinger, Aldrich, Ward, & et al, 1990; Weber, 1958). The theories from economics focus on the structures of competition and resources among firms and populations in order to determine the rates of founding and forces for economic activity in these populations (Schumpeter, 1934, 1950). Organisational theorists on the other hand, have highlighted various approaches to the development of organisations that draw on institutional and environmental factors (Astley, 1985; Barnett & Carroll, 1987; Baum & Singh, 1994; Tushman & Anderson, 1986). While this is a simplified description of each research stream and more often than not, these theoretical perspectives overlap, the focus on new ventures and entrepreneurship signifies an approach to entrepreneurship that specifies its analysis on the firm rather than the individual founder or entrepreneur. As Sarasvathy (2004) points out,

Almost all prevalent economic theories of entrepreneurship are theories of the firm. Either they try to explain entrepreneurship as the existence and survival of firms, or as firm performance in one way or another. And with rare exceptions, their explanations tend to be couched in terms of market forces, industry dynamics, or population ecology. Even the prolific literature focusing on the psychological traits of the entrepreneur tries to relate entrepreneur variables (attributes, behaviour, cognition, and so on) to the existence, survival, and performance of firms rather than to the achievement of the entrepreneurs’ individual aspirations and performance goals. Ten years later, Baumol’s words still ring true- The Prince of Denmark is largely absent from Hamlet…and our scholarship continues with him as a bit player at best (p. 520).

However, while these theories of entrepreneurship and organisation building offer some insight into the variables that affect new ventures and organisational founding\(^8\), there

\(^{8}\) For example, Romanelli & Schoonhoven (2001) dissect the growth and origins of new organisations using its local context as a source of influence for the organisation. The formation of an idea for a new venture proceeds not only from the internal capabilities of the firm but also from knowledge about local markets and competitive conditions for new products and services. They explore the local character of the organisational creation process and develop a theory of the local origins of entrepreneurial activity. This idea is carried by others who suggest that opportunities and resources for building new organisations arise
needs to be more research that explicates the role of founders and their specific activities in organisation and action. One promising approach that may provide further erudition on how founders build organisations is the cognitive perspective.

**COGNITIVE PSYCHOLOGY AND ENTREPRENEURSHIP: POINTS OF CONVERGENCE**

The cognitive perspective emphasizes the fact that everything we think, say, or do is influenced by mental processes—the cognitive mechanisms through which we acquire, store, transform and use information (Baron, 2004a, p. 221).

In the field of entrepreneurship, Baron (2004a) argues that the cognitive perspective may provide important insights into the field of entrepreneurship,

Given the scope and magnitude of the benefits conferred by the cognitive perspective in other fields, it seems reasonable to suggest that it might provide similar benefits for entrepreneurship. This may be true for several reasons. First...the entrepreneurial process is initiated and implemented by individuals (or teams of individuals); in other words, it springs, ultimately, from human volition and human action. For this reason, a perspective that sheds new light on key aspects of human behaviour (e.g., decision making, problem solving, the self-regulation of behaviour) can contribute substantially to our understanding of the process through which entrepreneurs recognise and develop new opportunities (Baron, 2004b, p. 169).

The call to apply cognitive theory to the study of entrepreneurship and new venture creation is a relatively recent development. However, similar to the Management and Organisation Cognition (MOC) literature, cognitive approaches or concepts to the application of entrepreneurship have always been assumed in the literature. For example, in the early part of the last century, Knight (1921) observed that entrepreneurship was associated with perceptions of risk and uncertainty. Schumpeter’s (1950) classic book on predominantly from the local environments of the individual’s work and professional activity (Aldrich & Wiedenmayer, 1993; Freeman et al., 1982; Romaneli, 1989a). They suggest that this idea integrates the approaches of the broad entrepreneurial environments, which ignore the entrepreneur as an important agent of the process and the theories about entrepreneurial personality, which ignore the environment. It suggests the importance of understanding the local context in the development of employment systems. More importantly, it identifies a way in which we can wed the broad findings of population level research in the entrepreneurial activities of the founder and the organisations they build.

Rather than offer an exhaustive review of the cognitive literature per se (see Baars, 1986; Bechtel, Abrahamson, & G, 1998; Blumenthal, 1970; Bruner, 1983; Chomsky, 1968; Collins, 1977; Corsi, 1991; Crevier, 1993; Finger, 1994; Gardner, 1985; Garner, 1988) or work in psychology relevant to entrepreneurship (see Baron, 1998, 2004a, 2004b; Forbes, 1999; Mitchell, Busenitz, Lant, McDougall, Morse, & Smith, 2002), this review will emphasise tensions and affinities between recent cognitive research and work with the aim of bringing the former into the service of the latter.
“Capitalism, Socialism and Democracy” discussed entrepreneurs as individuals who overestimated their own chances of success. Other examples of early work examining entrepreneurial activity from a cognitive perspective include works by famed Austrian theorist, Kirzner (1979) who looked at alertness to opportunity as an explanatory mechanism for the uniqueness of entrepreneurship. These early works strongly suggest that cognitive factors such as perception and interpretation play a role in the organisational creation process. Historically, the development of the cognitive approach to the study of entrepreneurship has been traced to the developments of the MOC literature\textsuperscript{10} that focus on the entrepreneur as largely critical to the success of the new venture (Hall & Hofer, 1993; Herron, 1990; Sandberg, 1986; Shane & Venkataraman, 2000; Stuart & Abetti, 1990). Mitchell (2002) discusses that the failure of entrepreneurial personality research (also known as the trait approach) in the 1980’s and 1990’s (Brockhaus & Horwitz, 1986; Sexton & Bowman-Upton, 1991; Shaver, 1995) required that a new approach be made in understanding entrepreneur’s contribution to the venture creation process.

The fundamental idea that entrepreneurs are members of a homogenous group that is somehow unique has not gone away. Entrepreneurs themselves, writers in the popular press, as well as those who have worked with entrepreneurs, persistently ignore the recent findings that disconfirm the trait approach and continue to openly assume and act upon the idea that there exists entrepreneurial uniqueness among individuals. And in our observation, until the cognition view emerged, it was somewhat ironic that entrepreneurship researchers could not clearly identify systematic (theoretical) reasons for the uniqueness of entrepreneurs, while those who were immersed in the entrepreneurship world knew that these people were somehow unique (Mitchell et al., 2002, p. 95).

The cognitive approach to entrepreneurship offers some insights into how entrepreneurs think and why they take certain actions. Drawing on the MOC and cognitive literature provides a framework that is theoretically rigorous and testable (Forbes, 1999; Huff, 1997; Mitchell et al., 2002). The developments in these fields of research may offer the potential to improve understanding of the cognitive aspects of venture creation. The cognitive approach lends itself easily to the theory and research of entrepreneurship.

\textsuperscript{10} In 1991, the US Academy of Management established an interest group in Managerial and Organisational cognition (MOC) in recognition of the role of cognition in managerial discourse. This reflected a growth of interest of scholarly activity and subsequent theorising into the appropriateness of the area as a distinct and necessary field. Researchers under this umbrella concerned themselves with the way in which managers and other organisational actors construct aspects of their life at work, develop theories of knowledge and represent such knowledge (Hodgkinson & Sparrow, 2002).
Recent work from the cognitive literature provides resources that allow a clarification of cognitive presuppositions behind theories of entrepreneurship and identify fundamental concepts and units of analysis that inform on these theories\(^{11}\).

A number of researchers have appreciated the potential of a cognitive perspectives for the study of entrepreneurship (Baron, 2004b; Forbes, 1999; Mitchell et al., 2002), anticipating the impact of cognitive research (Schoonhoven & Romanelli, 2001b; Shane, 2000; Shook, Priem, & McGee, 2003). For the most part, however, entrepreneurship researchers are only just beginning to build on the relevant work by cognitive psychologists, social psychologists, and public-opinion researchers in the field. As the scholarship for entrepreneurship and organisation building grew, the field sought more sophistication and complexity of theories. As pointed out earlier, the failure of the trait approach in studying entrepreneurs not only signalled a search for a more sophisticated and complex view for the individual analysis of entrepreneurs, but also a rallying point for a more integrative view of entrepreneurship that incorporates the contexts and economic and social change (Schoonhoven & Romanelli, 2001b). Researchers who write about the ways that entrepreneurs build organisations necessarily make assumptions about cognitive processes.

Such assumptions, while metatheoretical to sociologists, are keenly empirical from the standpoint of cognitive psychology. It is crucial, then, to evaluate our assumptions (or adjudicate differences among them) by microtranslating presuppositions (Collins 1981) to the cognitive level and assessing their consistency with results of empirical research on cognition (DiMaggio, 1997, p. 265).

Powerful cognitive assumptions in the founder’s mental model literature include: that founders rely on a mental model to build the employment system in their organisation (Burton, 2001); that information about opportunities and resources for building new organisations are predominantly in the local environment of individual’s work, and professional activity (Aldrich & Wiedenmayer, 1993); or that entrepreneurs have the capability to generate cognitive and institutional change (Rao, 1994). The multidisciplinary nature of entrepreneurship requires an integrative approach to examine these

\(^{11}\)Readers are directed to reviews on entrepreneurial cognition by Forbes (1999), Mitchell et al (2002) and Baron (2004a) for an overview of the scope of research under the rubric of entrepreneurial cognition.
assumptions on how founders build organisations\textsuperscript{12}. Selecting the appropriate framework to study cognitions among the multitude of theories and methods available can be an arduous task. However, it is imperative to make clear the “cognitive presuppositions” behind the theory of organisation building and elucidate the fundamental concepts of the cognitive approach in order to advance the field.

**FOUNDERS’ ORGANISATION BUILDING: BLUEPRINTS AND MODELS**

Entrepreneurs are the designers of organisations (Sarasvathy, 2004). As discussed earlier, bio-entrepreneurs in particular, are the key agents in forming the organisations within the biotechnology industry. These founders are key to the design and formation of important aspects of new venture creation (Burton, 2001; Eisenhardt & Schoonhoven, 1990; Harris & Ogbonna, 1999; Martin, Sitkin, & Boehm, 1985; Ogbonna & Harris, 2001). Sarasvathy (2004) for example, envisions the creation of the firm as a problem of design which can be approached through a cognitive framework. From a cognitive perspective, it is understood that founders approach organisation building with an idea or plan (Forbes, 1999). Although the nature and form of these organisational plans or blueprints differ in the conceptual literature, studies of cognition have uncovered approaches to organisation building that emphasise cognitive blueprints or models (Burton, 2001; Hill & Levenhagen, 1995). The idea of an organisational blueprint or mental model is not, in itself, a new concept. Guillen (1994) has emphasised the importance of normative or cultural blueprints in shaping organisation building and the organisation’s subsequent evolution. Organisations draw on culturally appropriate templates and conceptions of control in crafting structures, work roles, and employment relations because they enhance organisational legitimacy. This perspective of normative or cultural forces is emphasised by Fligstein and Byrkjeflot (1996) who theorise about the role of these normative understandings of control in which actors try to create stable worlds and find social solutions to their environments. An extension of this concept supports the notion of organisational inertia as organisations follow their own path to legitimacy based on their own prior socialisation and enculturation that is idiosyncratic to an organisation’s

\textsuperscript{12} A number of articles and books looks at the historical context (see Baars, 1986; Bechtel et al., 1998; Blumenthal, 1970; Bruner, 1983; Chomsky, 1968; Collins, 1977; Corsi, 1991; Crevier, 1993; Finger, 1994; Gardner, 1985; Garner, 1988).
environment and unique history (Fligstein, 1987, 1990). As such, cognitive concepts such as organisational blueprints and mental models are useful in describing founders’ beliefs or understanding of the world.

The entrepreneurial cognition literature reveals an abundance of studies that have looked at the mental representations used by entrepreneurs to guide their organisation building activities and efforts (Forbes, 1999). At the theoretical level, most studies have examined the role of these blueprints, beliefs and models in the creation of new ventures under conditions of high uncertainty and ambiguity (Busenitz & Barney, 1997; Knight, 1921; Stone & Brush, 1996), or focusing on the entrepreneurs decision making and thinking (Gartner, 1988; Gartner, Shaver, Gatewood, & Katz, 1994). For example, Busenitz and Barney (1996) theorised that individual cognitions are important to the entrepreneur. They posit that cognitions often precede entrepreneurial intent and that entrepreneurs have unique schemas regarding venture creation. Entrepreneurs make greater use of biases and heuristics, which allow for quicker information processing; cultural values, socio-economic factors and personal variables influence these cognitions. These heuristics and biases are based on schemas that emphasise opportunity and controllability. Shane (2000), in his study of technology-oriented new ventures, found that individuals prior knowledge about a market influences his or her choice of markets in which to exploit new technologies. Hill and Levenhagen (1995) focused on the use of metaphors and mental models by entrepreneurs. They argued that metaphors and models are often an effective way for entrepreneurs to capture those elements of the environment that they do not understand and to retain the flexibility to interpret those that they do know. It seems that the use of these metaphors and mental models speaks for the engagement of sense making and sense giving.

In a review of the entrepreneurial cognition literature, Forbes (1999) concluded that,

Research suggests that mental models play a critical role in enabling entrepreneurs to structure behaviours in their organizations. For example, entrepreneurs use metaphors to convey ideas that they have difficulty expressing and use organizational milestones, such as the first month of positive cash flow,

13 Others have suggested a role for cognition in how work is organised and managed including the importance of the cultural and historical expectations (Barley & Kunda, 1992; DiMaggio, 1997; Fligstein, 1990; Guillen, 1994; Karpik, 1978).
as ways of bracketing time and lending structure to the ambiguous process of new venture creation (p. 427).

While cautioning that more empirical research is needed to explain how these processes take place, Forbes’ (1999) review of the entrepreneurial cognition area illustrates the general growth of the cognitive approach to new venture creation\textsuperscript{14}. Much of the work in describing entrepreneurial cognition focuses on examining how entrepreneurs view the world or process information in the venture creation process (Baron, 2004a; Forbes, 1999). This perspective underscores the importance of knowledge structures or mental models in organisation building. Baron (2004a) believes that cognitive research such as “prototype models of object or pattern recognition” and “schemas” may inform key concepts in the entrepreneurial literature such as opportunity recognition and alertness to opportunity\textsuperscript{15}.

While many studies have explored the knowledge structures that entrepreneurs or founders have in new venture creation, research at the organisational level have also alluded to these cognitive knowledge structures. For example, Burton (2001) builds a framework for founders’ organisation building (particularly of the employment systems) by suggesting that founders, whether intentionally or not, approach organisation building with specific organisational blueprints or mental models for employment and employment relations. These mental models have significant impact on the organisations that emerge within industries. Rindova and Fombrun (2001) suggest that it is this shared knowledge and understanding in the form of product knowledge and organisational identity that actively construct the industry. A raft of other research has also suggested mental models for understandings, knowledge and thinking around entrepreneurial activity (Miner, Eesley, Devaughn, & Rura-Polley, 2001; Suchman, Steward, & Westfall, 2001;  

\textsuperscript{14} The majority of the research that Forbes (1999) reviews is concerned with the cognitive antecedents of organisation building and new venture creation. His review organises the literature according to an information processing perspective around entrepreneurial activities such as the stages of venture development (e.g., pre-founding, founding and post-founding stages). Forbes (1999) is a comprehensive early review of the entrepreneurial cognition literature.  

\textsuperscript{15} Prototype models of object and pattern recognition suggest that humans construct “prototypes” representing categories or sets of objects or patterns. These prototypes comprise our basic ideas of what a specific object or pattern is like, including its nature. They are mental abstractions that are broad enough to encapsulate categories of objects and exclude those that do not match these prototypes (Solso, 1999). Gaglio and Katz (2001) have drawn on the schema literature from cognitive sciences to show that alertness to opportunity may be mediated by the mental framework (or schema) that they have.
Swaminathan & Wade, 2001). The nature and form of these mental models have prompted Mitchell et al (2002) to ask,

What has yet to be done? Certainly…the boundary issues must be clarified. In addition…we have noted that the newness of the ideas and concepts being transferred into the domain of entrepreneurship has highlighted the need for broader consensus among entrepreneurship researchers on the elements of theory that are germane (constructs, variables, and relationships), and on the methods that are acceptable (samples, measures, and analysis techniques) (p. 100).

MENTAL MODELS IN THE COGNITIVE LITERATURE

Given the scope and nature of the cognitive sciences, employing a definition for mental models is complicated and far from straightforward. Hodgkinson (2002) observed that given the cross-disciplinary nature of cognition, there is a problem of simplifying and agreeing upon a common language. Correspondingly, Meindl, Stubbart, & Porac (1994) noticed that over a short time period, the cognitive literature (and in particular, the MOC literature) employed a rich diversity of complex terms, each highly similar on the surface but which actually may have very different connotations within the respective fields from which they have ultimately originated. This is an issue that impacts on our conceptualisation of an appropriate framework for understanding mental models. The majority of terms used in the cognitive literature, mental models included, can be categorised under the designation of “knowledge structures”. As Walsh (1995) points out, “knowledge structures” found its way into modern psychology from clinical neurology (Head, 1920; Oldfield & Zangwill, 1942; Woodworth, 1938). At its heart, the study of cognitions developed out of a need to understand how human beings think and how this in turn affects all aspects of the human endeavour. Table 2.1, from Hodgkinson (2002), demonstrates the diverse variety of constructs used to describe knowledge structures.

The variety of concepts used to describe knowledge structures in the cognitive literature adds to the difficulty of assessing consistent definitions for the field. In fact two leading cognitive researchers in the MOC field propose that these terms can be used interchangeably (Hodgkinson & Sparrow, 2002).
Arguably, they are sufficiently similar in meaning to justify this general usage...we use the terms ‘schemata, ‘cognitive maps’ and ‘mental models’ synonymously, to capture the overarching idea that individuals internalise their knowledge and understanding of organisational life in the form of a simplified representation of reality. In so doing, however, we must be mindful of the fact that these terms were originally developed for differing purposes by researchers pursuing a variety of problems in cognitive psychology, albeit sharing a common, general focus: the question of mental representation (Hodgkinson & Sparrow, 2002, p. 22).

Table 2.1. Constructs illustrating the Diversity of Concepts employed to capture Knowledge Structures in Cognitively-oriented Management Theory

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Source: Hodgkinson (2002)

While this may seem suitable at a general level of understanding, at a theoretical level, the diverse terms indicate a lack of precision and theoretical development regarding core constructs that would eventually require clarification (DiMaggio, 1997; Walsh, 1995)

While many readers might consider this diverse language an indication of imprecise thinking in the field, it suggests the early excitement generated when a host of researchers begin to discover a useful theoretical paradigm. It also suggests that the time is right to develop an agreed upon common theoretical language, consolidate what we have learned in our investigations to date, and conduct our continuing research activity with a full awareness of the established conceptual terrain (Walsh, 1995, p. 284).
Walsh (1995) illustrates a good starting point for developing a theory of employment system mental models. Informed from a variety of perspectives, cognitions have been studied from a philosophical grounding that informs us about the nature of reality right through to the rigours of scientific inquiry that attempts to build a biological connectionist understanding of the human mind. As with many multi-disciplinary subjects, framing the epistemological and ontological perspectives of the concept are paramount to understanding the area (Porac, Meindl, & Stubbart, 1996). Psychologists have approached the study of knowledge structures by looking at how information is acquired, stored, and retrieved from their memory (Lord & Maher, 1991). This simple premise reflects a theory driven information processing perspective (Walsh, 1995)\textsuperscript{16}. Cognitive scientists have used an information-processing model of performance in order to understand the complex mental processes performed by the brain in response to environment stimuli. Within the cognitive literature, there exist a variety of perspectives for how people navigate through their environments. The cognitive literature can be divided into several broad epistemological perspectives that give rise to the diversity of definitions for the mental model concept\textsuperscript{17}. It is through the examination of the literature that we may locate a useful approach in understanding mental models for this research.

Mental models as knowledge structures have been looked at in several ways. The use of the term mental models can be traced to Craik (1943) who suggested that people construct ‘small scale models’ of reality that are used to anticipate events and to reason,

\begin{quote}
By a model we thus mean any physical or chemical system which has a similar relation-structure to that of the processes it imitates. By 'relation-structure' I do not mean some obscure physical entity which attends the model, but the fact that it is a physical working model which works in the same way as the processes it parallels, in the aspects under consideration at any moment (p. 51).
\end{quote}

\textsuperscript{16} The notion of theory driven information processing comes from work on how information is processed. In cognitive psychology, information processing is thought to include top down and bottom up processing. Cognitive psychologists employ the term “top-down processing” to denote cognitive activities that are stored in long-term memory and that reduce the cognitive activity required to process an individual’s responses to the environment or stimuli. Actions that worked in the past are applied to the present so as to free up mental capacity (Hodgkinson & Sparrow, 2002). “Bottom-up processing” in contrast is often applied to novel or new situations in which stimuli influences actor’s cognitions and actions directly without reference to past memories. It is without doubt that in most cases, both types of cognitive activity are used in many situations (Walsh, 1995). However, Louis and Sutton (1991) theorise that top-down processes may be dominant in most situation.

\textsuperscript{17} A good theoretical foundation for the historical and epistemological development in the cognitive sciences can be found in Simon and Kaplan (1989) and Gardner (1985).
This idea illustrates a model for thinking that internalises models of the world and translates the resulting symbols back into actions or recognises a correspondence between them and external events. This conceptualisation of mental models is as a dynamic representation or simulation of the world. However, Craik’s (1943) conceptualisation had little to say about the form of such representations or about the processes that manipulate them. This led to many cognitive scientists following Craik to adopt the basic tenet that the mind is a symbolic system (Gentner & Stevens, 1983; Johnson-Laird, 1983; Newell & Simon, 1972). From the 1980’s there has been an enormous growth in studies of mental models. The theory of mental models describes mental models as an output of perceptual processes that can represent spatial relations (Glasgow, 1994), events and processes (Hegarty, 1992) and even complex systems (Moray, 1999). As can be seen from the examples of the uses of mental model theory above, these studies are extraordinarily diverse. However, there is little in common beyond the bare appeal to symbolic representations of some sort. The term “mental model” is also one of the least well-defined in cognitive research. These difficulties reflect the broad perspectives and approaches used in the cognitive literature as suggested above. Moreover, mental phenomena have always been difficult to capture and operationalise in any accurate way. Mental models have been used in a variety of contexts with the result being a ‘plethora of senses’ that is confusing, “and indeed, confused” (Moray, 1997, 1999; Rutherford & Wilson, 1991; Wilson & Rutherford, 1989). Rickheit and Sichelschmidt (1999) suggest that the mental model notion has been used “under various labels and diverse respects” (p. 9). By this, they meant that the mental model concept has been used to describe symbolic systems in the cognitive literature (for example, Gentner & Stevens, 1983; Johnson-Laird, 1983; Newell & Simon, 1972) to metaphors for the representation of knowledge (for example, Hutchins, 1983; Klimoski & Mohammed, 1994).

Several authors have attempted to categorise the use of mental models into a conceptual framework (Gentner & Stevens, 1983; Johnson-Laird, 1989; Rickheit & Sichelschmidt, 1999). Johnson-Laird (1989), and Rouse and Morris (1986) refer to mental models as hypothetical constructs that serve to explain and predict behaviours of a system by

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18 There are other researchers who have attempted to elucidate the mental model construct from a host of other disciplines (Moray, 1999; Resnick, Levine, & Teasley, 1991; Rutherford & Wilson, 1991; Wilson & Rutherford, 1989). However, the works by these authors represent the seminal and leading work and will be focused on here.
representing its relevant components and the relations between them in a symbolic way. In this way, the mental model plays,

A central role in representing objects, states of affairs, sequences of events, the way the world is, and the social and psychological activities of daily life. They enable individuals to make inferences and predictions, to understand phenomena, to decide what actions to take and to control its execution, and above all to experience events by proxy; they allow language to be used to create representations comparable to those deriving from direct acquaintance with the world; and they relate words to the world by way of conception and perception (Johnson-Laird, 1983, p. 397).

This general description brings with it a broad view that has been elaborated upon by the above authors. Rickheit and Sichelschmidt (1999) proposed that mental models as having the ability:

- to generate descriptions of the purpose of a system,
- to generate descriptions of the architecture of a system,
- to provide explanations of the state of a system,
- to provide explanations of the functioning of a system, and
- to make predictions of future states of a system

From the description of the mental model by Johnson-Laird (1983) and Rickheit and Sichelschmidt (1999), it is easy to see how research in various fields has adopted the mental model as an explanatory mechanism with diverse levels of theoretical sophistication. Such descriptions bring with them a generic usage that has been adopted indiscriminately by various perspectives even within disciplines. Rickheit and Sichelschmidt (1999) in examining the perplexity of the construct admit that the nature of mental models is surprisingly ambiguous.

To date, there is no generally recognised definition of mental models. Surprisingly few explicit definitions can be found in the research literature at all. Obviously, many researchers conceive of mental models in a relatively weak fashion, taking the mental models notion as a convenient metaphor in their study of the effects of knowledge on behaviour…other researchers, however, take a much stronger approach insofar as they claim mental models to have a distinct representational format and thus to have unique representation power (p. 11).
Gentner (2002) proposes that there are two main approaches in which mental models have been used. One approach seeks to characterise the knowledge and processes that support understanding and reasoning in knowledge rich domains. Much cognitive research focuses on the way in which people understand external objects, states or, events. Reasoning (often about an external system) is thus seen as a process of manipulating an internal model. In contrast to this, the other approach focuses on mental models as working memory constructs that support logical reasoning. This approach, for example, has been used largely by manual control research to postulate that people develop representations of machinery or systems they are controlling. The mental model is assumed to be used by people as a representation of the system in question. This perspective is exemplified by Ackermann and Tauber (1990), and Wilson and Rutherford (1989) who look at computer and machine models that people have. Placing the mental model construct into these approaches is helpful because it locates some of the similarities and divergences of the mental model approach in the literature.

Definitions and conceptualisations of the mental model as working memory constructs suggest that mental models have unique representational power and format. Johnson-Laird (2001; 1989), following this approach describes the conditions under which mental models represent bodies of knowledge,

Unlike other proposed forms of representation, it does not contain variables. Rather, a mental model employs tokens to represent a set of entities while the properties of the tokens represent properties of the entities.

It can consist of tokens corresponding only to perceptible entities, in which case it may be realised as a quasi-pictorial image. Alternatively it can contain elements corresponding to abstract notions; their significance depends crucially on the procedures for manipulating models.

The structure of the model corresponds to the structure of the situation that it represents. Alternative possibilities are represented by alternative models. In addition, the model can be supplemented by propositional annotations to represent negation, implicitness, and the like.

19 The definition and discussion of mental models in this thesis will focus chiefly on the knowledge-based approach as they form the basis of the mental model approach in the MOC and entrepreneur cognition literature.
This approach to the mental model concept assumes a series of unique representations, structures, and processes that makes it a unique cognitive construct. As can be seen, the unique representational format and properties of mental models in this approach do not correspond to the approach taken in the MOC or entrepreneur cognition research literature (Austin, 2003; Boeker, 1988; Daniels, Johnson, & de Chernatony, 2002; Druskat & Pescosolido, 2002; Fiore, Salas, & Cannon-Bowers, 2001; Hill & Levenhagen, 1995; Hodgkinson & Johnson, 1994; Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000). The latter knowledge-based approach that proposes the mental model as a term to be explained is far more cogent for studies of organisations. Rickheit and Sichelschmidt (1999) categorise the notion of the mental model into their utilisation and approaches. This categorisation consists of cognitive maps of physical environments (Ferguson & Hegarty, 1994; Taylor & Tversky, 1992), naïve physics (Collins & Gentner, 1987; Hegarty & Just, 1993), model-based reasoning (Johnson-Laird, 2001; Klauer & Oberauer, 1995), cognitive linguistics (Blumenthal, 1970; McNamara, Miller, & Bransford, 1991) and, perception and knowledge (Cooper, 1989; Rumelhart, Hinton, & Williams, 1986). Integrating the study of mental models with the two approaches by Gentner (2002) provides a way in which mental model research can be encapsulated. If the categorisation of mental models is put into a continuum with the mental model as working memory constructs at one end and mental models as metaphors for understanding and reasoning at the other end, the scope and application of the concept of mental models is clear. Figure 2.1 shows the categorisation of mental model research in this way.

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20 In fact, Johnson-Laird (1983) subscribes the mental model with properties that constrain its definition and use to elements of constructivity, economy, determinacy, expandability, finiteness and computability. This has been largely taken to mean that mental model as an explanatory principle has functional and boundary conditions such as its ability and shape in its token structure (Johnson-Laird, 1983), its representational format (Fischbein, 1994), and its relations to elements as structural analogy (Gentner & Stevens, 1983).

21 A caveat is appropriate here as the mental model concept in the literature is vast, and neat categorisation of the research is not easy. Even the dichotomy of the mental model as a “knowledge based approach” and “working memory construct” may not be broad enough to encompass some of the approaches taken.
The approach suggested by Gentner (2002) is a useful way to understand the mental model concept as it explicates important assumptions. Firstly, as noted earlier, mental models as working memory constructs have special representational power and properties (Fischbein, 1994; Rickheit & Sichelschmidt, 1999). Mental models as working memory constructs have specific constraints in the way they are structured particularly of the external world (Gentner & Stevens, 1983; Johnson-Laird, 1983). Mental models as working memory constructs focus on immediate temporary working memory sketches set up for the purposes of immediate reasoning tasks such as propositional inference (Johnson-Laird, 1983). In contrast to this, mental models used in understanding and reasoning focus on the knowledge and process used in knowledge rich domains. This approach is broad in scope and application. The majority of research that fits within this approach ranges from understanding mental models of “bottom up” processing of perception (Cooper, 1989) to theories of knowledge as “top down” processing (Rumelhart et al., 1986). The categories of mental model research that emphasise the former approach are: cognitive linguistics, model based reasoning, cognitive maps of environments and naïve physics. These categories attempt to specify mental models as having special theoretical properties and processes based on working memory constructs. The latter approach is associated with the mental model research category of perception.

The “working memory” and “knowledge based” approaches to mental model are not a dichotomy. However, when placed in this continuum, these approaches reflect the level of theoretical development and sophistication for the mental model concept used in the research. While Gentner (2002) proposed the “working memory” and “knowledge based” approach, a more useful distinction for this continuum is the “working memory” at one end of the continuum and “knowledge as a metaphor” at the other end of the continuum, “knowledge based” encompasses many levels of theoretical sophistication that includes the specific structure and process of knowledge as well as a metaphorical construct for knowledge.
and knowledge. This last category fits along the diverse spectrum of the two approaches as research exploring the mental model as perceptual and knowledge constructs, which are diverse in its definitions and theoretical sophistication. Rickheit and Sichelschmidt (1999) describe the perception and knowledge category of mental models as stressing constructiveness (cognition that involves the constructions or reconstruction of the structural and functional relations that exist among external entities), functionality (cognition implies in the last resort to the establishment of some mapping relation between internal and external structures), transcendence (cognitive activity includes the integration of both the information inherent in a stimulus and the information inferred from knowledge), and goal-directedness (the main purpose and criterion of cognitive processes is the optimal integration of what is perceived with what is known). It is in this latter area. Goal-directedness, most mental models research in the entrepreneurship area fits. While this is a useful way to categorise some of the research in the organisation building literature, not all studies in the entrepreneur literature reflect Rickheit and Sichelschmidt’s (1999) qualifications.

Mental model research in the entrepreneur area that can be categorised as perception and knowledge research can further be understood by the level of theoretical development of the mental model construct. Broadly speaking, within this research category, the mental model concept has been used as a cognitive metaphor for individual level perceptions (Burton, 2001; Fligstein, 1987, 1990, 1996; Guillen, 1994) or as a cognitive mechanism for organisation building (Busenitz & Lau, 1996; Hill & Levenhagen, 1995; McGrath & MacMillan, 1992; Palich & Bagby, 1995). The former utilises the mental model simply as a metaphor for entrepreneur’s perception or thinking, while the latter focuses on the cognitive underpinnings of entrepreneurs. Within the entrepreneurship literature there is a tendency to implicitly acknowledge the cognitive processes of entrepreneurs as a valid and substantial concept without much theoretical development (Forbes, 1999; Mitchell et al., 2002). Some have defined this cognitive component as shared beliefs, ideas or meanings around the processes of organisation building (Rindova & Fombrun, 2001; Swaminathan & Wade, 2001). Schoonhoven (2001b) devotes a section to the idea of mental models in entrepreneurship in her book “The Entrepreneurship Dynamic”.

A mental model is a coherent idea, held in this case by organizational founders, about right and appropriate ways of organizing their firms. Such ideas, which
vary over entrepreneurs even in the same organizational population, develop
from prior educational and organizational work experiences, whether in
replication or explicit deviance from those experiences. Mental models also
emerge among members of an organizational population (p.391).

As suggested by Schoonhoven (2001b), the idea of mental models is abundant in the
research literature (Fligstein, 1987, 1990; Fligstein & Byrkjeflot, 1996; Ginsberg, Larsen,
& Lomi, 2001; Guillen, 1994; Miner et al., 2001; Rindova & Fombrun, 2001; Swaminathan & Wade, 2001). These analyses often come from broad economic or sociological analyses, and thus, the nature of the mental model is not articulated in a theoretically sophisticated way. This has led some to suggest that although these insights have been discussed in much of the literature, these ideas are theoretically underdeveloped and empirically untested for a variety of theoretical and methodological reasons (Baumol, 1968; Gartner, 1988). The entrepreneurship and particularly, the management and organisation cognition literatures often use the mental model as a concept to reflect shared meaning or beliefs about particular areas of the entrepreneurial or the management process. For example, mental models of organisational forms are thought to be actively disseminated and shared understandings about the appropriate ways of organising (Rindova & Fombrun, 2001; Swaminathan & Wade, 2001), or a general understanding among industry populations about the contexts for organising and aspects of entrepreneurial activity (Miner et al., 2001; Suchman et al., 2001). Schoonhoven (2001b) suggests that the mental model is the “cognitive substantiation of institutionalised understandings” (p. 392).

Research that specifically utilises the mental model as a cognitive concept for organisation building or new venture creation is rare (Hill & Levenhagen, 1995), however, much of the research in the entrepreneurial cognition area on knowledge

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23 Schoonhoven and Romanelli (2001a) use the term “mental model” as an all encompassing term to denote cognitive components in theories of organisation building and entrepreneurship in this case. As we will soon see, the use of this term is a valid description of the cognitive concepts used in the cognitive literature in the management and organisation sciences.

24 Although, technically speaking, Hill and Levenhagen’s (1995) usage falls more into the metaphor category as the mental model used in this perspective is used as an explanatory mechanism for entrepreneur’s sensemaking and sensegiving. “Metaphors and other mental models provide a means for individuals and, ultimately, organizations to create and share understanding. These mental models establish images, names and an understanding of how things fit together. They articulate what is important and unimportant” (p. 1068).
structures is identified by other constructs such as schemas and cognitive maps. The organisation building literature is far more replete with the concept of the knowledge structure than the specific concept of mental models. While some of the literature on organisation building has adopted the use of mental models as metaphors for entrepreneur’s thinking, another approach within this area has looked at entrepreneur’s organisation building focusing on the entrepreneur’s knowledge and processes. These range from the sophisticated development of cognitive concepts such as the use of schemas in opportunity recognition (Gaglio & Katz, 2001), to Hill and Levenhagen’s (1995) mental models as metaphors for sensemaking and sensegiving. These studies emphasise the role of knowledge and process in the entrepreneur’s organisation building. Some of the theoretical developments have focused on stages of the entrepreneurial process. One of the formative works looked at defining intention to create a new venture as the state of mind that directs an entrepreneur’s attention, experience, and action towards a particular business goal (Bird, 1988). Bird’s (1988) conceptual paper highlights the personal and social factors that influence entrepreneurial behaviours through the formation of entrepreneurial intentions. Busenitz and Lau (1996) offer a theoretical piece that argues that the content and process of cognition plays a role in the development of entrepreneurial intentions. These entrepreneurial intentions rely on schematic factors such as perception of success and control.

McGrath and MacMillan (1992) provided an empirical account of the role of beliefs across cultures. They surveyed entrepreneurs in nine different countries and found that entrepreneurs in culturally different countries consistently perceive that their beliefs about the nature of work, failure, and responsibility are different from those held by others in their societies. This research provided some evidence that entrepreneurs may differ to others although the exact nature of this difference remains largely unexplored (Baron, 2004a). The majority of studies examining entrepreneurs’ knowledge structures have relied on questionnaires, surveys and case studies (Forbes, 1999). However, this suggests that entrepreneurs’ cognitions particularly in terms of their content and processes

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25 This is what Hodgkinson and Sparrow (2002) have referred to as the diversity and interchangeable nature of knowledge structures.
26 Although much of the research typically focuses on the intention to create new ventures rather than on organisation building efforts themselves.
27 This review is not meant to be exhaustive but rather to show some of the empirical and theoretical approaches used in the literature. For a more comprehensive review of the entrepreneur literature please see Forbes (1999) and Baron (2004a).
28 This is an important distinction in evaluating the entrepreneur literature and efforts to build a cognitive framework. This will be discussed in greater detail in the methodology chapter.
are a fruitful area for further exploration. To that end, Jenkins and Johnson (1997) explored entrepreneurial intentions by using cause maps. They found that the cause maps elicited from entrepreneurs who had growth oriented intentions were more coherent and performance oriented than maps of entrepreneurs who did not have growth oriented intentions. Entrepreneurs who did not have growth oriented intentions tended to emphasise control and individual fulfilment. Perhaps one of the most striking examples from this research stream is that by Palich and Bagby (1995) who looked at the decision-making processes of entrepreneurs and managers using categorisation theory\textsuperscript{29}. This theory proposes that people process information by assigning new data to pre-defined mental categories. They found that entrepreneurs do not have greater risk propensity than non-entrepreneurs, however, they are far more likely to categorise equivocal situations more favourably than non-entrepreneurs. This line of research suggests that the content and processes of entrepreneurs may very likely reveal answers to the reasons and rationalities behind their activities (Baron, 2004a; Mitchell et al., 2002). This conceptualisation of mental models perhaps allows further theoretical development for the study of organisation building.

It is almost unheard of for real problems to take the form of syllogisms, however complicated. There is no opportunity in a controlled, simplified laboratory task for much “real” behaviour. In “real world” contexts people must model not just the task and its properties, variables, and dynamics, but also of the environment, and the interactions of the two, as well as their own abilities, the effects of intervention, and so on…It is also very important to remember that in almost all real situations, people work in groups and teams, not as individuals, and that the “task” and the “environment” therefore include extremely important and powerful social and organizational factors, which themselves must be mentally modelled, as must those emotional and motivational factors so often omitted from most cognitive psychology and all cognitive science (Moray, 1999, p. 227).

This approach to studying the mental models of founders when building organisations is an important development for the entrepreneurship literature. To this extent, these mental models perhaps correspond far more closely to the idea of mental models of knowledge or the world (Moray, 1999; Rouse & Morris, 1986). The philosophical basis of mental models used by founders matches those conceptualisations of knowledge representations linked to ideas of the long-term knowledge, the meaning and any relevant general

\textsuperscript{29} Their methodology consisted of questionnaire surveys of 92 entrepreneurs and non-entrepreneurs.
knowledge of the world (Craik, 1943; Moray, 1997; Rouse & Morris, 1986; Rutherford & Wilson, 1991; Wilson & Rutherford, 1989).

The above studies focusing on entrepreneur’s cognitions demonstrate the importance of knowledge and information processing. Complex environments such as those found in the process of new venture creation produce elements that demand a sophisticated level of knowledge and information processing (Sharfman & Dean, 1991). While much of the research in knowledge and processes of entrepreneurs focuses on opportunities and the pre-founding stages, there is little research that focuses on specific organisation building activities (save perhaps for the Stanford Project on Emerging Companies (SPEC) project that will be discussed below). Forbes (1999) suggests that interpretive processes of entrepreneurs may by influenced by individual-level characteristics such as their prior entrepreneurial experience or their functional background (Cooper, Folta, & Woo, 1995; Sutcliffe & Huber, 1998; Waller, Huber, & Glick, 1995).

In addition to exploring the factors that lead to differences in entrepreneurial interpretations…it is important for researchers to consider the potential consequences (sic) of differences in entrepreneurial interpretations. In other words, researchers must ask whether the schema and processes associated with entrepreneurial cognitions work to the benefit of entrepreneurs or to their detriment (Forbes, 1999, p. 431)

For the purpose of this study, the mental model concept is seen as knowledge representations of the founder’s world. In the next section, I review the largest existing research project on founder mental models and employment system as a starting point for the application of my operationalisation of employment system mental models in the context of New Zealand biotechnology.

FOUNDER EMPLOYMENT SYSTEM MENTAL MODELS

It is useful to continue discussions of how founders build their organisations by looking at the work of the SPEC project that forms the basis of Burton’s (1995; 2001) work and others30. The project was a series of studies on young, high-technology firms in California’s famed Silicon Valley. This project sought to examine how start-up

30 The SPEC project forms the basis of research papers by James Baron, M. Diane Burton and Michael Hannan (Baron et al., 1996, 1999a; Baron & Hannan, 2002; Baron et al., 1999b, 1999c, 2001; Burton, 1995, 2001; Hannan et al., 1996).
organisations get established including the process and mechanisms that explain organisational trajectories and change. In particular, the SPEC studies were designed to examine the founding conditions, the evolution of employment practices, organisational designs, business strategies, and the longer-term consequences of early organisation building (Burton, 2001). Publications from the project have documented the existence of distinct organisational blueprints or models described as sets of premises governing the employment relation among founders of high-technology start-ups (Burton, 2001). There have been a variety of links found between these organisational blueprints or models, with organisational features such as the evolution of bureaucratisation, administrative intensity, development of the HR function, and organisational developments such as the replacement of founders with a new chief executive officer, and the chance of going public (Baron & Hannan, 2002; Baron et al., 2001; Burton, 1995, 2001).

The sample of the SPEC studies consists of over 170 young high-technology firms founded between 1982 and 1994 and had at least 10 employees at the time of sampling in 1994-1995. The SPEC project focuses on firms in one region and a single broad category of economic activity in order to control for labour market and environmental conditions. These broad segments of high-technology activity include computing (hardware and/or software but not computer-related consulting services), telecommunications, and medical technology (devices and/or biotechnology). The SPEC project was a five year longitudinal study. Trained MBA and PhD students, including the researchers, conducted semi-structured interviews with the Chief Executive Officer (CEO) and the key informants that were nominated to provide information about the company history and human resource practices. Questionnaires also formed the basis of the data collection as informants were initially asked to complete questionnaires that asked for details about the firm, and the data was then used as a guide for the interviews (Burton, 1995). In particular, CEOs were asked face-to-face to provide details about their firm’s current strategy, structure, and business environment. Aside from the CEOs, founders of the firms were asked to recount the details of the founding including how the founding team was assembled, the original business plan, the planned core competencies of the firm, sources of initial capital, initial staffing, and initial employment practices. Furthermore, founders were also asked about their professional background, external partners and stakeholders, and whether there was a clear organisational “blueprint” or “vision” in creating the enterprise. They were then asked to report on the firm’s current structure and
practices and to identify the timing and nature of major organisational changes or “milestones”. In addition to the CEO and founder interviews, senior managers with responsibility for human resources were surveyed and then interviewed at length about the firm’s past and current employment practices. Documents that record the history of the firm, its organisation and its personnel practices were also collected including publicly available information such as annual reports and prospectus for public offerings.  

In general the findings of the SPEC studies show that founders’ blueprints not only shape the evolution of human resource practices and the human resource function (Burton, 2001), but also the likelihood of going public (Hannan et al., 1996), the odds and timing of CEO succession (Hannan et al., 1996), and changes in organisational structure and the extent of managerial intensity (Baron et al., 1999a). Founders’ employment models have also been found to be associated with a number of factors including the intended business strategies, and early influence of important constituents such as venture capitalists (Burton, 2001). These findings suggest some important implications for the building of the employment system. These studies form the basis for an examination into the emergence and evolution of high-technology start-ups.

One of the first papers on the SPEC project examined the models of employment relations espoused by company founders and how these models shaped the evolution of human resource management in their companies (Baron et al., 1996). Baron et al (1996) identified three dimensions on which founders based their employment systems. These dimensions were attachment, selection and modes of coordination and control. This clustering of founders’ espoused models formed the basis of analysing the employment system in a number of studies from the SPEC project. Four archetypal employment system models were identified from these clusterings identified as star, engineering, commitment and factory. The “star model” is characterised by challenging work,

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31 A full description of the methodology of the SPEC project including detailed timelines, and selection of firms can be found in Burton (1995) and the SPEC website (Stanford Project on Emerging Companies, 2005).
32 The term employment model has been used primarily throughout the SPEC project and the term usage will be used to describe the authors use, however, employment system mental models will be used to develop this concept further to reflect the focus and analysis on the cognitive aspect of the concept.
33 As mentioned earlier, the SPEC project produced a number of articles that based their data analysis around these dimensions of the employment system (Baron et al., 1996, 1999a; Baron et al., 1999b, 2001; Burton, 2001; Hannan et al., 1996).
autonomy, professional control and the selection of elite personnel based on long-term potential. The “engineering model” is characterised by challenging work, peer group control and selection based on specific task abilities. The “commitment model” refers to models based on emotional/familial attachments of employees to the organisation, selection based on cultural fit, and peer group control. Finally the “factory model” is based on monetary motivation, selection on pre-specified tasks, and formal control and coordination and close managerial oversight. Table 2.2 highlights the four archetypal employment models.

One of the main findings of the paper was that there were strong interrelationships among these three dimensions and the consistency of strong complementarities that characterise the employment systems. Further analyses focused on the timing of adoption of sets of formal HR practices and procedures. Two analyses were used: first, a multinomial logit regression analysis of the adoption of practices and procedures in the first two years of the firm and secondly, an event history analysis of the companies’ history.

<table>
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<tr>
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<td>Attachment</td>
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<td>Task</td>
</tr>
<tr>
<td>Love</td>
<td>Values</td>
</tr>
<tr>
<td>Money</td>
<td>Task</td>
</tr>
</tbody>
</table>

Source: Baron et al (1996)

The propensity to adopt specific HR policies and documents and hire a full-time HR manager (the speed at which they did so, controlling for their employment size and industry) was found to be related to the employment system which they started with. Multinominal logit regressions analysis on the data revealed that founders who conceived of employment in factory terms were less likely to adopt HR policy and documents relative to comparable firms with other models (star, engineering, or commitment). Founders with star models of employment systems were more likely to institute intellectual property or “non-compete” agreements and stock options within the first two years than similar firms with a different employment system. Firms in the engineering and the commitment employment models were more likely to grant stock options than
factory models, although they were considerably less likely to grant stock options compared to the star employment system models. These findings indicate that the star employment system model organisations tended to rely on key technical employees over the long-term and attempt to try and reduce the likelihood of their leaving the company. Star companies were also more likely to adopt a mission or values statement by the end of the second year than the factory models. Baron et al (1996) postulate that this may be an attempt to promote a distinctive corporate identity early on in which key employees would identify with, or alternatively, as a way to attract the best scientific and technical employees outside of the Silicon Valley area. Star models were more likely to have job descriptions, standard employment applications, and standard performance evaluation forms by the end of the second year. The speed at which star models adopted formal HR practices and procedures was related to the need for such firms to attract top scientific and technical personnel and be able to evaluate who the stars are in an attempt to exert some form of organisational control over autonomous professionals. Commitment models were most likely to implement background checks, conduct formal employee orientation programmes, and to sponsor regular social events for employees. It would seem that an emphasis on creating a commitment/familial employment system would warrant a focus on creating long-term relations with employees and engage in providing for the employees’ social welfare. These findings suggest that founders’ espoused employment models exert significant influence on the evolution of the employment relations in their firms.

Further analysis using event history techniques to estimate the effects of the founder’s employment system model on the rate of adopting the various HR practices and documents were also examined. The results revealed that, even after controlling for company age and time-varying employment size, there were significant differences in the time of adoption of various employment policies and documents for the four employment system models. Firms that adopted a model other than the factory model were faster to develop standardised employment applications, performance evaluations, newsletters, HR information systems, employee orientation programmes, in-house training, social events, company-wide meetings, and compensation. Commitment models and engineering models tended to be faster to develop HR information systems, formalise performance evaluations, develop various policies and practices aimed at internal communication and socialising, in-house training, communication, and share corporate profits or efficiency
improvements through profit sharing or gain-sharing. Engineering models were more likely to emphasise stock options and non-monetary recognition in the form of recognition awards, while commitment models were more likely to highlight HR activities that systematise employment relations and HRM. Star models appear to focus on adopting HR practices that facilitate selection, and differentiate and reward star employees. Star models were also faster to implement standardised forms for evaluating performance including implementing affirmative action plans, and the rate of implementing human resource information systems. Baron et al (1996) suggest that the evidence points strongly to the importance of consistency and complementarities within HR systems in founders’ conceptions of the employment system. An additional finding was that the adoption of the HR manager in companies was related to the size of the firm, with younger firms making the transition to a professional HR Manager if they are large. Founders’ employment system models were also found to have a strong independent effect on the speed with which a full-time HR manager is brought on board. Companies that had a “more HR-intensive” blueprint” (such as the star and commitment models) were more likely to hire HR specialists sooner than otherwise-comparable companies (Baron et al., 1996). The authors further suggest that this is strong evidence for path dependence in the evolution of employment systems. They conclude by suggesting that,

This is yet another indication that organizational origins matter and that the initial premises that guided the design of employment relations exert an enduring effect on these companies, even as they grow, mature, and in some cases change strategies and top management (Baron et al., 1996, p. 46)

The above work by Baron et al (1996) suggests some important conclusions for the building of the employment system by founders. Firstly, founder’s employment system models appear to be a genuine and potentially beneficial concept for the organisation building literature. Analysis of the data showed that firm founders’ espoused employment models were related to the subsequent development of aspects and features of the employment system. These employment system models indicated that founders with organisational blueprints or models for their firms have an effect on the employment system building in their organisations. In addition, these blueprints of models appear to shape the employment system including the human resource practices and organisational structures that evolve in the companies. However, as the authors indicated, the results were suggestive and preliminary as several methodological limitations reduce the
generalisability and causal directions of the research. Specifically, the analysis of the SPEC database for the study was retrospective and data collection was from a top management perspective. Furthermore, the mechanisms and processes through which these organisation building efforts impact on the organisational structures and practices of the companies remain obscure and speculative. Despite this, the findings from this analysis became the basis for further on-going data collection and analyses.

Hannan et al (1996), in a companion paper, explored the processes of organisational imprinting using a sample of 100 young, high technology companies from the SPEC project. Hannan et al (1996) examined the effects of a pair of initial conditions: the founders' models of the employment relations and their business strategies. Their analyses indicate that these two features were well aligned when the firms were founded. However, the alignment was found to have deteriorated over time, due to changes in the distribution of employment models. In particular, the star model and commitment model are less stable than the engineering model and the factory model. Despite their instability, these two blue prints for the employment relation have strong effects in shaping the early evolution of these firms. In particular, firms that embark with these models have significantly higher rates of replacing the founder chief executive with a non-founder as well as higher rates of completing an initial public stock offering.

Taken together, the early analyses on the SPEC project data (Baron et al., 1996; Hannan et al., 1996) suggests the importance of organisational models and blueprints in the employment system building process. Founder employment system models are correlated with significant milestones within their firms. Multivariate statistical analyses from both studies show that these founder employment models shaped the subsequent adoption and timing of various human resource policies and documents over the companies’ histories, as well as the speed at which the first full-time human resource manager was appointed. The evidence for these correlations suggest that founders espoused models for employment have a large and intriguing part to play in the organisation building process. The studies also suggest the importance of founders’ ideas and conceptualisations as a focus for further analyses into the building of the employment system in new start-ups. The unique data collection of using both quantitative and qualitative data for an analyses into founders’ employment models show that the models that founders have of the
employment system building are able to be studied and understood within the context of organisational development and evolution.

In an ensuing research paper, Baron et al (1999b) examined the founding conditions of the SPEC project companies to determine the managerial and administrative intensity over time. The study was based a second wave of data collection that looked at replicating and verifying the early results of the first data collection. The SPEC project also expanded its data collection to include new research questions and data prompted by the results of the initial data collection. These included a more detailed look at the crucial milestones of the firm, an analysis of the career trajectories of the top management team and an investigation into the products and technologies of the firms. The SPEC project monitored the initial sample of companies over an extended period of time. Baron et al (1999a), however, examined the evolution of bureaucracy and the founding conditions of the firm. Baron et al (1999a) propose that the evidence from these longitudinal analyses supports the notion of path dependence in the evolution of organisational structures. The study confirms earlier findings from the SPEC project about the enduring effects of founder’s employment models and their “logics of organizing” (p. 527). Table 2.3 provides the extension of employment models data in the SPEC project from these subsequent studies.

Table 2.3. Five Archetypal Employment Models based on Three Dimensions

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Selection</th>
<th>Coordination/Control</th>
<th>Employment Model</th>
<th>Percent of Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attachment</td>
<td>Work</td>
<td>Work Potential</td>
<td>Professional</td>
<td>8.4%</td>
</tr>
<tr>
<td></td>
<td>Work</td>
<td>Work Skills</td>
<td>Peer/cultural</td>
<td>32.5%</td>
</tr>
<tr>
<td></td>
<td>Love</td>
<td>Love Fit</td>
<td>Peer/cultural</td>
<td>7.1%</td>
</tr>
<tr>
<td></td>
<td>Work</td>
<td>Work Skills</td>
<td>Formal</td>
<td>5.2%</td>
</tr>
<tr>
<td></td>
<td>Money</td>
<td>Money Skills</td>
<td>Direct</td>
<td>3.9%</td>
</tr>
</tbody>
</table>

*From: Burton (2001)*

These findings from the second wave of data collection in the SPEC project are further explored in detail in a companion article on the evolution of bureaucracy (Baron et al., 1999a). In particular, the paper focuses on facets indicative of bureaucratisation: the evolution of managerial and administrative intensity, the formalisation of employment
policies and the proliferation of senior management roles that are differentiated with respect to function and/or rank in an effort to explore the implications of founders’ models for the evolution of bureaucracy. Using multivariate regression analyses, the findings provide evidence that founders’ conceptions of the employment relations and the social makeup of an organisation at its inception appear to impact on the three facets as above. Aside from the enduring effects that founding conditions have on managerial and administrative intensity, already discussed in the previous study, there was a significant effect of founders’ models on both the formalisation of employment relations, and on the proliferation of senior management titles. Firms founded along bureaucratic versus commitment lines tended to be at opposite extremes in terms of their propensity to formalise employment practices and specialise roles within the senior management ranks. The effects of founders’ models employment formalisation and title proliferation were considerably less strong than for managerial and administrative intensity. The results increasingly support the notion of imprinting of founders’ employment models on organisational structures.

The subsequent papers by Baron et al (1999b) and Baron et al (1999a) both confirm the utility of organisational blueprints or founders’ models of organising. With the addition of more companies, and additional data collection on a number of issues as discussed in the studies above, analyses of the SPEC data found significant impact between the founders’ employment models with aspects of the organisational structures such as human resource policies and practices, administrative and managerial intensity, and the speed of appointing a human resource manager and increase of managerial positions. These findings suggest an important role for founders’ models or blueprints in the organisation building process. However, the concept of founders’ employment models bear further scrutiny as the nature and process of founders’ employment “models” has not been articulated in detail34. While the analyses of the SPEC project shows intriguing effects of founders models of employment on the evolution of the firm structure, the exact process and contribution that founders have remain obscure.

34 Subsequent to the above studies, other analyses of the SPEC data was conducted and published (Baron et al., 2001; Baron et al., 2002). Baron et al (2001) examined the changes in employment models effects on turnover while Baron et al (2002) examined the propensity to hire women into high technology companies and its effects on subsequent bureaucratisation. However, this is beyond the focus of this thesis and will not be discussed here. Suffice to say, the employment models that is the basis of analysis for the SPEC studies have important empirical consequences on a number of organisational features.
Founders may embed their distinctive visions and values in enterprises, or founders may simply be conduits through which economic, social, or cultural forces systematically shape organizational blueprints. Our results demonstrate that these blueprints affect the pace of bureaucratization, but they do not resolve the thorny issue of the distinctive contributions made by founders and other actors in building and changing organizations (Baron et al., 1999a, p. 542).

As can be seen in the quote above, the researchers, while finding distinct and significant effects of employment models on organisational structures and the extent of bureaucratisation, can only conjecture about the true mechanisms and processes that founders have on the development of their firms. In order to provide a detailed analyses of founder employment models, Burton (1995; 2001) focused her analyses on founders’ mental models that develop about the employment relationships as a result of previous work experiences35. Her argument emphasised the role of founders in the advent of organisational diversity.

Although extant theory implies that organizations founded at particular times in particular industries tend to exhibit similar employment models, differences in founders’ educational and employment experiences may produce diversity in their understanding of what the normative employment models are (Burton, 2001, p. 14).

Using the SPEC data, Burton (2001) analysed founders’ employment models and their relationship with important variables such as the organisational strategy, founding team characteristics, and external partners. The aim of the study was to articulate the origins of founders’ mental models of employment systems. It was hypothesised that strategy, founding team characteristics and external partners were important in creating the diversity of employment models that founders espoused. Burton (2001) explored the sources of conformity and deviation from the dominant industry model using multinomial logistic regression analyses to predict the employment model.

A number of important factors emerge from her analyses. One of the most important findings was that employment models may vary even in relatively homogenous high-technology sectors. There is considerable variation even around the dominant models in her sample. Firms pursuing a non-technology strategy were more likely to deviate from

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35 This article represents the first use of “mental model” as a unitary concept for founders’ employment models. As will be discussed earlier, the concept is used to allude to the cognitive components of founders’ organisational models.
the dominant industry model as opposed to firms pursuing a technology strategy. Most of the high-technology firms in the SPEC sample reported pursuing a technology-driven strategy either by enhancing existing technology or developing innovative new technology. These firms focus on product development rather than organisational development and were less likely to conform to the dominant industry model than firms founded to compete on the basis of superior sales, marketing, or service. Firms competing on organisational competence were more likely to pay greater attention to organisational design and structure. Furthermore, founding team characteristics such as team size, and having a team with diverse technical backgrounds, such as in finance, sales, and marketing, were also more likely to deviate from industry employment model norms. Founders with senior-level management experience were also more likely to deviate from industry employment model norms. The role of external partners such as lawyers, advisors, investors and accountants were not statistically significant. Burton (2001) touches on the implications of these findings.

At a minimum, the findings reported here suggest that broad interpretations of institutional theory particularly, and organizational theory more generally, may systematically underestimate the patterned variation in organizational models present in a given field. Entrepreneurs do not appear to be overly constrained by overarching cultural pressures, as represented in institutional theory, or by the expectations of those people and other firms on whom they depend, as in resource dependence theory, or by the technical requirements of the task (Burton, 2001, p. 36).

Looking at macro-theories of entrepreneurship, Burton’s (2001) analysis suggests that there is something deeper occurring at the individual level prompted by the founders of the firm and their mental models. Burton (2001) suggest that the variation of employment models can be attributed to founders’ choices. Her analyses focuses on the employment models from a normative perspective and comments that the variation observed from the SPEC studies can be understood from the founders’ perspective and their choices in employment system building.

Deviant employment models may be mistakes, and they may results from founders being disconnected, but they do not appear to stem from a lack of experience. Instead it appears that novel employment models are tolerated when the founding team has extensive experience, both across functions and at the highest level of organizations. It is this seasoned professionals who are credibly able to devise their own employment model. The second alternative is
that non-standard employment models reflect deliberate strategic choices by entrepreneurs trying to differentiate their firm in the labor market (Burton, 2001, p. 37).

Burton’s (2001) analysis raises some interesting questions for the role of founders in organisation building not yet discussed in previous analyses of the SPEC project. Firstly, while the earlier work in the SPEC project focused on the importance of founders’ employment models for the subsequent evolution of the firm, the mechanisms or processes for how founders’ employment models could be understood were not articulated in a theoretically sophisticated way. This is perhaps due more to the overall design and the objectives of the SPEC project whose objective was primarily to examine the evolution of HR practices and employment relations from a normative perspective than by any research omission. The perspective taken by the researchers also reflects an overall perspective and levels of analysis reflective of their sociological and human resource backgrounds. Burton (2001) attempted to explicate the concept of founders’ employment models by focusing on the origins of these employment models. She puts forward the idea that these models stem from mental models that founders have of the employment relationship.

In making organizational and employment-related decisions founders necessarily rely on a mental model of the correct and appropriate ways to organise and to manage (Burton, 2001, p. 14)

While Burton (2001) utilises the idea of “organisational blueprints” or “mental models” as a conceptual idea for organisation building, she does not articulate what these mental models are nor how they could be understood beyond their face value and convenience to explain effects at the organisational and industry level. In this vein, she suggests that founders may either embed their distinctive visions and values in enterprises or they could simply be conduits through which economic, social and cultural forces shape the organisational blueprint. The notion of the mental model is thus, a useful concept to describe the individual actions of founders at the collective or organisational level of analysis. However, the meaning of mental models or organisational blueprints that founders utilise is not well articulated other than to suggest that it has a cognitive connotation that is important in organisation building.
What is an employment system mental model? From the description offered to us by the researchers of the SPEC project, the employment system mental model is a coherent idea about the employment relationship that founders have for the organisations they create. These models are influenced by the experiences that these founders have of employment systems from previous organisations they have worked in. It is postulated that the mental models that these founders hold of the employment system influence the organisations they build. From this premise, it can be said that mental models are important in organisation creation particularly in the building of the employment system in the new venture. In Burton’s (2001) description, the employment system model appears to reflect a form of belief or knowledge structure which founders utilise in creating the employment system in their organisation. One way in which we can try and understand the concept of the employment system mental model is to examine the research protocols for obtaining the employment systems model. As stated above, the study by Burton is based on SPEC data that have produced several research articles that identified models with distinctive human resource practices and these distinctive employment models are associated with other firm outcomes such as initial public stock offering, transition to non-founder CEO (Hannan et al., 1996), managerial and administrative overhead and bureaucratisation (Baron et al., 1999a). These employment system mental models appear to be empirically observable and have measurable and predictable consequences for firms (Burton, 2001). This brings up the question that if they are empirically observable and measurable constructs, what are these mental models and how can they be understood?

The primary data in the SPEC project to elicit the employment system models were derived from open-ended interviews conducted with founders. These interviews lasted 60 minutes, during which the founder was asked to describe the impetus for forming a...
company, how the founding team was put together and the planned source of competitive advantage. Each founder was asked whether he or she had ‘an organisational model or blueprint in mind’ when he or she founded the company. The data collection was a retrospective recollection of the context of the organisation building process in the context of a semi-structured interview in which the questions and probes were open-ended and were part of an informal dialogue. The data was then analysed qualitatively and organised around themes or dimensions that the founders articulated (Burton, 2001). Referring to Table 2.3 and the description of how employment system models were elicited above, it can be concluded that the employment system mental models are knowledge structures that founders articulate about the organisation they have built around people including both its formal and informal practices. However, the use of mental model in describing founders’ models of employment systems appears to be what Rickheit and Sichelschmidt (1999) describes as a concept that is conceived “in a relatively weak fashion” (p.11) 37. The mental model concept here thus fits into the far end of the continuum seen in Figure 2.1 as a metaphor approach. The use of mental model by Burton (2001) is used as a metaphorical device rather than as a focus on the knowledge or process that entrepreneurs in her sample use to guide their organisation building behaviours. The mental model concept as described represents an avenue for greater exploration and explanation.

The SPEC studies are important for the understanding of entrepreneur’s organisation building efforts. Firstly, they articulate the importance of early decision making in the evolution of organisational structures and milestones. Such early decisions appear to have important effects on the shape and nature of the new venture. While the SPEC studies represent a significant extension of the research on emerging companies and founders’ organisation building, some of the methodological limitations bring up questions about the nature and process of founders and their organisation building efforts. The first limitation to these studies is that the data from the SPEC project is analysed from the perspectives of the founder and top management team. Such an approach defines itself as not being able to control for bias in perceiving organisational reality. Baron et al (1996) describes this as a problem of management ideology versus employee

37 Although as stated above, the objective and analysis of the SPEC project was not designed to analyse the cognitive aspects of organizational building. Rickheit and Sichelschmidt (1999) was merely pointing out the convenience of the term “mental model” for cognition in the literature.
They acknowledge that the lack of investigation of employees in the firms studied was an area that would provide further insight into the organisations. Another limitation of the studies is that the analyses of the SPEC project are based on the founding conditions and organisational level features. This makes it difficult to analyse the specific individual level effects and processes of founders on their organisations. In addition to this, the SPEC project, while controlling for regional and economic variables by focusing on industries within one geographical region, examines the employment system in a heterogeneous sample of high technology firms. While the authors make an argument regarding the focus on the high technology sample, such an approach may disguise the unique requirements and environmental demands of particular industries. The demands for biotechnology versus information and communications technology firms, for example, may be overlooked in terms of its environmental, cultural and organisational requirements. Lastly, utilising the mental model concept in its conceptualisation of its founders’ blueprints is theoretically underdeveloped. While Burton (2001) has used the mental model as a metaphor, a review of the literature, particularly of the entrepreneur cognition area with respect to studies done on perception and knowledge, allows a more sophisticated development of this cognitive phenomena of organisation building.

BEYOND THE SPEC PROJECT: FOUNDER'S EMPLOYMENT SYSTEM MENTAL MODELS

This thesis sets out to articulate the mental models of founders in their building of the employment system. In contrast to the SPEC project, the focus of this thesis will be on the founders’ mental models (i.e., their knowledge and processes) and how these employment system mental models influence the employment system of the organisations they build. In order to address the research gaps evident from the above review, this thesis sets out to examine founders’ organisation building efforts particularly of the employment system using a mental model cognitive framework. This framework approaches the mental model as a knowledge structure that focuses the analyses on the entrepreneur’s information processing and knowledge. By identifying a mental model approach that focuses on the causal links of the founders’ organisation building, this thesis builds a picture of the mental models founders utilise in building their employment systems. This approach is useful for examining how bio-entrepreneurs gather and build the employment system in their new ventures. It highlights the significant impact and
demands of this knowledge-intensive industry on founder’s organisation building efforts and proposes a meaningful way in which to capture the diversity and rationalisations of founders’ actions. In addition to developing the conceptualisation and use of employment system mental models, this thesis sets out to integrate the cognitive models of founders with the organisations they have formed. The analysis of how these mental models relate to organisational features of the firms bio-entrepreneurs have created enables a holistic theory of organisation building that incorporates organisational and individual levels of analysis.

SUMMARY AND CONCLUSIONS

The review of the cognitive literature argues that founders use mental models to structure their activity (Forbes, 1999). Many authors agree that the cognitive approach used in examining organisation building and new venture creation is a fruitful area for investigation (Baron, 2004a, 2004b; Mitchell et al., 2002). The cognitive approach reveals important details about founders’ organisation building efforts and articulates a framework for analysing founders’ contribution to the firm they have built. While the entrepreneurial process is highly complex and no doubt influenced by a multitude of variables at the individual, interpersonal and societal levels (Baron, 2002), the cognitive perspective offers a rich source of conceptual tools (Baron, 2004b). Following this line of logic, this chapter makes explicit “the best way of “importing” this perspective into ongoing entrepreneurship research” (Baron, 2004b, p. 170).

The literature on organisation building suggests that founders approach the building of their organisations with a plan or blueprint of what it should look like. These “models” or “blueprints” can be understood as forms of mental representations. The entrepreneurship literature implies the role of these mental representations in the venture creation and organisation building process (Schoonhoven & Romanelli, 2001a). Such conceptualisations are normally from sociological or institutional perspectives that conceive these mental representations in an underdeveloped fashion. The nature and form of these mental models is of considerable debate in the extant literature although categorisation of them is possible and helpful (Gentner, 2002; Rickheit & Sichelschmidt, 1999). The nature of mental models in entrepreneurship research has often been at the level of metaphors or working models of knowledge and cognitive process.
Understanding the mental model approaches in the literature allows an understanding about the appropriate way in which to view founders’ organisation building efforts. The studies that encompass the knowledge structure approach emphasise the role of the founder’s knowledge and cognitive process in organisation building activities. These studies articulate the structure and processes of founders and provide a means to which metaphorical cognitive ideas can be understood and expanded on. The integration of the research area provides a framework in understanding bio-entrepreneur’s organisation building efforts particularly in the building of the employment system.

The SPEC project remains the seminal work in examining founders’ organisation building efforts. It highlights the importance of founder’s employment system mental models in the evolution of organisational structures and features of the firms they have built. Founder’s blueprints not only shape the evolution of human resource practices and the human resource function but also the likelihood of going public and the odds and timing of CEO succession, organisational structure and the extent of managerial intensity. Founders’ employment models have also been found to be associated with a number of factors including the intended business strategies, early influence of important constituents such as venture capitalists (Baron et al., 1996, 1999a; Baron et al., 1999b, 2001; Baron et al., 2002; Burton, 2001; Hannan et al., 1996). However, due to theoretical and methodological objectives and design, the SPEC project can only conjecture about the cognitive processes of founder’s organisation building efforts.

The SPEC project and advances in cognitive psychology offers a framework for how bio-entrepreneurs build the employment system in their firms. While the SPEC project looks at a diverse range of high technology firms in their sample, this may conceal the unique environmental influences and organisational demands specific to certain industries. The biotechnology industry represents a knowledge-intensive industry with specific demands and requirements that may impact on the employment system of firms bio-entrepreneurs build. Utilising a cognitive framework would expand on the important variables that impact on the founder’s understanding and their organisation building efforts. While the SPEC project has uncovered the impact of founder’s organisational blueprints and the importance of the employment systems, it is limited in its ability to explain the specific role and process of founders’ mental models in organisation building.
This thesis seeks to address the limitations of the SPEC project by focusing on the cognitive processes of founders. It seeks to explore founder’s mental models of employment and how these cognitive processes impacts on the organisations they build. The unique contribution that bio-entrepreneurs’ employment system mental models have on the subsequent employment system of their firms will address the research gaps inherent in the literature on bio-entrepreneurs, organisation building and cognitive psychology.
CHAPTER THREE
Methodology

To take volitional action, however, actors must, at least for certain periods of time, fix their goals and decide on a certain interpretation of outcomes. Without momentary certainty of this kind, it seems that purposeful action would cease. Given a set of goals, one can gather information to one’s advantage, leverage it, create knowledge, and disseminate knowledge so organizations are more effective. Organizations and their actors move in and out of these different processes continually by asking questions such as: How did we do? How should we do? How best to do it? (Lant & Shapira, 2001, p.369).

INTRODUCTION

Given the enormous theoretical and practical applications of the mental model concept in organisation building, the means by which these concepts can be studied requires greater examination. As with many multi-disciplinary subjects, an epistemological and ontological understanding of the research area are paramount to understanding how to obtain answers to research questions (Porac et al., 1996). The notion of mental models can be interpreted as an effort to thematise knowledge and their links to organisation structure. In order to exploit the insights on previous studies of cognition in organisation building, an understanding of how mental models contribute to organisation employment systems is needed. Recent work in cognitive psychology and cognition as applied to the MOC and entrepreneurial cognition area provides significant resources for understanding founders’ cognitions in building their organisations. Founders’ mental models and their organisation building efforts invite an approach that explicates the structure and process of these mental models and allows an exploration of organisation building activities of the employment system. Huff (1997) suggests that an exploration of cognition requires an individual analysis that builds on the individual’s own unique experiences and knowledge. This interpretive approach has its roots in sociology and, in particular the sociology of knowledge (Berger & Luckman, 1966; Lant & Shapira, 2001). This is an important point as employment systems are a diffuse and social phenomenon (Baron, Dobbin, & Jennings, 1986; Baron, Jennings, & Dobbin, 1988; Edwards, 1979; Jacoby, 1985; Kochan, Katz, & B, 1992). How these mental models of employment systems are utilised in building the employment system requires an epistemological stance that recognises these interpretive notions of both objective and subjective meanings. As such
the focus is on the language and interpretations of the individuals. In addition to this, an exploration of the commonalities of these mental models between founders is made. Such an orientation necessitates the adoption of a qualitative paradigm. Gephart (2004) describes qualitative research as a means for uncovering concepts and phenomena of interest.

Qualitative research employs the meanings in use by societal members to explain how they directly experience everyday life realities. It builds social sciences constructs from members’ “concepts-in-use” and focuses on the socially constructed nature of reality...an important value of qualitative research is description and understanding of the actual human interactions, meanings, and processes that constitute real-life organizational settings (Gephart, 2004, p. 455).

As can be seen from this description, a qualitative approach offers insight into how founders build organisations as the approach: helps explain complex causal links in real-life settings; describes the context in which the phenomena or concept occurs and describes the role of these mental models; as well as allowing an evaluation of their outcomes. Such an approach enables an examination of the naturally occurring cognitions around employment system building and allows an analysis around words, text, and talk as meaningful representations of cognition (Gephart, 2004). This “knowledge perspective and knowledge production techniques”, located in the qualitative epistemology and ontology, is supported and encouraged by Hindle (2004), who argues that social cognition is the key to understanding entrepreneurial thinking and action at the individual level.

The locus of entrepreneurial thinking is not just between peoples’ ears; we are bound to consider the complex interaction of mind and environment (p.587).

This justification links well to Huff’s (1997) agenda for future research in the management and organisation cognition area. She articulated that future research in cognition should investigate issues that link cognition to the broader agendas of organisation science, provide empirical evidence that ground further theoretical development, and study cognition as an emergent phenomenon, interactively linked to experience. The study of founders’ mental models of employment systems requires an emphasis on the individual and organisation to illustrate the organisation building activities of founders.
The above literature demonstrates the importance of utilising an approach that takes into account not only the founder’s mental models but also the organisation and the context of organisation building. In order to answer the research question, the research design adopts a multi-method case study approach. Shook (2003) encouraged the use of multi-method studies to triangulate findings on the difficult area of individual levels of research. The case study method can explain, explore and describe the phenomena of interest. While our levels of analysis focus on the individual, organisational outcomes and context are implicit in our research question. This analytical approach attempts to control for industry and environmental variables by examining companies in an emerging sector within the biotechnology industry: the human therapeutics sector within a regional and social setting of a major city in New Zealand.

Employment system mental models\(^{38}\) perhaps represent an abstraction of a complex concept that is developed from past experience and subsequently guides the way new information about employment is organised. In this way, the building of the employment system is able to incorporate new ideas and influences from other parties and people in the building of the employment system of the firm (Stein, 1992). However, for a more complete view of how mental models may inform the cognitive processes of individuals, it is proposed that a mental model is a dynamic representation created in working memory by combining information stored in long term memory (the user’s conceptual model of the system) and characteristics extracted from the environment. The mental model may be used to substantiate the cognitive processes of founders and therefore, may be of relevance to our understanding of how these models may be used. Such conceptualisation fits into the knowledge based category of mental models and suggests some avenue for an appropriate methodology. Given the diversity of conceptualisations of cognitive research in general and the proliferation of concepts used to explain knowledge structures, it is perhaps not surprising that there exists a diversity of research methods available for its study (Eden & Spender, 1998; Huff, 1990; Meindl, Stubbart, & Porac, 1996). While the idea of knowledge structures in different forms permeates most discussion of mental models, it also represents a subject of considerable debate for methodology (Eden & Ackermann, 1998; Huff, 1990; Spender, 1998). The uses of these cognitive mapping

\(^{38}\) The employment system mental model is not a standard usage in the literature, however, while “mental models” have been used to describe this cognitive substantiation of founder’s mental models of organising around the employment system (Burton, 2001), the “employment system mental model” will be used in this thesis to enhance precision of the description of mental models of employment systems.
methods are particularly widespread in the MOC literature (Hodgkinson & Sparrow, 2002) and only now being applied to the entrepreneur cognition literature (Forbes, 1999; Mitchell et al., 2002). However, despite the elusive nature of capturing cognitions, cognition researchers generally regard that the research methods available for capturing these knowledge structures are appropriate for examining cognitions.

My belief is that mental maps can also be more than a methodological tool: we can hope to capture something that has the same essential characteristics as though itself. In this view, the mental map is the knowledge that subjects use themselves. Even if current maps fall short of this ideal, we are closer with cognitive mapping to understanding intentional choice than we have been before (Huff, 1990, p.14).

Ultimately it is this concern with uncertainty, and with managers’ responses to this fact of their activity, that demarcates our field. It is here that we separate from the traditional literature on managerial decision-making, which, if it treats uncertainty at all, is actually discussing computable risks. Thus instead of defining the manager as a computing device, we define her or him as a key actor who invents or creates a bounded field of decision possibilities which is then navigated in the process of choice...we are interested in the boundaries and structure of the model created, and in the process through which its creator navigates its terrain (Spender & Eden, 1998, p.3).

This view is shared by most leading cognitive scholars in the MOC as well as the entrepreneurial cognition literature (Baron, 1998; Eden, Jones, & Sims, 1979; Hodgkinson & Sparrow, 2002; Huff, 1997; Lant & Shapira, 2001; Meindl et al., 1996; Neisser, 1976; Spender, 1998; Starbuck, 2001; Weick, 1990). Given the debate on the way mental models can be defined it is hardly surprising that there is also controversy over what research methods are most appropriate for their study. Furthermore, given the difficulty of capturing cognitions in a manner that highlights its use in organisations, this thesis utilised a case study approach that incorporated cognitive mapping methodology to uncover the founder’s mental models. Whilst a case study approach is itself an eclectic design that incorporates many methodologies, a significant focus of this methodology chapter will be placed on the cognitive mapping methodology adopted for this thesis. This is important as founders’ mental models form the basis for analysis of the building of the employment system.

The first section outlines the overall approach including the rationale and justification. Following this, a critical discussion of the issues facing the methodologies and
approaches used to analyse founder’s mental models and the organisations they built will be made. The design, methods and techniques for analysis adopted will also be explained in detail. The current research departs from previous research in organisation building by focusing on the founder’s cognitive models for organising and placing the founder at centre stage in the organisation building process.

**EPISTEMOLOGICAL AND ONTOLOGICAL FOUNDATIONS**

The current study was conducted using an interpretive perspective\(^{39}\). This perspective is characterised by its subjectivist view of the organisational world (Burrell & Morgan, 1979) and posits reality as a social product that cannot be understood apart from the intersubjective meanings of the social actors who are involved in its enactment (Berger & Luckman, 1966; Geertz, 1983; Rosen, 1991). From this epistemological perspective, the aim of interpretive research is to understand how members of a social group, through their participation in social processes, enact their realities and endow them with meaning (Rosen, 1991). An interpretive perspective also means that the methodology utilised by the researchers must get close to the subject of their inquiry if meaning is to be understood and interpreted. This perspective ties in with conceptualisations of employment system organisation building as a dynamic social process in which decisions and activities are diffused throughout organisational levels (Boxall & Purcell, 2003; Romanelli, 1991). The purpose of the research using this interpretive paradigm is to describe, interpret and understand the data rather than to predict, control and generalise (Burrell & Morgan, 1979). Habermas (1988) suggests that the nature of the research question requires an examination of the boundaries of the world to which the question pertains to. This thesis seeks to explore the personal and social worlds of founders, the nature of the research question is not on the technical or objective facts that typify positivist approaches; rather, the aim is to examine the personal experiences of founders and their organisation building activities. It is this question that the interpretivist approach acknowledges and manages (Hussey & Hussey, 1997). This research question also exemplifies the recognition of multiple stakeholders in the organisation building dynamic (Mingers, 2001). The objective of this research is to explore the inter-subjective

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\(^{39}\) While the various philosophy of research and science and its underpinning are important and places constraints and boundaries to this research, they have been discussed better elsewhere (Guba & Lincoln, 1994; Kuhn, 1970; Morgan & Smircich, 1980; Popper, 1963). This thesis will present a brief rationale for the approach used and the important ideas that underpins it.
experiences of organisation building that recognises the role of the founders’ mental models as well as their interactions with others in building the employment system.

This thesis combined an inductive and deductive approach. Interpretive research tends towards the inductive as the researcher collects data that are relevant to the informants and attempts to preserve their unique representations. This means that researchers attempt to account for phenomena with as few *a priori* ideas as possible (Gioia & Pitre, 1990). As such, the analysis of the data in this thesis were not categorised *a priori* but rather the themes and issues significant to the founders and participants in the organisations under investigation were allowed to surface. However, the research did not occur in the absence of a theoretical framework. The theoretical positions explicated in the previous chapters provided a broad theoretical framework within which the study was located. The findings of the research were inductively derived from the data as well as explored in a deductive manner. This approach has been supported by a number of authors (Dachler, 2000; Mellenbergh, Ader, Baird, Berger, Cornell, Hagenaars, & Molenaars, 2003). The theoretical underpinnings of this thesis guided the selection of research strategy and its intention is to explore the research aims rather than test specific hypotheses.

The thesis’ objectives also justify an interpretivist approach to this study. As described in the previous chapter, the paucity of research understanding the relationship between founder’s mental models and their effects on the employment system eliminates a positivist approach due to the lack of a defined framework for understanding (Creswell, 1994; Hussey & Hussey, 1997). Without an established theoretical framework interpretivist perspectives seeks completeness in establishing understanding of the personal and subjective worlds (Habermas, 1988). This research sets out to elucidate founder’s mental models for the building of the employment system in their firm. This requires a research process and data collection techniques that generate truthful and complete meanings for the participants. The lack of a set paradigm for understanding this world essentially drives the interpretive approach. This approach discerns the type of qualitative or quantitative methods suitable to unearth the phenomena of interest.
THE RESEARCH DESIGN

The research design of this study utilised a case study approach over multiple sites. The purpose of this is to capture the founders’ organisation building efforts within one localised industry: the human therapeutics industry in the Auckland region. The design focused on a single region and sector of economic activity. By looking at a single industry sector within a single region controls for market and environmental conditions as well as some of the institutional influences that may shape organisations (Burton, 2001; Marchington & Harrison, 1991). Furthermore, by studying human therapeutic biotechnology new ventures, we are also controlling for technological and organisational characteristics. Burton’s (2001) sample in the SPEC studies studied high-technology start-ups in different technological industries that include computer, semi-conductor, manufacturing, telecommunications and medical related industries. By looking at new ventures in one technological industry, it is hoped that the structure and processes of employment system mental models will be articulated and help explain the organisation building of founders within one industry sector.

The case study research design of the thesis utilises two main approaches. Firstly, it utilises cognitive mapping methods to provide insights into founders’ cognitions. The objective of this approach is to uncover founders’ employment system mental models. The methodological approach focusing on founders includes cognitive cause mapping, archival data collection of founders and founders’ own personal observations. However, the choice of cognitive mapping methods represents an area for further theoretical and methodological discussion. This discussion centres on the appropriateness of the various cognitive mapping approaches for the research’s theoretical framework and its analytical approach. This study also adopted an emergent design whereby uncovering founders’ conceptualisation of the employment system was done without a priori assumptions as to their knowledge structures or processes. It utilised the comparative cause mapping approach to explicate the employment system mental model. The unearthing of naturalistic and indigenous conceptualisations using the comparative cause mapping approach is one of its strengths due to the non-standardisation a priori approach in eliciting concepts in interviews (Laukkanen, 1990, 1992, 1998).
The second main approach utilised in this thesis centres on the organisation data collection. These methods were used to gather organisational data on the founders’ organisation building efforts. The case study data collection methods include the use of archival data collection, observation, interviews, and documentation. In order to explicate founders’ organisation building efforts, data collection was aimed at collecting any and all information of the evolution of the employment system in each organisation as well as the organisational features of each organisation. The interviews include formal and informal interviews with all levels of each organisation. Formal interviews were conducted with at least one member of the top management team, senior staff, and junior staff from each department of each organisation. In addition, informal interviews were also conducted among various employees within each organisation as well as in addition to the formal interviews participants. Archival data was also collected of both public and private documents, and include documentation, emails, company memos and newspaper articles of the organisations. In addition, the researcher organised access to the company sites and was allowed to collect observations of the founder and employees in their natural settings. The justification and rationale for the case study methodology is discussed in the next section.

**CASE STUDY METHODOLOGY**

Bryman (1989) argues that case studies permit the generation of theory and can serve a number of other purposes such as exploratory investigations and confirmation of other studies. Yin (1994) asserts that the type of research question plays a large role in the appropriate type of methodology. He goes on to advocate that ‘how and why’ questions are best answered through qualitative approaches, particularly case studies, as they allow a deep involvement in the investigation to map a relevant explanation to the questions posed. The focus on how and why something occurs necessitates a focus on a wide range of possible explanations. How founders utilise mental models of the employment system to build the employment system in their organisations requires a focus on elements of the founders’ thinking as well as the organisations that they have built.

Case study methodology was chosen for a number of reasons. Firstly, an understanding of mental models and their effects on organisation building requires in-depth understanding of cognitions within a specific social context (Walsh, 1995). In explicating
the ways in which mental models are used in building the employment system, there needs to be an analysis of the employment system of founder’s organisations as well as of the founder’s mental models themselves. Furthermore, Yin (1994) proposes that the case study is suitable when the researcher is conducting an empirical inquiry that investigates a contemporary phenomenon within its real life context. He suggests that case studies may provide insight when the boundaries between the phenomenon and context are not clearly evident. Dyer and Wilkins (1991) further supports the use of the case study approach to highlight constructs by showing its operation in an ongoing social context. Stake (1994) describes this as orienting researchers “to complexities connecting ordinary practice in natural habitats to the abstractions and concerns of diverse academic disciplines” (p. 239).

Secondly, case study research are well suited to exploratory research where detailed analyses can be carried out (Eisenhardt, 1989; Yin, 1994). The use of case study design is to gain more depth and insight into the founders’ models of employment systems as well as the organisation they build. Since the study of founders conceptual mental models of the employment systems require that this be made in a contextual and natural setting. Thus, this provides further justification for the appropriateness of the case study methodology.

The unit of analysis is the critical factor for the case study methodology (Yin, 1994). Typically, the focus of most case studies is a system of action rather than an individual or group of individuals. This is particularly true for the objectives of this research. The focus of this thesis is on the founder and their organisation building activities. Thus, the primary units of analysis in this study are individuals (interviewees), for whom the primary sources of data are in-depth interviews, personal observations, and archival data; and the organisations (cases), for which sources of primary data are interviews, observations, documents and archival records. However, for different parts of the study, the unit of analysis could be at the level of individuals, departments or the organisations themselves. Multiple units of analysis strengthen the causal claims, the mechanism through which results are generated. The mechanisms are mainly causal and causes can be claimed at different structural levels (Nachmias & Nachmias, 1996). In order to advance the understanding of the mental models founders use to guide their organisation building efforts, an analysis that allows various levels of analysis is useful. In particular, it allows a consideration of the impact of founders’ cognitions on the organisation and its
organisational members. Such an approach is useful to extend the findings of the SPEC project in terms of how founders build the employment system in their firms as a focus of analysis, as well as linking the research outcomes to the broader theory of organisation building. The methodological objectives of this research thesis are to look at the individual cognitions of founders and the organisational dynamics and outcomes that these founders’ cognitions have on the organisations they have built. The multi-method approach of the case study allows the flexibility and inclusion of these levels of analysis. The research design thus focuses methods that articulate the individual as well as the organisational.

Case study methodology is also particularly suitable when multiple sources of evidence are available to satisfy the demands of the research question. Multiple informants are warranted in order to build a picture of employment system building. Employment systems are diffused through multiple levels within organisations (Child & McGrath, 2001; Foss & Foss, 2002) and involves multiple actors (Boxall & Purcell, 2003; Pinfield, 1995). The conditions set out by Yin (1994) suggests a suitable fit for case study methodology to examine founders’ mental models of employment system in organisation building. Using a naturalistic inquiry, the philosophy of case study approach represents a unique and viable way to understand founder’s mental models within the context of founder’s organisation building.

While using a case study approach is important for theory building and understanding the construct being studied, the use of multiple cases over a single case has been advocated by some (Dyer & Wilkins, 1991; Yin, 1994). In the case of multiple-case design, Yin (1994) proposes that evidence from more than one case study can be more compelling and increase the robustness of the findings. However, this needs to be balanced in order to avoid reducing the depth of descriptions (Stake, 1994). One of the advantages of using multiple case studies is the ability to provide a comparative analysis for theory building (Stake, 1994). This is important for the study of mental models that founders have and utilise in the building of the employment system. There is some suggestion that environmental influences have moderating normative influences on founders and the organisations they design (Brockhaus & Horwitz, 1986; Burton, 2001; Collins & Porras, 1994).
However, some of the limitations to the case study approach can include the lack of rigour and generalisation. For this, Yin (1994) offers several recommendations that are in line with the goal of maintaining scientific rigour. Some of the ways to ensure logical consistency and scientific rigour are the use of multiple data sources, coupled with data analytic strategies of pattern matching, a chain of triangulated evidence, and explanation building following replication logic. A research method that utilises a series of case studies within a single industry also reduces the effects of these limitations. Another advantage of focusing on firms within a single industry is that it allows for some degree of control for industry and labour market variations. The unique requirements and demands of the biotechnology industry can be studied in detail and the environmental conditions in the industry can be controlled for.

The limitations of generalisation have always been a major criticism of case study methodology. This is due to the limited amounts of case study numbers. However, an argument can be made for theoretical generalization as opposed to statistical generalisation. Stake (2001) perhaps argues it best when he said that:-

> The scientist and the human scholar alike search for laws that tell of order in their disciplines. But so do all other persons look for regularity and systems in their experience. Predictable covariation is to be found in all phenomena (p. 133).

As with carefully designed experiments, careful attention to a well-planned research design with careful theoretical sampling of cases and reliable cross-case analyses can confirm or disconfirm inferences drawn (Yin, 1994). Further to this, triangulation of cause maps of founder’s employment system mental models are made with observations, archival data and informal interviews with members of the organisations in which they build. Yin (1994) identified 6 sources of evidence in which data can be collected within the case study methodology. These include documentation, archival records, interviews, direct observation, participant observation, and physical artefacts. The data collection for the case studies are described in a later section, but include five of these six data sources.
THE CASE STUDIES

The sample for this case study was selected on the criteria set up by Burton (1995, 2001). This includes identifying new venture or start-ups within the industry. Organisations had to be aged ten years or less to qualify as a new venture or start-up. In addition, companies were required to meet the minimal criteria of having more than ten employees and have an identifiable founder that was still associated with the company. It is crucial in this study to understand the founders’ context and environment. Therefore, all steps were taken to collect as much case study information as possible in order to locate the founders’ cognitions within employment system building context.

A database of possible participant companies was collected utilising the Directory of New Zealand biotech export companies (BIOTENZ) network, the national body representing New Zealand providers of biotechnology, pharmaceutical and natural products goods and services, Statistics New Zealand biotechnology database, Industry New Zealand biotechnology sector (Randall, 2001), Australia and New Zealand Biotechnology Directory , New Zealand Biotechnology Association ((NZBA), 2002), and through university and professional networking. From an initial identification of ten companies in Auckland, six were eliminated as two did not fit the criteria of having more than ten employees, two did not have an identifiable founder still with the company and two did not meet the maximum age requirement of ten years. A total of four companies fulfilling all the necessary criteria were contacted. While this may seem a small number of cases within the industry, it could be justified as the objective of this research stream is exploratory and thus, these case studies prompted a greater depth of data collection and analysis of the role of founders in employment system building.

NEGOTIATING ENTRY

Four companies were contacted through the founders or CEOs. Two of the companies had founders who were also the CEOs. One company had a founder that was the Chief Scientific Officer and one company had co-founders who were the CEO and Chief Scientific Officer (CSO). In all cases, the founders and the CEOs were sent an information pack along with a letter of introduction (See Appendix C). A meeting was arranged through direct contact, phone-call or through the personal assistant to the CEO.
and founders. Of the four companies that were approached, one declined to participate in the research.

Over a two year period, the researcher arranged to access each company and made appointments with members of the organisation. This included making site visits to each company on a number of occasions as well as formal interviews with members of the top management team, employees and founders themselves. A detailed description of the case study information gathering of each company will be covered in detail in the ensuing chapters. The researcher, in most cases, was granted access to members in all levels of the organisation.

DATA COLLECTION TECHNIQUES

Within the rubric of case study methodology, there exist a variety of data collection methodologies (Yin, 1994). For the purposes of this research, interviews, observation, participant observation, written documents, archival data, and informal discussions were the chosen methods for collecting information at the case study sites. Field notes were kept and where possible, interviews were digitally audio-taped. Written documentation was collected as often as possible. This written documentation included annual reports, confidential business reports, human resource management reports and formal documentation and private memos and reports. Access to documentation was variable across each company. However, some of these companies were forthcoming about showing the researcher examples of these reports on the site. Additionally, written documentation in the form of founders’ own reports of work available in the public domain was gathered. These include company reports, specialist articles in periodicals and magazines and interviews with the media.

In all companies, the researcher observed many of the members of the organisation in their working environment. In two companies, the researcher was given a tour of the facilities and introduced to members of the organisation. The researcher was also allowed to observe many of the laboratory activities in several site visits.

Semi-structured interviews of as many participants within the organisation were conducted. Aside from formal interviews with the founders, formal interviews were also
conducted with other members of the top management team, senior staff, and employees. In particular, an attempt was made to interview at least one member of the top management team, a senior scientist, a staff scientist and a junior scientist for each of the organisation. The semi-structured interviews asked questions regarding the organisation’s history with the company, their involvement in the employment system and observations around the employment system including experiences in the company (see Appendix B).

In addition to this, data gathering also included informal discussion of various aspects of the company’s management, employment system and founder and CEO involvement with the company. Often informal discussion with members of the organisation also included administrative, specialist and technical staff. In some cases, the human resource manager, other staff members or the founders themselves, suggested participants. In addition, attempts were also made to interview a long serving member of the organisation as well as a new entrant into the organisation. In some cases, some of the respondents represented more than one of these categories. These informal discussions were a great source of information regarding the employment system and the influences of the founders in the organisation. The engagement of the researcher with employees of the organisations studied allowed rapport to be built among the participants and allowed the researcher to immerse within the culture and language of the participants (Fontana & Frey, 1994). Another important reason for the use of informal discussions and observation also allowed the researcher to “create a ‘sharedness of meanings’ in which both the interviewer and respondent understand the contextual nature of the interview” (Fontana & Frey, 1994, p.371).

Data for the comparative cause mapping was obtained by semi-structured interviews of four founders of biotechnology pharmaceutical firms who are currently involved in the company. These interviews were used to acquire the subjects’ causal ideas around anchor concepts as sub-discourse themes (Laukkanen & Niittykangas, 2003). However, one change was made to the methodology protocol described. Instead of collecting data over two sessions, the research took one session to elicit data for the cause mapping (Appendix D). The semi-structured interview was designed to accommodate the founders’ schedules and time constraints. While the two stage elicitation process was designed to elaborate subjects own naturalistic conceptualisations and expressions of the phenomena under
study, it is unlikely that having one session over two sessions in terms of time constraints would restrict the output or quality of data of the interviews. Furthermore, the researcher was allowed to either feedback the resulting cause maps to the respondents via email or a personal visit when founders were available. This allowed validation of the cause maps and allowed the respondent’s to verify the data used. The semi-structured interview questions can be found in Appendix B. Each session with the founders lasted one hour or more. Interviews were conducted around questions of the employment system, the founding of the organisation and the factors around founder’s decision making around employment issues. Founders were asked to tell of their personal conceptions and beliefs, about the antecedents of each anchor concept/phenomenon and, respectively, their consequences. In addition a critical incident technique was used to describe founder’s activities and milestones in building the organisation and employment system. The interviews form the basis of comparative cause mapping of the founder’s employment system mental models. Notes were also taken by the researcher and each interview was digitally recorded. The data was then transcribed and input into a database using specific software, CMAP2 (Laukkanen, 1998). In order to compare the subjects and to locate core notions and causal patterns, a coding is necessary to group the original expressions into same-denoting sets. These were given a descriptive tag, which corresponded to a standard term (SNT). The programme was used to process the coded data, creating two standard term-using databases, one for the standard term-in-use, and the other for the subjects’ expressed causal linkages. These data were then converted into graphical maps to represent the founders’ employment system mental models.

The methodological rigour of data collection was ensured in several ways. Where possible, interviews were recorded and transcribed verbatim. In addition, summary notes were taken at interviews, public lectures and informal interviews to systematically capture the qualities of each interview (Denzin & Lincoln, 1994; Miles & Huberman, 1984; Yin, 1994). Where possible, notes were taken from sources that the researcher was not allowed to remove or copy such as confidential written documentation and informal discussions.
Archival Evidence

Archival evidence is used to gain a third source of evidence for the case study data collection and analysis. Archival evidence, for example, in the form of newspaper articles, magazine articles, scientific journals and business reports form part of the building of the case study. This archival evidence provides a fruitful source for triangulating evidence from the other data collection methods. The amount of data generated from this was variable for each company. For Company A and C, the amount of archival evidence available was substantial\textsuperscript{40}. Company B had less archival evidence available compared to the other two case studies\textsuperscript{41}. However, while there was less company information available for Company B, the quality of information available was sufficient to provide a rigorous source for triangulation.

Archival evidence that was available from the public domain did not require formal permission from these organisations; however, care was taken in its use so as not to describe these organisations in detail. In most cases, the use of archival evidence was to provide a richer picture of the case studies as well as to be used in conjunction with other evidence to provide a measure of internal consistency.

Documentation

While every attempt was made to collect as much documentation as possible, most small-medium sized enterprises (SMEs) have less formalisation, reducing feasibility of this data collection method. In one of the case studies, formalisation of many of the organisation’s practices was in the process of being done with very little being written down as formal documentation prior to the research. However, drafts, notes or memos regarding the organisation’s documentation were collected where no formal or complete documentation was available.

An inductive analysis was performed in combination with the other data collection methods to provide a cross check of the data collected regarding the firm. This, in

\textsuperscript{40} Each company had around 50 or more sources of evidence on both the founder and their firms that included newspaper articles, financial reports, founder profiles, journal periodicals, business magazine articles.

\textsuperscript{41} Organisation and company reports were less available (about 8), while there was a larger amount of archival information about the founders and members of the top management team (20 or more).
combination with the numerous opportunities for observations, discussion and interviews allowed an insight into the companies studied.

**Interviews**

As interviews form a substantial part of the research method, a comment on the interview process is warranted. The popularity of interviews as a data collection method lies in its ability to provide accounts important to organisational actors (Lofland & Lofland, 1984).

The interviews with the founders and their top management team generally lasted an hour or more. The general interview schedule (Appendix B) was used as a general guide for the objectives of the research. This served to ensure the interview did not move too far away from the domain of exploration. However, it is prudent to mention that this schedule served only to initiate questions around the employment system and the researcher attempted to allow each founder to express their own natural ideas and interpretations about the employment system (Laukkanen, 1990). Therefore, the interviews were all quite different and did not follow the sequence as presented on the schedule, nor were all questions asked in the same way or asked at all.

The interviews also covered a wide spectrum of aspects as the aim was to create as much of a holistic picture of each company as possible while allowing any ambiguities, contradictions and confusion to emerge if necessary. The semi-structured interviews were designed to elicit rich descriptions of the employment system and the issues important to the participants. The importance of building a rapport and trust between the researcher and the participants became an imperative in the data collection process (Fontana & Frey, 1994). The range of participants also became important as a means to both understand and triangulate the findings in this research.

**Methodological Issues in Cognitive Mapping**

As a cognitive or cause mapping methodology forms the basis for uncovering founders’ employment system mental models, a substantial amount of space is devoted to highlight some key issues in choosing the appropriate cognitive mapping methods. Within this field of managerial and organisational cognition, the terms “mental map”, “cognitive map” and “cause map” are used. The distinctions between these terms are not always clear very
much reflecting the different terminologies used in describing knowledge structures. While all refer to some form of knowledge structure, most have been used interchangeably. Tolman (1948) first proposed cognitive maps based on field theory. Field theory asserts that individuals create fields or maps in order to understand and anticipate their environments. However, some authors define the causal map as limited to causal dimensions in the respondents’ thinking or causality relations (Bougon, 1983; Laukkanen, 1992). The use of cognitive maps to depict and explore the cognitive structures of individuals has become popular in the managerial literature. Originally, the cause mapping method developed by Axelrod (1976) in political science, was based on the practical demands of content analysis and the need for the analysis of documents to infer cognition. Casual mapping techniques have existed in management research for many years. While causal mapping was initially used to access the belief systems of managers, they have been used more recently in linking managerial cognition with action such as decisions made, and organisational performance (Barr, Stimpert, & Huff, 1992; Hall, 1984). The methods used for cognitive or cause maps have varied depending on the researcher and the purpose of the research. Methodologies such as cause mapping, cognitive maps, and structured approaches to interviewing research subjects are as variegated and diverse as the theoretical stance of their particular research streams. Akin to the theoretical diversification of the cognitive literature, the methods presented to scholars of cognition are similarly diverse. Within the last decade, the notion that individuals’ cognition and how these are shared in an organisation to guide their behaviours has gained wide acceptance between managers and researchers of management (Eden, 1992; Walsh, 1995). The literature on decision making within organisations and how organisations think consists of a wide range of research examining the impact of cognition on organisational behaviour (Agyris & Schon, 1978).

The cognitive map can be defined broadly as a device that may contain all possible types of relations occurring in patterns of concepts (Bougon, 1983; Fiol & Huff, 1992). The key distinction between a cognitive map and a cause map is what Huff (Huff, 1990) describes as a cause map being somewhere in the middle between maps that deal with manifest content and maps that specify underlying cognitive structures. While a

42 Discussed in detail in Chapter 2 (also for more detailed methodological discussion see Eden & Ackermann, 1998; Huff, 1990; Jenkins, 1998; Langfield-Smith & Wirth, 1992; Markoczy & Goldberg, 1993; Meindl et al., 1996).
cognitive map is a broader generic concept that may contain graphical representations regarding information (Bougon, 1983; Fiol & Huff, 1992), the cause map is usually limited to causality relations whereby manifest content and the underlying cognitive structures are important (Huff, 1990; Laukkanen, 1990). Causal mapping is a subset of cognitive mapping and is concerned with representing cognition as a set of causal interactions. Reviews exist for the many varieties and usages (Eden, 1992; Huff, 1990; Laukkanen, 1992).

Huff (1990) suggests that cognitive maps cover a variety of relationships that can be categorised into five families. She suggests that cognitive maps can be placed on a continuum with the ‘manifest content’ maps on one end and the more ‘interpretive maps’ at the other end. The difference between the two extremes is the level of interpretation that is required to understand the models of cognition. Manifest content maps assume that verbal expression is direct indication of mental activity while at the other end, the organising framework and social settings are assumed to have strong influences on thought, expression and action thus requiring considerable interpretation on the part of the researcher (Huff, 1990). This continuum, offers some way to group the many available methods into categories along this continuum (see Figure 3.1). The different generic families are:

- maps that assess attention, association and importance of concepts,
- maps that show dimensions of categories and cognitive taxonomies,
- maps that show influence, causality and system dynamics,
- maps that show the structure of argument and conclusion, and
- maps that specify schemas, frames and perceptual codes

Maps that assess attention, association, and importance of concepts are typically general cognitive maps that emphasises emphasis and placement. These kinds of maps display frequency of the concepts and their relationships or differences. Maps that show
dimensions of categories and cognitive taxonomies investigate complex relationships among concepts. These maps draw on dichotomised concepts and show hierarchical relationships among broad concepts and more specific categories. Maps that show influence, causality and system dynamics highlight relationships among cognitive elements. Cause maps allow investigators to focus on action. Maps that show the structure of argument and conclusion are increasingly complex in terms of its aims. These maps attempt to show the structure of the logic behind conclusions and decisions to act. Maps that specify schemas, frames, and perceptual codes examine the underlying mental framework or structure that affects all action and behaviour.\(^{43}\)

![Figure 3.1. Five families of cognitive maps (Source: Huff, 1990)](image)

As can be seen above, this taxonomy of cognitive mapping is aligned by its purpose for research. The different families can also be aligned by the increasing need for interpretation from the researcher in understanding the cognitive processes (and one can argue, complexity). Of the different categories of maps above, the most likely group that approximates to our research is the group of maps that show influence, causality and system dynamics. This category of cognitive mapping is also one of the most popular mapping methods in organisation theory and strategic management. This research for cognitive mapping is the search for causal relationships among cognitive elements. The employment system mental model is one that stipulates that cognitive mapping focus on action: the building of the employment system in new ventures.

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\(^{43}\) Huff (1990) explores the taxonomy of cognitive maps in detail and provides a thorough discussion of the various content and underlying assumptions of each type of map.
Three main assumptions predominate the use of cause maps (Huff, 1990). The first is that casual associations are a major way in which understanding about the world is organised. The second is that causality is the primary form of post hoc explanation of events and lastly, choice among alternative actions involves causal explanations. Employment system mental models appear to fit these assumptions. Firstly, as reviewed in the last chapter, founders approach organisation building with a definite blueprint or model. This is corroborated by research from the SPEC project (Baron et al., 1996; Burton, 2001). Employment system mental models may be a way in which founders approach organisation building, with a conceived idea of what the employment system should be like in their organisation. Secondly, causality can be associated with past understandings of the employment relation. This reflects their experiences of the informal and formal ways to manage based on their past experiences and knowledge. Finally, the last assumption that choice is based on causal explanations of alternative actions is evident in that founders often are able to articulate the reasons behind their actions in organisation building particularly of the employment system (Burton, 2001). The merit of a cause mapping approach is in its ability to elicit the interpretive choices and actions of the founders.

The advantages of this form of mapping include the simplicity of the coding schemes resulting in good inter-coder reliability (Axelrod, 1976). The predictive power of the maps appears to be quite good (Bonham & Shapira, 1976). The main interest for using cause maps, however, is the internal consistency and stability of an actor’s cause maps over time, its usefulness in predicting future actions, and in explaining past actions (Huff, 1990). These advantages are clearly suitable for examining employment system mental models that founders have.

In the context of understanding decision-making, causality provides a potentially higher level of procedural knowledge (how it works or how to do it) than other sets of relationships such as association, constructs or categories. In addition its output is relatively robust and parsimonious which is in contrast to the complex frameworks of argument maps and schemata that rely on high levels of interpretative input from the researcher in order to create the final map (Jenkins, 1998, p.234).

Theoretically, employment system mental models are cognitive models or blueprints that founders utilise when building the employment system in their new ventures. These
mental models are hypothesised to be organisational frameworks for building employment systems. To this end, causal mapping is an appropriate methodological framework for which to understand these mental models of organisation building. “How” and “what” questions are addressed using causal mapping methods (Jenkins, 1998). However, in order to understand the diversity of founder’s mental models and employment system building within an industry, it is imperative to utilise a comparative framework for causal mapping\textsuperscript{44}.

**Cognitive and Cause Maps**

Cognitive maps and cause maps offer a range of complexities depending on the requirements of the research. One of the ways in which we can organise a comparison of the different causal mapping methodologies is to utilise the framework depicted by Jenkins (1998). Figure 3.2 establishes the necessary criteria for selecting a mapping methodology within the context of theory. In this figure, the two key dimensions of methodological issues and the research context are important factors in approaching the problem of consideration of mapping methodologies. The mapping methods are balanced by two key dimensions, which are the methodological issues and the research context. The methodological dimension is informed by research practice and theory while the research context is influenced by the specific nature of the research study. The balancing of these two dimensions is mediated by the concept of practicability that mediates either dimension’s influence on the final selection of the mapping method. At the bottom of this figure, is the concept of practicability which mediates each dimension’s influence on the final selection of the mapping method.

\textsuperscript{44} It bears reminding that while case studies generally represents a multi-method approach with various methodological issues around each distinct method used, this thesis will devote considerable space in examining the cognitive mapping issues of founders as this forms the basis of our research question and analysis. The other methods used in this thesis data collection will be discussed in brief although where possible, further reading or information will be referred to.
The mapping methods of surfacing, mapping and analysis are less defined in terms of its delineations. Some methods provide a bridge among the three phases while others are not quite as clear. The purpose of identifying these phases is to assist in evaluating existing approaches using the cartographic analogy suggested by Weick (1990). Surfacing is concerned with the collection of data through surveying or studying from existing maps; its analogy is that of elicitation of maps. Mapping is where the data is combined to create the map through a particular transformation process that includes coding, converting or assessment of the data. The final phase is that of the analysis where the map is actually read or interpreted. This framework is a very useful way in which to present the selection of the methodologies.

Jenkins (1998) in discussing the design issues with cognitive mapping highlight the four broad areas that are important in finding the right methodology:

- Epistemology - what is the theoretical basis for representing cognition?
- Reliability - are they free from systematic bias imposed by the researcher or other individuals?
• Validity - does the methodology capture the issues that are salient to the respondents?

• Practicability - do they allow management researchers to build the sort of relationship they need with the management community, through methodologies that are efficient and challenging rather than time consuming and irritating?

With respect to the above framework, the appropriate methodological approaches require an examination of both the research context (research question, scope and unit of analysis) and the methodological issues (epistemology, reliability, validity and practicability). This is supported by Hindle (2004) who presented a framework for choosing qualitative research methods. This framework can be used as a map that informs the choice of qualitative methods for conducting research. While Hindle (2004) described the framework for choosing qualitative methods, there are some commonalities with this framework to that of Jenkins (1998). These frameworks chart the importance of resolving decisions in these three principle territories. Jenkins (1998) specifies the critical areas such as the research context and methodological issues while Hindle (2004) charts the domains that these research context and methodological issues may occur. Both Jenkins (1998) and Hindle (2004) specify the domains or issues to be discussed when deciding on the appropriate methodologies. However, Hindle (2004) specifies a further domain, that of the methodical content that informs the relationships between data collection techniques and analysis. With both these frameworks in mind, the discussion of the research context and methodological issues will be used to organise the rationale of this thesis. This will further elaborate the methodical choices used in this thesis. The ensuing section discusses how an examination of the research context allows us to narrow down the choices that could be utilised in this thesis.

Research Context

The research context focuses attention on the rationale of the methodologies used. The research question of this thesis identifies a group of methodologies under the rubric of cognitive mapping aimed at eliciting knowledge structures of founders. In order to determine the appropriate cognitive methods used to highlight the role of mental models in employment system building, a framework for comparing the utilities of the different cognitive mapping methodologies is beneficial. A variety of different cognitive and
cause maps have been proposed in the literature (for a review, see Bood, 1998). However, in addition to considering the research question under investigation, the scope of the research questions also needs to be considered. In this case, the flexibility of cognitive mapping methods for comparative analysis is an important requirement for the research question. Causal map methodologies utilised to explicate the employment system mental model among founders need to have the flexibility for comparative analysis. Comparisons of cognitive maps have been made in the literature (Eden & Ackermann, 1998; Jenkins, 1995). Such studies have been used to compare the cognitive maps of individuals (Axelrod, 1976; Bonham & Shapira, 1976; Reger, 1988; Stubbart & Ramaprasad, 1988), and groups (Fiol, 1990; Fiore et al., 2001; Huff & Schwenk, 1990; Narayanan & Fahye, 1990). These studies have looked at changes in the cognitive structure of individuals or groups to demonstrate learning or to demonstrate ‘shared meanings’ among groups or individuals. Bood (1998) has organised a framework for comparing cognitive maps. In his article, he discusses the four major cognitive mapping methods and their utility for studying organisational learning. Bood’s (1998) framework for comparing cognitive and causal mapping is useful in its ability to identify the advantages and disadvantages of each method including the nature and requirements of the cognitive or causal mapping. He organises the various comparative cognitive mapping techniques into aspects such as the data required, nature of the cognitive map, format of the cognitive map, nature of the comparisons of the cognitive maps, the captured type of knowledge, advantages and disadvantages of each methodology. Table 3.1 represents the comparison of the different methodologies. This table highlights the advantages and disadvantages each technique offers. Table 3.1 compares the major comparative causal mapping techniques in the literature. These include the comparative causal mapping by Laukannen (1990; 1992; 1998), Repertory Grid Methods (Reynolds & Gutman, 1984; Simpson & Wilson, 1999), Self-Q Method (Bougon, 1983) and the technique suggested by Eden (1998). The methods are described briefly and a consideration of appropriate cognitive mapping methods discussed.

45 Cause maps will be the term used to describe the methodology chosen for this thesis; however, the term cognitive maps will be used as a broad all-encompassing term that includes causal mapping as well as the other various cognitive mapping methods (Eden, 1992; Eden, Ackermann, & Cropper, 1992).

46 Some of the comparisons have been updated by subsequent studies. In addition, in its original form, Bood (1998) discusses content analysis, however, due to its rise in popularity and development of a comparative form (Simpson & Wilson, 1999), repertory grid technique is inserted instead. Some aspects of the table have also been updated. For example, cognitive mapping using Graphics COPE is now in a newly packaged form called Decision Explorer.
Cause mapping as a research method has been described as a way of describing and understanding representations of models in which people navigate a system or some real domain. While it is often a description of unobservable human cognitive content, it is nevertheless, a model for understanding the underlying mechanisms and structures that represent a target system including the critical interrelationships within it (Laukkanen, 1998).

Cause maps are thus describing the single elements and patterns in which social actors like managers are found to think about some issue of phenomena. The underlying assumption here is that action-oriented knowledge is to a large extent causal and system oriented. Laukannen (1990; 1998), for example has proposed a methodology for eliciting cause maps in combination with software to analyze systematically the data gathered. Over several sessions (in general about three), interviews are conducted to obtain general and behavioural information regarding the domain of interest. The initial interview is then followed up in the next few to elicit concepts and causal beliefs around the anchor themes. Concepts and cause-effect relations between concepts are fed into the computer software (CMAP2) in order to obtain these cause maps. The various concepts used by the respondents and the causal assertions that relate to these concepts can be examined in detail as well as comparing other cognitive maps. The basis for comparisons of maps is the standardized concepts and the links between these concepts. The main advantages with this form of causal mapping are that it provides with a comparability database for respondents on the main concepts and their linkages. The other advantage is that it approaches the elicitation of concepts and causal linkages without placing an a priori assumption of the types and nature of the concepts used unlike some other cognitive mapping approaches. As can be seen from Table 3.1, the advantage of this method includes the ability to compare the content and causal linkages of the maps generated.
<table>
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<tr>
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<th>Comparative Cause mapping with CMAP2</th>
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<td>Dissimilarity data</td>
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<td>Cause and effect relations, lines of argumentation</td>
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<td>Dictionary, Axiomatic, Different dimensions, Statistical difference</td>
<td>Dictionary, directory, recipe, Change in concepts, Change in linkage, Change in centrality</td>
<td>Dictionary, directory, and recipe, Change in concepts, Change in linkage, Change in centrality</td>
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<td><strong>Disadvantage</strong></td>
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<td>Comparison requires fixed pool of constructs</td>
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</tr>
</tbody>
</table>

*Source: Based on Bood (1998)*
Repertory Grid Methodology developed from personal construct psychology (Kelly, 1955). This method requires generation of elements, either by the respondents or by the researcher based on theoretical considerations. These elements are then subjected to the respondents classifying, ranking and comparing them pairwise. There is a huge repertoire of methods for comparing elements (Fransella & Bannister, 1977). Comparison of respondents on these elements have also been developed (Reynolds & Gutman, 1984; Simpson & Wilson, 1999). The method also allows the use of quantitative statistical methods for analyses including multidimensional scaling (Bood, 1998). The advantages of this method are its ability to systematically analyse and compare responses on the pool of constructs generated to highlight their underlying features. The main disadvantage of this method is that comparisons and analysis of constructs are on the initially generated pool of constructs and does not allow new constructs to be compared or generated.

Another popular cognitive mapping method is the use of Decision Explorer, previously known as Graphics COPE, which is software for recording and analyzing cognitive maps among group members. The main directive for Decision Explorer was to solve complex, strategic problems within groups. This is a group cognitive mapping technique that allows a range of analysis including the listing of concepts, tracing lines of argumentation, clustering of concepts or listing various argumentations. This allows a visual display of cause maps in a way which permits analysis of groups or individual thinking. The process for eliciting these maps involves relatively unstructured elicitation allowing concepts to be developed from causal links rather than linking a pre-defined group of concepts (Eden, 1992). The elicitation is normally done on the groups of subjects at the same time rather than on individual subjects. The focus then is on the collective thinking and cognitive maps of groups of individuals. The causal connections become the focus of the mapping exercise (Jenkins, 1998). The main advantage of this is the interactive nature of the group mapping exercise where various elements are discussed and shared in the elicitation process. However, the limits of this are in not being able to identify and analyse the idiosyncratic and individual content and maps of each subject.

The Self-Q method developed by Bougon (1983) sets out a structured approach to interviewing research subject that and eliciting concepts in a systematic and organised way. This technique allows respondents to collect and verify concepts and examine their causal linkages. This self-questioning approach is designed to minimise biases from the
interviewer and allow verification of the maps produced. This technique is an interviewing process that utilises a three stage approach in elicitation. The technique has been described as focusing on the elicitation rather than the analysis side of the mapping activity (Jenkins, 1998). The main advantage of this method is its ability to compare and analyse the mapping of constructs and elements with interaction from the respondents. The main disadvantage is its limited focus on an initial pool of constructs. These are some of the more popular approaches to cognitive mapping and the methodological outlines highlight appropriate methods for different research contexts. However, as will be discussed, the most appropriate methods for our research question will require a careful consideration of the research context and methodological issues. Several authors have proposed techniques for comparing cognitive maps (Eden & Ackermann, 1998; Langfield-Smith & Wirth, 1992; Markoczy & Goldberg, 1993). However, it has been cautioned that some methods that are suitable for one area of cognition may be unsuitable for other areas (Eden & Ackermann, 1998).

Existing research that compares cause maps may be divided into two forms that either amalgamates elements of individual maps or structure a comparison across maps. For example, Decision Explorer software has been used to ease the use of comparisons in a single merged map while methods have existed for the use of standardizing content analysis to compare cognitive maps (Weitzman & Miles, 1995). The analysis of cognitive maps either way usually requires that the interviewers are aware of the contextual variables that dominate the methods for eliciting these maps. In particular, words, language, jargon and “shorthand” vocabulary of the interviewees may represent situated understandings. Current measures of similarities and differences in cognitive maps may depend upon statistical analyses that assume agreement about syntactical equivalence. The three elements of a cognitive map in which meaning is derived include the words that make up a construct that may be judged as synonymous with other words or phrases, or more significantly the context of the construct within the map. These elements provide context to a construct and meaning is derived from them. The problems of comparing maps thus require a need for researchers to be clear about the status of the data they are using (Eden & Ackermann, 1998). This is an important aspect for choosing a methodology that would incorporate suitable elements when used in comparison to other cognitive maps. In this sense, the comparative cause mapping technique is a cognitive mapping method that is attractive because it does not have any a
priori assumptions of the founder’s conception of the employment system. In addition, the comparative cause mapping approach identifies important idiosyncratic characteristics of individuals as well as allowing a standardised concept base to be built for comparison among subjects.

However, there is another issue that arises from this form of standardisation. In an attempt to compare cause maps, previous attempts have focused on using subjective researcher judgement (Barr et al., 1992), or used only a small amount of information within idiosyncratic maps (Ford & Hegarty, 1984). The difficulties of subjective researcher judgment is perhaps more evident in the repertory grid technique when the choice of constructs may be supplied by researchers rather than by the subjects. In addition, the elicitation process may not be designed to add to the number of constructs generated initially. This limits the richness of subjects’ responses to the elicitation of elements in the repertory grid. However, comparative cause mapping may be ideal in that it allows several iterations of analysis of rich data that comes out from semi-structured interviews. This feature is suitable as Laukkanen (1996) defines ways around limiting the effects of subjective researcher judgement as well as the potential comparative data used. However, before a final decision on the appropriate cognitive mapping methodology can be made, the methodological issues of the research need to be carefully considered. One way to decide which cognitive mapping method is appropriate is to consider the issues of epistemology, reliability, validity and practicality (Jenkins, 1998)\(^47\). The integration of Bood’s (1998) and Jenkins’ (1998) theoretical frameworks of methods allows a rationale to be developed about the right and appropriate cognitive mapping method to use.

**Reliability**

Reliability using the comparative cause mapping approach is often associated with replicability (Easterby-Smith, Thorpe, & Lowe, 1991; Gummesson, 1991). However, some consider the concept of reliability within this qualitative method to be tenuous and

\(^{47}\) Jenkins (1998) includes epistemology as an important determinant for choosing cognitive mapping methods. However, as this has been touched on in depth earlier, it will not be discussed here. Suffice to say Huff (1997) suggests that research on cognitions should consider the individual’s experiences of their organisation building and recognise their own unique experiences and knowledge. The methods chosen must be able to highlight similarities (due to the limited number of elements to choose from) and differences (their reasons behind them). This suggests that cognitive mapping methods that allow the comparison of the content and structure of maps would be advantageous.
inappropriate (Taylor & Bogdan, 1984). The first objection to the standard of reliability includes the idea that replicability for cognitive maps is not appropriate because cognition is contextually driven. Cognitions captured at a specific time for a specific reason may not necessarily be embodied at another time. The point is that reliability for cognitive mapping should focus on the distortion that could be created by the researcher rather than from the methods themselves. Kerlinger (1973) discusses this further by discussing the possible distribution of error. The distribution of error in causal mapping is the idea that there systematic bias caused by the preconceptions held by the interviewers, coders, or other individuals may affect the data (Jenkins, 1998).

Two main strategies are used to ensure reliability within comparative cognitive mapping (Jenkins, 1998). The first involves keeping the list of variables presented to the respondents consistent. The use of these variables *a priori* alleviates the reliability and analysis problems by keeping the variables consistent and thus replicable. Methods that utilise this approach include Markoczy and Goldberg’s (1993) methodology of comparing cause maps.

The second method is to ensure consistency is by adopting coding processes *post hoc* that ensure consistency by using set criteria. This approach is most often used with documentary data (Axelrod, 1976; Bettman & Weitz, 1983; Huff & Schwenk, 1990; Narayanan & Fahye, 1990). However, methods such as Laukkanen’s (1992) comparative cause mapping utilise this approach to ensure standardisation of the data is comparable. Jenkins (1998) has criticised this approach by saying that there is very little consistency in the way coding is treated in various studies with some having no or little design for how coding issues are dealt with and reported (Bonham & Shapira, 1976; Cosette & Audet, 1992; Hart, 1977; Levi & Tetlock, 1980; Roos & Hall, 1980; Stubbart & Ramaprasad, 1988). As with high levels of interviewer input there is a danger that systematic bias may be distributed in comparisons with multiple individuals and organisations. Methodologies which allow this kind of latitude need to address how the cognitions of the researcher are separated from those of the respondents. Laukkanen (1996) proposes that if researchers stay close to the conceptual usage of the subjects, bias may be reduced as the natural language of the subjects speaks for itself. This thesis adopts Laukkanen’s (1996) methods for ensuring reliability by staying close to the founder’s verbal conceptions and articulated links.
Validity

In discussing the issues of validity in comparative cause mapping, Jenkins (1998) highlighted the issue of whether validity in cognitive mapping is a question of epistemology. While some have questioned validity in the traditional sense (Kerlinger, 1973), others have established a phenomenological approach (Easterby-Smith et al., 1991). Jenkins (1998) argued for the latter approach. Maps only capture a partial structure through concepts and links, the more appropriate question of validity should be whether the respondent is allowed to respond in a way that is salient and meaningful for them.

Jenkins (1998) highlighted two important dimensions in validating causal mapping approaches. The first dimension is that of saliency versus comparability. In his discussion of saliency versus comparability of cause maps, he discusses that methods chosen are often a trade-off between capturing the variables and relationships of interest (saliency) and comparability. The attempt to capture commonalities between maps to make meaningful comparisons might diminish the saliency of the maps. The most frequent approach in ensuring comparability is to use an a priori set of variables that are presented to the respondents. The obvious benefits are that researchers can identify the total number of variables and their connections with a predefined matrix across all maps (Jenkins, 1998). The question then is whether establishing variables captures individual views of the world or whether they force the respondent to work within a set of variables that is not central to their individual cognitions. This has the potential to limit the strength of the mapping approach in that it removes the ability to reflect the divergence of respondent’s reasoning as well as limit any new aspects that are not considered in the literature (Jenkins, 1998; Reger, 1988). Further, there is the possibility that having a set of variables may impose a structure that may not be a true reflection of respondent’s structure.

The second dimension that Jenkins (1998) identified, concerns the atomistic versus the holistic aspect of comparative cause mapping. Under this dimension, there is the possibility that the issue of presenting variables may also impart a false sense of structure to the cause maps formed. For example, one common way of eliciting data from the respondents is to present paired comparisons and for respondents to make causal links
between the variables. This can lead to what Jenkins (1998) refer to as “a highly atomistic approach to constructing a cognitive map”. The problem is that in doing this the resulting map may show simple connections and inflate particular connections, instead of presenting a holistic map. Stubbart and Ramaprasad (1988) have attempted to assuage this problem by presenting the maps back to the respondents and asking them to amend the map to provide a more coherent representation of their views. The utilisation of comparative cause mapping in this thesis avoids these problems of validity firstly, by retaining the idiosyncrasies and similarities of the founder’s individual cause maps. Comparison is achieved by examining the similarities of key concepts and causal linkages elicited by the founders. The utilisation of CMAP2 (a comparative cause mapping software) allows a methodical and quantitative comparison to be made of their concepts and causal links (in addition, a quantitative analysis can be performed which calculates the number of links between concepts). By comparing the number of key concepts and causal links in each founder’s idiosyncratic maps, the commonalities between the maps can be established with minimal influence of the researcher’s input. In addition, maps elicited from the founders were presented back to the founders for validation of key concepts and linkages.

**Practicability**

Feasible research questions may be determined more by access possibilities than by theoretical considerations (Easterby-Smith et al., 1991).

While this may be an unfortunate effect of some research, it is particularly cogent for cognitive mapping. The important issue with choosing a methodology is to consider validity and reliability of the research. However, in the case of mapping research, practicability issues are of equal importance. Jenkins (1998) has contended that a primary issue for mapping research is that they are ‘appropriate to the situation of the respondent’. The importance of gaining the cooperation and trust of respondent’s in order to access what may be highly personalised and sensitive data is crucial to cognitive mapping methods. Brown (1992) discusses this by describing how rigorous methodologies may cause irritation and avoidance behaviours in respondents. This is important for all qualitative research but particularly relevant for cognitive mapping methods. In order to improve the elicitation of cognitions from respondents, researchers are required to balance the requirements of the cognitive mapping methods used and the need to allow
respondents’ acceptance of the cognitive mapping techniques and their ease to respond. In this research, the problem of practicality was mitigated by the comparative cause mapping approach. The comparative cause mapping approach utilises a semi-structured interview and *post hoc* analyses of the founders’ interviews. This preserves the founder’s own words and interpretations which forms the basis for analysis. The semi-structured interviews of the comparative cause mapping approach also demonstrates more face validity and acceptance by participants than other cognitive mapping approaches such as the repertory grid (Laukkanen, 1996). In addition to these dimensions, the choice of cognitive mapping methods also needs to take into account the research context.

**Integrating Research Context with Choice of Cognitive Mapping**

In small and emerging firms, founders do not talk about HR, but rather as a flow of interrelated activities that they deal with concerning their employees, activities that fluctuate and change over time. In applying the “muddle through” strategy, many CEOs stumble upon synergistic ways to manage their personnel that do not easily fit into our preconceived traditional HR notions (Cardon & Stevens, 2004, p.318)

The research context provides a useful way to organise the choice of cognitive mapping used. In the case of the research question, founders’ mental models of the employment system are the main focus of investigation. These models are mental representations that highlight knowledge of the right and appropriate ways in which to organise work and employment within their new firms. These mental models are hypothesised to be knowledge representations and reasoning about how and why particular aspects of the organisation and employment are appropriate for their organisations. In this context, the cognitive methods of comparative cause mapping, self-Q method, and cognitive mapping using decision explorer are fitting as these methodologies examine the cause and effect relations of cognitions as well as lines of argumentation (see Table 3.1). The repertory grid method while able to account for the underlying phenomena behind founders’ actions and behaviours is excluded because of its emphasis on dissimilarity data.

The research question also impacts on issues of epistemology. The discussion thus far of the mental model approach in studying founders’ ideas of the employment system suggests that interpretation and sense making is an important process for the founders. The need to examine founders’ mental models in their naturalistic social setting and how
these mental models impact on their actions remain a central theme in deciding the proper
cognitive mapping method. The diverse meanings that founders have of the employment
system suggest that the way in which experiences and individual variables may interact
into behaviours and action. The research question and the epistemology of this research
is interpretivist. It requires that cognitive mapping approaches retain founders’ subjective
values and meanings around their knowledge and process of employment system
building. In this regard, the comparative cause mapping method is fitting as it allows
respondents’ natural language to emerge and does not impose standardisation of concepts
and relations a priori as opposed to the other methods.

The scope of the research is also an important factor in the research context when
deciding on the most suitable cognitive mapping method. Comparison of founders’
employment system mental models represents an important aspect as the mental models
of founders in industry have important implications for the emergence and development
of these mental representations. The ability to allow a structured comparison of founders’
mental models while retaining the idiosyncrasies of individual founders is imperative.
While all the cognitive mapping methods discussed above allow comparison of cognitive
maps, comparative cause mapping and repertory grid technique allow the individual
idiosyncrasies of individual cognitive maps to be retained. The self-Q method and
cognitive mapping using Decision Explorer utilises aggregate standardisation of concepts
in groups. Thus, individual idiosyncrasies are clouded or obscured. This impinges on the
reliability and validity of methodological issues. The comparative cause mapping
approach allows an analysis of the concepts and their derivatives used by their subjects.
The analysis of cause and effect relations and lines of argumentation may also highlight
founders’ understanding of their environments and the key actions in their organisation
building efforts. Another advantage of the comparative cause mapping approach is that it
allows respondent’s naturalistic language and lines of argumentation. The influence of
the researcher is kept at a minimum until post hoc analysis. However, there are
techniques available that minimises the influence of the researcher in the comparison of

The unit of analysis of this thesis’ research context is the individual founder and thus
cognitive mapping methods that aggregate group comparisons such as the Self-Q method
and the cognitive mapping method using Decision Explorer are inappropriate. While the
interactive nature of the cognitive mapping methods is advantageous in other settings, the requirements for the thesis was for cognitive mapping methods that would allow a comparison of the content of cognitive maps of founders. In this case, the comparative cause mapping approach demonstrates a clear fit for the philosophical context, research question context, and methodological concerns raised.

**TRIANGULATION OF DATA**

Triangulation has been defined as “the combination of methodologies in the study of the same phenomenon” (Denzin, 1978). Triangulation is a form of research strategy that has been described as a convergent methodology, multi-method/multitrait or convergent validation (Campbell & Fiske, 1959; Jick, 1983; Webb, Campbell, Schwartz, & Sechrest, 1966). Many authors have advocated triangulation as a means of ensuring methodological rigour in research (Denzin & Lincoln, 1994; Webb et al., 1966). Arguments for triangulation include the idea that more than one method should be used in the validation process to ensure that the variance reflected that of the phenomenon under investigation and not of the method (Campbell & Fiske, 1959). This validation of two or more distinct methods allows for cross validation and congruence of comparable data (Jick, 1983).

Denzin (1978) distinguishes between triangulation that is used between methods. Both types of triangulation are more suitable for testing the degree of external validity for the former and internal consistency or reliability for the latter. However, one other purpose for the use of triangulation is for capture a more complete, holistic and contextual portrayal of the unit or phenomena under study (Jick, 1983). One of the advantages of this is that the use of multiple methods to highlight phenomena can also be used to uncover unique variance of data otherwise ignored by the limitations of single methods. In the case of this research, the use of triangulation is used not only to examine the case from multiple perspectives but also to enrich our understanding by allowing for new or deeper dimensions to emerge (Jick, 1983). One other advantage for the use of triangulation of data in this research is that while convergences of data reflect some form of validation of the data and methods, dissimilar results or discrepancies over different methods may yield a focus on the theoretical or methodological propositions for these discrepancies. The research of founders’ employment system mental models and the
organisational features of the organisations they form require that the process of compiling research material based on multi-methods to examine convergence of data as well as generating perhaps more complex or alternative explanations when divergence is apparent. The use of triangulation also focuses the analysis of the data in search of a logical pattern or “the capacity to organise materials - all of its materials - within a plausible framework” (Weiss, 1968, p. 349).

DATA ANALYSIS OF THE CASES

The analysis of data for case studies remains one of the most difficult and discerning aspects of case study research methodology. There are few fixed formulas or cookbook recipes to guide methods and much is dependent on the investigator’s own style of thinking, sufficient presentation of evidence and careful consideration of alternative interpretations (Yin, 1994). As suggested by a number of authors (Jick, 1983; Miles & Huberman, 1984; Yin, 1994), this research will highlight its theoretical strategy for analysing the data and approaches the data with a clear analytical technique.

Yin (1994) prescribes the approach to data analysis to begin with a general analytical strategy in place. The two main strategies in doing this are to either have theoretical propositions guiding the analysis or to develop a descriptive framework for organising the case study. The study adopted the former approach in that it relied on theoretical propositions to guide the objectives and design of the case studies. The research questions as explored in the literature review chapters shaped the data collection plan and guided the set of research questions, reviews of the literature and the potential new insights into this study. Furthermore, this approach also helped shape the analytical strategy that will be described below. The strength of this approach as described previously is the ability of the theoretical framework to organise the case studies and define alternative explanations to be examined (Yin, 1994).

Like most qualitative research, the study did not focus on the issues of generalisability but on how founders’ conceptualisations of the employments system are represented. Specifically in attempting to make sense of the data, the dominant mode of analysis began with the use of data reduction and pattern matching. In general, the identification and categorisation of the themes presented in the results chapters arose from the application of
the methodology described above (Denzin & Lincoln, 1994; Yin, 1994; Yin, 1993). On completion of the transcription data process, the data was examined for significant and/or insignificant thematic similarities and/or dissimilarities utilising within/cross-case analytical methods and coded along thematic lines (Miles & Huberman, 1984; Morse, 1994; Yin, 1994). Data analysis further follows Huberman and Miles’ (1994) analytical processes of data reduction, data display and conclusion/verification. These processes occurred throughout that entire research process. This provided the basis for the iterative identification and classification of themes associated with employment systems which will be presented in the ensuing chapters (Miles & Huberman, 1984). As with all case studies based on qualitative data, data reduction was employed as a basis for making sense of the information. Data reduction is a form of preliminary analysis that guides establishing meaning in a case study in a systematic way (Miles, 1983). Data analysis was then contrasted with the founder’s cause maps of the employment system (Appendix D highlights the specific analyses of the comparative cause maps).

**PRESENTATION OF THE DATA**

The case study will be discussed with regard to the comparative cause mapping analysis. Each chapter of the case study will firstly present the results of the cause mapping of the founder’s employment system mental model followed by presentation of the case study evidence collected around the employment system of each company. Analysis of the founder’s employment system mental model will be combined with the analysis of the case study evidence. The presentation of the data in this way will allow an analysis of the founder’s employment system mental models and their organisation building efforts with regard to the employment system.

The level of analysis commenced at the level of the individual followed by the organisational level analysis. The richness and complexity of the data generated for the comparative cause mapping produced a depth of understanding of the respondents’ ideas about the employment system in organisation building. Combining the methods of archival documentation, semi-structured interviews, informal discussions, observation and written documentation an analysis of founders’ employment system mental models with the employment systems of the companies they’ve formed. These case studies allow
an understanding of the role employment system mental models have in the organisation building efforts of founders.

ETHICAL CONSIDERATIONS

Due to the sometimes sensitive nature of the research stream in discussing employment and management issues in each company, the preservation of confidentiality was of utmost importance. This was particularly relevant in this research as many of the data collected were of highly confidential nature. This included sensitive information on documents such as organisational strategy and business plans, science reports on projects of valuable IP, perceptions, attitudes and behaviours of employees towards each other and their superiors as well as their employees (including managing styles, politics, science results and IP). Given the nature of these kinds of information, this research applied an ethics strategy throughout the study guided by qualitative methods and standards set by Miles and Huberman (1984) and the University of Auckland’s Human Subjects Ethics Committee (Appendix C).

In order to ensure data quality and preserve the rights of respondents, participants in the study were assured of the confidentiality of the data sets as well as the intent of research. Names and identification of participant organisations remain private and participants were given the option to have their interviews digitally recorded as well as the option to stop recording of their interviews at any time. In addition, respondents and especially the founders were given the option to check over their data sets in order to ensure that they and their companies would not be identified. This was also in line with the comparative cause mapping methodology of allowing founders to validate their cause maps.

SUMMARY AND CONCLUSION

This chapter summarised the theoretical, epistemological, and research issues of the methodologies used in this study. In general, issues related to the use of the comparative cause mapping and case study approach were justified and related to the theoretical requirements of this research. Details of the analysis of the multiple methods in this research were also discussed including the presentation of the case studies and the analysis methods used in this research.
Having analysed the case studies and triangulated the results of the various methods used in the case study, several themes emerged around the employment system building of the founders and the founder’s employment system mental models. These models represent the cognitive components in the evolution of the employment system and form the basis of discussion for each case study.
Chapter Four
Company A

COMPANY DESCRIPTION AND HISTORY

Company A is a leading biotechnology research and development companies in New Zealand\textsuperscript{48}. Company A is a research and development biotechnology company based in Auckland, New Zealand. Its core business is in the health sector although it has expanded into other sectors due to its broad technology platform. The company’s business objectives are based on an active discovery research and development programme and the company holds a number of patents including three which are undergoing human clinical trials. In early 2000, Company A, together with its development partner, a US based biotechnology company, received clearance from the US Food and Drug Administration (FDA) to initiate Phase II clinical trials on its health patents. Throughout the early 2000s, the company had licensing deals with major international pharmaceutical firms for development a commercialisation of its health patent programmes. The results of its clinical trials showed appreciable clinical benefits. During this time, Company A also branched out into other sectors pursuing its interests outside of the health sector such as the agricultural industry.

Company A has partnerships with several large biopharmaceutical, and agricultural companies. Partnerships have been used to fund research to effectively develop potential products. Collaborations have also been made with several large biotechnology companies both in the Asia-Pacific and USA. Company A moved into joint ventures with other companies providing intellectual property in the form of patents and technology databases, as well as with ongoing research capabilities. It has an extensive collaboration network with other biotechnology companies including local and international well-known corporations. Corporate partnerships have provided 85 percent of the investments in the company and have allowed the company to develop a wide range of intellectual property. For the year 2000, revenue totalledNZ$28.7 Million, compared with NZ$7.2 million in 1999\textsuperscript{49}.

\textsuperscript{48} At the request of the founders, as well as to maintain confidentiality, details of each company’s description, specific technology, and history will be omitted or kept at a minimum.

\textsuperscript{49} Source: New Zealand newspaper business section and investment periodical
The company was founded in 1994 and has grown to over 150 employees from an initial start-up number of 25. Company A’s structure has several levels with the CEO at the top followed by the top management team which include the Business Development and Licensing Officer, Chief Operating Officer (COO), corporate services and executives. Its employees, primarily scientists, work in teams that are led by project supervisors. The project teams are mobile and dynamic with different projects constituting members whose roles change with the project goals. For example, team members may constitute a team with a project supervisor, however, if the project fails, members may be re-distributed to other projects or may take supervisory leadership of new ones. Employees are aged between 19 and 65, and of the 150 staff, over 50 have PhDs. 140 out of the 150 employees are involved in research. The organisation reflects an international diversity with over 20 different nationalities represented. Company A is located in an suburb adjacent to the central city in an industrial portion of a major metropolitan area. Its established base boasts a state of the art laboratory and office space. The company has been recognised and awarded for its expertise and business model in its industry. In addition to this, Company A sponsors several initiated community programmes to encourage science and technology in the community.

DESCRIPTION OF THE DATA COLLECTION

Data collection took place on site over the course of seven months (this included four site visits and one interview that was conducted at the participant’s home). Access to the company was obtained through a variety of methods. At the beginning, the researcher networked with the Chief Operating Officer (COO) through personal university contacts associated with the company. From this, the Founder (also the CEO) was contacted by sending the research information package (see Appendix C) and a follow-up telephone call to the Founder’s personal assistant. Formal interviews were scheduled with the CSO and the founder/CEO. From the meeting with the founder/CEO, who was interested and supportive of the research, formal meetings were conducted with the HR Manager, and informal interviews were conducted with other employees of the company including the senior staff and employees\textsuperscript{50}. For the formal interviews, each participant was given a research information sheet which detailed the study methodology and ethics approval. In

\textsuperscript{50} The senior staff comprised two senior staff members including a project leader and senior scientist. Employees comprised four people including a scientist, two junior scientists who had just started at the company and the personal assistant to the HR Manager.
the formal interviews, participants were also asked to sign a consent form (Appendix C). Interviews were digitally audio-taped with the participant’s permission; informal interviews were not audio-taped although the researcher made notes during these interviews. Aside from these meetings, informal discussions with other employees also took place during the site visits.

In addition to access into the company and its employees, the researcher was granted access to numerous written documents by those interviewed. This was either given to the researcher or shown to the researcher during the interviews. Written documentation included confidential company reports, employments contracts, emails, strategic business plans, scientific goals and plans, performance management manuals and memos. In additions, observation was made of the working conditions and employees in the workplace through access to the employees’ laboratories, corporate offices and employees’ lunch room and cafeteria. The researcher observed the employees in their work environments during office hours which were between the hours of 8:30am and 5:30pm.

As this company was a very established company and with a high profile founder/CEO, media articles and documentation about the company were obtained from the public domain. These included the company’s annual reports, newspaper articles on the founder or the company, and popular periodicals in academic, business and biotechnology. In addition, the researcher attended conference seminars and lectures over the course of two year, by the founder and Company A’s scientists as well as the company presentations such as annual company meetings and public lectures at the University.

In order to explicate how the employment system of this case study evolved and the influence of the founders in building the employment system, the founder’s cause map constructed from interviews with the founder will be discussed and used as an organising framework to present the data of this case study. This elucidates the organisational blueprint of the founder and how it is used to build the company. The domains of Founder A’s cause map includes employment system antecedents, employment system,
organisational culture and employment system goals\textsuperscript{51}. We will begin with a brief description of how the organisation came into being from the founder’s perspective and then a description of the founder’s cause map will be discussed. Following from this, an analysis of the organisation’s employment system using case study evidence will be presented. A within-case analysis combining evidence from the entire case study will be discussed with reference to the literature.

In general, the main findings from Company A were the effect of the founder’s employment system mental model on the employment system of the company. Founder A’s mental model was influenced by various stakeholders\textsuperscript{52} and antecedents. These antecedents and influences were related to the various stakeholders involved in the company. Stakeholders such as legal advisors played a moderating role in the building of the employment system. Furthermore, the founder’s influence on the design and management of the science in the company was also a significant effect on the employment system of the company. Aside from the moderating effects of these stakeholders, Founder A’s background provided an important source of expertise and influence on the employment system of Company A. The building and design of the employment system from the founder’s perspective was also related to the creation of an organisational culture that reflected norms of professional practice and expectations. In addition, the nature and structure of the employment system of Company A reflected expectations of commitment through a family or collegial working atmosphere. These findings are discussed in relation to the existing literature.

**FOUNDER DESCRIPTION AND BIOGRAPHY**

The founder of company A, Founder A, is aged 50+. He is the current CEO of Company A and is still active in the day-to-day operations of the business. In addition to being

\textsuperscript{51} These domains represent founders’ employment system cause maps and the standardisation of these maps will be detailed in the next section.

\textsuperscript{52} It is acknowledged that the use of the use of the term “stakeholder” implies organisational theories such as stakeholder theory (Freeman, 1984). However, this was a natural term used by the founder to indicate key advisors as well as key stakeholders and is not used in the same theoretical context as these academic theories.
CEO of Company A, Founder A also serves on several industry and professional scientific boards and societies\textsuperscript{53}.

Founder A completed a PhD in microbiology in 1967. His post doctorate activities included a combination of commercial and publicly funded institutes. After completing his PhD, Founder A took up postdoctoral work at one of the first biotechnology companies in the United States. Following from this, Founder A accepted a position as Associate Professor in the Department of Microbiology at a prominent United States university. He was promoted to Professor in 1978. Founder A then returned to New Zealand after 15 years overseas to accept a professorship at the local university, a position which he held for ten years.

In the early 1990s, on his sabbatical from academia, Founder A was invited to be an interim director of research for a large and successful biotechnology company based in the United States. On returning to university, Founder A approached the Vice-Chancellor at the University to get time from work to start a company. After six months of promoting the idea to investors and developing business networks, Founder A founded his first company, Company A, in 1994.

Founder A was the founder and CEO when the company was founded in 1994. He steered the company through its start-up and establishment phase and continues to lead the direction and management of the company. The idea for founding a biotechnology company at the time was a mixture of opportunity and the growing interest in biotechnology as the next economic and technological age. As previously described, the founder came from a University background having left a professorship to found this new company.

Founder A

\textit{We had this vision that we would start a biotech company here and build a very modern genomic platform and yes, we would look at therapeutics for health but we would use that platform to look at the genomes of the organisms that would be economically important down here which were forests, trees and grasses and livestock...and this was way off the radar screen for companies particularly in the US cause they were all focus on the human genome}

\textsuperscript{53} The founder’s history and biography is summarised from interviews with the founder as well as archival evidence about the founder from sources such as newspaper and magazine articles, and company profiles.
At the time of the 1980s and the early 1990s, Founder A noted that biotechnology was the future technology and the next economic wave. The current growth and successes of biotechnology companies and investment into biotechnology particularly in the US influenced Founder A in commercialising the work that he was doing at University. He thought that creating a company might have important economic and intellectual advantages for research.

Founder A
What I saw in the US in the 1980s was a lot of people leaving university going to form companies particularly in the area of immunology and haematology and we were doing similar work in the medical school...and I began to realise that the balance of power was shifting and the best science is actually being done in these new creative young companies

Following his year-long stint as Director of Research for the biotechnology firm, Founder A decided that the time was right for founding a company.

Founder A
...so in 1992, I had a sabbatical, I went to (colleague’s company) in Seattle and worked as a Director of Research for a year and that made me, ah convinced that if you really wanted to do modern biology... either you really needed a lot of money in the University or you had to go out and raise the money and form a company. I decided that I would go and raise the money and start a company and pretty much do the same kind of work that I was doing at the University and I thought I could do it better off venture capital and investor funds

Founder A also expressed a belief that biotechnology was the way of the future not only in science terms but also from an economic perspective. The confluence of events that appeared to influence Founder A’s thinking also appeared to be the issue of the economics of science that include funding for science.

Founder A
At the time, this was 1993, the...writing was on the wall. The health research council wasn’t growing, the public research funds wasn’t growing, and I personally felt that not only was the time right to start a biotech company in NZ, but, I had this conviction and I still do, that if NZ is going to do well, its got to transform its mainly agricultural economy into a biotech economy. And in the 1980s and the early 1990s, most of the money that was going into biotech was actually going to health. And...it was important to understand at that time that technology was growing, that’s genomic technology...several groups was going to sequence the human genome. And that was a big undertaking but you could see right back then that whoever captured the biological information would
actually capture the future of the industry. Because industries at the end of the day is built on information and who controls the core information controls the business.

Founder A joined forces with two key players from a financial institute that he had met through business networks and this helped Founder A develop the business plan and find the right networks. After about six months promoting the idea to many business institutions, key contacts were made with lawyers and financial institutes that would be decisive in forming the company and its features. These key people would have a major influence on how the company was formed and how money was raised. At this time, Founder A also found that leaving the University permanently would facilitate fundraising for his new venture.

Founder A
...so I decided that I would leave the University and that was a big issue because I thought I could raise the money but I hadn’t raised anything at that point. But I left the University and became full-time in this newly forming company and then I found I could get money, get commitments. And I think for a lot of people even today who try to raise money and can’t. The issue to the investment community, I’m sure is that if I was an individual trying to raise money and I had a professorship in the University, well...I had a very secure position. And to the investment community, they are always reluctant to put money into an individual who’s got another job. And I think that when I left and decided this was it... they had more confidence to invest money into this little venture and into me.

Having raised the required funding, Founder A decided that he needed to build the company around people. Acknowledging the serendipitous events that followed, Founder A approached the University to allow the transfer of research funds from the University to the new company along with its people. The funding from the university essentially funded about 25 people from the University. This was a particularly controversial request on the part of Founder A.

Founder A
The University allowed me to approach each person that was supported by my grant and to come with me. They all came. And one of the small committee that was put together by the University to look at it and... the chairman of this committee, I always remember, he went through and heard the story, then he realized that everyone that was coming with me was supported in the University by soft money, on grant money. So they had no security and none of them had superannuation funds or anything like this. And he couldn’t believe it. And so
he went back to the University and said, look this is crazy, what are we doing blocking people from starting something...they have no committed salary, they don’t have money for superannuation, if they want to go start a company and try to create some security doing science then they should

CAUSE MAP OF FOUNDER A

In order to organise the analysis of the founder cause maps with evidence from the company’s employment system, the cause maps of the founders are discussed around the domain maps of the employment system. This allows an examination of the mental models founders have of the employment system and analyse their effects on the companies that they have built. In addition, this allows a naturalistic approach to be followed that contrasts the founder’s mental model with the employment system of the company.

Founder A’s 30 standard concepts can be grouped and understood under domains labelled employment system influence, the employment system, organisational culture and employment system goals. Table 4.1 highlights Founder A’s standard concepts in his cause map. These level groupings allow the ability to frame the analyses of the employment system around these concepts. Understanding the founder’s cause maps around these groupings can be interpreted as centring on aspects of the employment system. In this case, Founder A’s employment system mental models contain concepts that influence the structure and aspects of the employment system and their causal linkages. These include influences on the employment system practices, such as those from venture capitalists and university advisors that may impact on aspects of the founder’s employment system practices itself. The employment system concept grouping or domain maps have to do with the functional policy and practices of the employment system. The domain map of organisational culture contains concepts of culture in the organisation that the founders are trying to achieve with their models of the employment system.

The cause map can be seen to impact on employment system goals; this group represents organisational level concepts of performance goals and results. Thus, the discussion of founder’s employment system mental models will be around the four domains of employment system antecedents, employment system, organisational culture and
organisational goals. These domains emerged from the analysis of the founder’s interview and form the basis for cause mapping. The rationale behind these domains is discussed below.

Table 4.1. Founder A standard concepts

<table>
<thead>
<tr>
<th>Standard Concepts</th>
<th>Domain Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. University Advisor</td>
<td>Employment system antecedents</td>
</tr>
<tr>
<td>2. Legal Advisor</td>
<td></td>
</tr>
<tr>
<td>3. Venture Capitalists</td>
<td></td>
</tr>
<tr>
<td>4. Science as a business</td>
<td></td>
</tr>
<tr>
<td>5. Extensive Pipeline</td>
<td></td>
</tr>
<tr>
<td>6. Controlling Core Information</td>
<td></td>
</tr>
<tr>
<td>7. Technical Background</td>
<td></td>
</tr>
<tr>
<td>8. Commercial Background</td>
<td></td>
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<tr>
<td>9. University Background</td>
<td></td>
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<tr>
<td>10. Other Companies</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Standard Concepts</th>
<th>Domain Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Find the best</td>
<td>Employment System</td>
</tr>
<tr>
<td>2. Attract People</td>
<td></td>
</tr>
<tr>
<td>3. Commitment</td>
<td></td>
</tr>
<tr>
<td>4. Best Knowledge and Skills</td>
<td></td>
</tr>
<tr>
<td>5. Fit the Culture</td>
<td></td>
</tr>
<tr>
<td>6. Professional Evaluation</td>
<td></td>
</tr>
<tr>
<td>7. Peer Control</td>
<td></td>
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<tr>
<td>8. Senior Management</td>
<td></td>
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<tr>
<td>9. Planning</td>
<td></td>
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<tr>
<td>10. Competitive Salary</td>
<td></td>
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<tr>
<td>11. Stock Options</td>
<td></td>
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<tr>
<td>12. 1st Class Facilities</td>
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</table>

<table>
<thead>
<tr>
<th>Standard Concepts</th>
<th>Domain Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Excellence</td>
<td>Organisational Culture</td>
</tr>
<tr>
<td>2. Professionalism</td>
<td></td>
</tr>
<tr>
<td>3. Communication</td>
<td></td>
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<tr>
<td>4. Working in Teams</td>
<td></td>
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<tr>
<td>5. Regular Control</td>
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<td>6. Deal with Failure</td>
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<table>
<thead>
<tr>
<th>Standard Concepts</th>
<th>Domain Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Science Results</td>
<td>Employment System Goals</td>
</tr>
<tr>
<td>2. Commercial Products</td>
<td></td>
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</tbody>
</table>

The standardisation of the cause maps used a ‘soft’ approach that replaced synonymous expressions with a typical term, close to the founder’s natural vocabulary (see Appendix D for a full description of the comparative cause mapping approach). The cause map was built around the standardised concepts from the founder’s mental model of the employment system. Analysis of the standard concepts allowed categorisation of the domains of the employment system mental model54. These domains reflect human resource and employment system models found in the literature (Beer, Spector,

54 Due to the ongoing nature of the data collection and large amount of data generated through the interviews with all founders, this process was an iterative one where analysis went back and forth between the data collection and data analysis phases (Eisenhardt, 1989; Ellram, 1996). This approach is also advocated by Laukkanen’s (1996) comparative cause mapping standardisation.
Lawrence, Quinn Mills, & Walton, 1984; Pfeffer, 1994). The validity of this approach was obtained by getting the founder to review and affirm the ensuing cause maps (including its domain content) for external validation.

Founder A’s employment system antecedents include university advisor, legal advisor and venture capitalists as external influences on the building of the employment system in the company. Other companies also appear to impact on the employment system. The founder’s individual background such as his technical, commercial and university background also feature as influential concepts in Founder A’s employment system mental model. Organisational strategy around science as a business and the company’s model of having an extensive pipeline and control core information are important factors in the employment system mental model.

Examining features of Founder A’s employment system mental model, find the best and attract people appear to be connected to the founder’s requirement for attracting and getting the best people for his company. In terms of selection, commitment, best knowledge and skills, and fit the culture are important concepts in selecting people for the company. Other employment system policies and practices include professional evaluation, peer control, senior management, as modes of coordination and control and planning, competitive salary, stock options, and first class facilities as ways in which Founder A attract people to the company.

Organisational culture features such as excellence, professionalism, communication are espoused features of the culture that Founder A wanted to create with the management of people in his company. The expectation to work in working in teams, having a programme of regular control, and the ability to deal with failure are important cultural aspects of the organisation that Founder A attempted to create. Founder A links features of this employment system with the organisational goals of achieving science results and commercial products.

55 For example, the employment system antecedents domain reflects stakeholder influences as described by Beer et al’s (1984) Harvard model, while the employment system domain reflects practices generally found in descriptions of high performance work systems (Becker, Huselid, Pickus, & Spratt, 1997; Becker, 1962; Pfeffer, 1994). The organisational culture domain draws its standardisation from the literature on organisational culture (Deal & Kennedy, 1982; Ouichi, 1981; Peters & Waterman, 1982).
Examining Founder A’s cause map for centrality, **find the best** and **excellence** are the two most central concepts in the cause map. Total degree of **find the best** is ten while **excellence** has a total degree of eight. This can be seen visually in Figure 4.1. This suggests that these two concepts are important concepts to Founder A’s employment system mental model. An analysis of the founder cause map and the employment system of the company will be made around these broad areas of the employment system in the within-case analysis.

The full cause map of Founder A reflects domains of employment system antecedents, the employment system itself, its effects on organisational culture and the employment system goals. While Figure 4.1 shows the full cause map of Founder A, including its causal linkages among the various domains, each domain will be discussed and analysed separately in order to focus on the founder’s mental model and its effects on the employment system in Company A.

**WITHIN-CASE ANALYSIS**

This section integrates the three dominant methodologies in the discussion of how the founder’s employment system mental models impact on the organisations they’ve built. In particular, the founder’s cause maps of the employment system will be used to organise a discussion of the founder’s organisation building efforts. The next section will discuss how Founder A’s employment system mental model as represented by the cognitive cause map impacts the organisation as evidenced by the data collection in the case study. The objective of this analysis is to triangulate the different methods of data collection in order to explicate founders’ employment system mental models and the impact on the organisations they build. The following analysis begins with an in-depth analysis of the influences that impact on the employment system mental model. This is followed by an analysis of the employment system and its subsequent impact in creating an organisational culture conducive to creating and achieving organisational goals.

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56 As discussed in the methodology of comparative cause mapping (Appendix D), total degree indicates the total number of causal linkages to and away from the standard concept. This is a measure of centrality or importance of the concept in the participant’s cause map.
Figure 4.1. Employment system cause map of Founder A

Employment System Antecedents

Ten standard concepts were identified as influencing Founder A’s employment system mental model in Company A. These include external partners such as university advisor,
legal advisor, venture capitalists; the organisational strategy such as science as a business, extensive pipeline and control core information; the founder’s individual background such as technical background, commercial background and university background; and other companies. These concepts form important influences on the employment system. Figure 4.2 shows the domain map of employment system antecedents in Founder A’s employment system mental model.

External partners represent an important group of influence to this founder’s employment system mental model. Founder A identified the university advisor as a source of support and advice not only on the formation of the company but as a source of influence in the formation of the employment system. The university advisor concept is identified as representing people from University that the founder worked in. This includes key people such as the vice-chancellor, and colleagues at the university that Founder A worked with. The university advisor concept was particularly influential in allowing the founder to find management experience and the senior management in his company. This was informed by the founder’s own networks from his university background. In particular, the founder utilised this network to find key people in his senior management team in the early days of the company and remains an influential way of finding chief scientists and employees in the company. This is corroborated by the HR Manager who identified that the founder’s networks are an important source of recruitment and that senior members of the organisation came from the founder’s previous university contacts.
Legal advisor is an important key influence in the founder’s employment system mental model. Legal advisor represents external partners such as lawyers who helped set up the company. The founder is particularly influenced by this particular group as this was his first company and the governance of the organisation was left in the hands of this particular partnership. The lawyers for this particular company were especially influential not only in setting up the corporate governance of the company but also as a source of influence for a particular employment system practice, employee stock options in the company.

Founder A

*I don’t know what I would have done without (lawyer name), because he’s my legal advisor today, he’s been with me the whole time, (lawyer name) dealt with all the company formation and he dealt a lot with that. But you got to have people you have to trust because at the end of the day, they take out and do that portion, so he put together the company, the constitution...he put in place an employee share option plan, which was absolutely novel in NZ at the time (for the biotech industry).*

Venture capitalists also seem to function in advising the founder on the basic direction of the company and its strategy. The organisational business plan seems to be influenced by these financial advisors and influence the employment system indirectly through the setting of the organisational strategy and vision. In the early days, these financial advisors were important in signalling the goals and needs of building the company. By advocating science as a business and making the business plan viable and attractive, finances were secured and the building of the employment system could begin. The venture capitalists were also associated as key people in forming the network and structure of the company. Venture capitalists and legal advisor appear to be the first key people in the formation of the company that would influence the company’s basic strategy, and indirectly the employment system. The influence of these two groups of external partners can be corroborated by archival evidence and by the senior scientist of the company.

Investment Periodical

*(on the role of financial investors and Founder A)...fruitful partnerships that help set up the business...the net result is the partnership has increased their exposure to the business world...and provide different approaches to solving problems.*
Senior Scientist

...(Founder A) spent a lot of time with (lawyer’s name) to set up the business...

The impact of these various stakeholders highlight the importance that these stakeholders have on the employment system mental models of founders as well as the employment systems they’ve built. The idea that stakeholders have a significant effect on the subsequent employment systems of firms has been explored in the literature (Boxall & Purcell, 2003; Donaldson & Preston, 1995; Kochan & Dyer, 1993). From a theoretical perspective, Boxall and Purcell (2003) highlighted the importance of understanding stakeholders needs and wants in the HR planning process.

Because firms are networks of stakeholder groups, we must expect that any major initiative involves political management, particularly where investors must be persuaded to support the initiative or where employee groups are being asked to make changes that threaten their interests...In a nutshell, firms are beholden to stockholders (who supply financial capital) but they are also dependent on any stakeholder group (such as suppliers and key customers) that contributes resources that are valuable to the firm (Boxall & Purcell, 2003, p. 39).

However, there is little evidence of the way in which stakeholders impact the employment system. Company A provides some evidence for the impact that stakeholders may have on founders’ mental models of the employment system. The commitment and help that various stakeholders such as venture capitalists or university advisors provide may very well shape aspects of the founder’s employment system mental model and the employment system that emerges. The influences from venture capitalists, legal advisor, and university advisors have a significant impact; indirectly, through advice and expertise; and directly through influencing the setting up of aspects of the employment system such as the introduction of stock options in Company A. Haunschild (1994) asserts that these inter-organisational relationships are important determinants of organisational characteristics and can form important influences on each other.

Organisational strategy also appears to be an important factor in the employment system mental model. The particular approach of commercialising science as a business in Company A is an important precursor to the development of the employment system. Founder A highlights the specific approach of Company A by emphasising the extensive pipeline strategy of Company A.
Founder A

...I saw science as a business. And today I would say our business is doing good science. And I’ve felt for 30 years that if you do good science, really good science, it’s very easy to sell it. If you do lousy science, it stinks no one is going to be interested...so I decided that what I wanted to do was to build a science company which meant that in the formative years, the emphases were in terms of the people, what we build and our business development processes...the emphasis in terms of the people, what we build, and our business development processes were all based on our approach to science and technology.

As illustrated above, the organisation is one that bases its business on a diversified platform in technology. This was a deliberate move by Founder A to distinguish it from other companies, especially in the United States. Founder A also saw this as a basis for competitive advantage. Founder A spent time at length to emphasise that this particular niche in business is wholly dependent on finding the best talent in order to lead and control the core information that is required. This was often repeated in his discussion of the staff and the vision of the business.

The evidence presented in the SPEC projects showed that strategy matters (Burton, 2001). Depending on the type of strategy that firms pursue in the business environment, employment systems of the firm are dependent on the strategic direction of the companies (Boxall & Steeneveld, 1999; Burton, 2001). The mental model of Founder A suggests that where matters of employment are concerned, Founder A was able to express and link the formation of strategy for their organisation building with the required employment system requirements. This is important for two reasons. Firstly, research on cognition assumes the ability of founders to process information and make decisions is confined by their cognitive limitations. That people are subject to ‘bounded rationality’ (Simon, 1947) is not a new idea, however, ideas detailing the emergent nature of strategy and human cognition has only started to illuminate our understanding of the strategic management of human resources and employment (Boxall & Pureell, 2003; Child, 1997; Eisenhardt & Zbaracki, 1992; Mintzberg, 1978). Founder A’s employment system mental model suggest that the cognitive element of strategy is an important precursor to the building of the employment system. The nature of how strategy influences the employment system can be traced to the developments for putting in place the appropriate managerial and administrative policies and practices (to the founder’s mind). Strategic management of biotech companies and the ongoing process of managing its valuable human resources accordingly is highly complex work. Thinking around the strategic
direction and intended pursuit of competitive advantage has significant impact on the
decisions around the employment system (Barr et al., 1992; Boxall & Purcell, 2003;
Eisenhardt & Zbaracki, 1992; Hambrick, 1995). This is also influenced by the
stakeholders and individual background of Founder A.

Founder A’s unique background and characteristics played a role in the formation and
influence of the employment system mental model. Founder A’s technical background
forms the basis of his technical experience and skill. Having a PhD in his area of
expertise was for Founder A, his knowledge and technical skills in understanding the
research and work processes including how development of his intellectual property was
to be achieved. His technical background also afforded him an insight into how
employees liked to work in his particular discipline. Founder A’s university background
was important in that it allowed him to form many of his networks and contacts, which
still remains a resource of considerable value. These networks and contacts allowed
Founder A to find the appropriate scientists and top management team that would
constitute the key managerial people in Company A. Founder A’s commercial
background also allowed him to understand the imperative for forming the appropriate
employment system in his company. This impacted on the strategic orientation of
Company A.

One of the interesting findings from Company A is the role that these technical
experiences play in the formation of the employment system. Burton (2001) found that
non-technical experience in the top management founding team in her high technology
sample were more likely to result in deviation from the dominant forms of employment
systems within the industry. She hypothesised that prior experience of the founding team
such as management experience and founding experience may have a significant impact
on the building of the organisation (Cooper, 1985; Finkelstein & Hambrick, 1996;
Fligstein, 1987). The findings from this thesis are able to build on how these experiences
(and specifically, the types of experience) affect the formation of the employment system.
It would seem that technical experience forms part of Founder A’s ability to understand
and appreciate the science and research potential of the intellectual property for
commercialisation. Technical experiences in education and research produce an interplay
with the employment system imperative (finding the best). Founder A’s employment
system model also stresses the role of his commercial experience in forming the strategy
of his company. Founder A’s commercial background helped him model the strategy of the organisation (and the subsequent employment system) from his previous experiences in industry. This has a significant impact on the employment system. This finding highlights the role that differences in background make on the underlying strategising and organisation building process (Hambrick & Mason, 1984; Murray, 1989). Prior work experiences form a very strong expectation for what employment systems should look like (Aldrich & Von Glinow, 1992). In this case, Founder A relied on his previous knowledge and experiences to help him model his organisation on previous employment models that he experienced. In addition, these experiences allowed Founder A to form the important networks required to build the social and human capital necessary (Murray, 2004). This fits in well with Shane’s (2000) ideas of how prior experience is associated with opportunity recognition. The idea that founders learn from their experiences and develop “knowledge corridors” (Venkataraman, 1997), forms the basis for how experience is encapsulated into recognising opportunities (Shane, 2000). In the same way, the building of the employment system in nascent organisations is predicated on the formation of cognitive organisational models developed from experience. The implications from Company A is that the organisation employment system may be determined by prior experience and individual differences that occur prior to firm formation rather than at birth (Shane, 2000; Stinchcombe, 1965).

The last influence on the employment system is that of other companies. Within this concept is the founder’s network of rival companies and companies that he previously worked for as well as companies that colleagues have founded that have impacted on the employment system building of Company A. These constitute a major influence on the Founder A’s knowledge and experience in handling aspects of the employment system. Other companies also represent a source for finding the best talent required for Company A’s directed business strategy. Furthermore, other companies may also set the competitive salaries afforded to star scientists and the best talent within a particular labour market. Founder A utilised the organisational model of a colleague’s company where he worked as a Director of Research on his sabbatical.

Founder A

…I maintained my friendship with (colleague name) at (colleague’s company) so I followed very closely their own business model and how they proceeded so I learnt a lot from that.
Having other companies in the form of rival companies and network companies allowed Founder A to adapt and choose aspects of the employment system that he found to be successful.

Founder A

I was in a very privileged position because when (colleague’s company) started in 1994, in the US, there were 2 or 3 very very successful biotech companies who were about 12 years old at that time, there was (colleague company), who was run by my friend, (colleague’s name), there was (rival biotechnology to Company A), who bought (colleague’s company), several years ago for ten billion... and (rival biotechnology). And so, I had, I knew the founders of these companies, I watched them grow and so... my aspirations were to actually try and adapt what was good in their business model and their philosophy back here to actually grow so... I had a very clear idea in my mind of what I would like to achieve, and the route I wanted to go... but it wasn’t a prescribed plan and there was no certainty that I could do it, and I found very quickly that as long as you had a template in your mind and you stick to it you adapt as you go along because they were not bolted down.

As stated previously, other companies influences Founder A’s employment system mental model because the companies within Company A’s industry are competing for the same labour markets. With respect to the competitive environment of these Company A, Founder A expressed the impact rival biotechnology companies have on the recruitment of employees and in setting the market rates for scientists in his company. This is seen to have both a direct and indirect effects on aspects of the employment system in the mental model. Other companies in the form of rival biotechnology companies or companies that resemble Company A represented both as a model to emulate and a competitor in terms of the labour markets that the companies competed in. Founder A’s employment system mental model illustrates how some companies perceive the competitive groups in their industry (Porac, Thomas, & Baden-Fuller, 1989). The companies found to have a direct impact on the employment system are firms that are similar to Company A. These companies are often overseas companies from which Founder A modeled the building of the employment system.

Within the sector, other biotechnology companies did not consider each other to be of direct import due to the particular niche and geographical location. This is in spite of the insistence of Founder A, as well as Company A’s COO and HR Manager that the rivalry between biotechnology companies in the sector was of little significance due to its small size. Interestingly enough however, the mobility of executives among Company A were
found to be highly salient, with management talent from Company A having had worked in the other similar companies in our sample at different points in time. In addition, many of Company A’s executives and scientists were heavily headhunted in the sector by other companies.

**HR Manager**

*I look at (biotech company name), (scientist’s name), he was hired out of our business development and if I look at (biotech company), (executive’s name 1) and (senior scientist’s name) has been hired out of strategic business development to go into there...(executive’s name 2) was hired out of (Company A) to go out and run (biotech company name 2). (biotech company name 3) has hired some of our staff to go into their organisations into key positions.*

The mobility of key executives to move from one company to another within this regional sector is relatively easy. One possible explanation is the size of the industry fosters a more collaborative attitude based on the relationships of the people within the industry in order to maintain viability and cooperation as an industry. Another alternative explanation is that Company A does not view other companies in the regional sector as rivals and therefore, believes their needs are different to other companies. Responses from the top executives interviewed in Company A and Founder A themselves view their firms in contrast to the other companies within the sector as “unique” compared to the other companies in the sector. In the absence of a perceived similarity among the firms, the perceived competition for key talent is diminished.

Summarising the employment system antecedents, Founder A had several important influences in the building of the employment system. These influences include the founder’s own background, external advisors, the strategy of commercialising science and other biotechnology companies. Employment system mental models are informed by an individual’s experiences and background. This is particularly lucid in the mental models of Founder A. Elements such as the Founder A’s technical background, commercial experiences and his work in academic settings impact strongly on the evolution of the employment system they build. Burton’s (2001) study found that the models of employment systems in her sample were mediated by experience in the form of management experience, and technical experience. Founding teams were likely to deviate from a dominant industry model when there were more senior management experience and non-technical experience in the founding team. The implications from
this thesis suggests that experiences in the form of previous work and commercial experiences form part of the formative influences on founder’s mental models. For Founder A, past commercial and academic experiences of working in laboratories significantly affected the formation of their employment system mental model. This to some extent validates findings in Burton’s (2001) work in how experience generally affects the formation of the employment system. The implications being that founders generally bring into the formation of the employment systems lessons learnt from their work experiences in terms of how they would like to be managed and the best ways in which to achieve work. This is highlighted by Founder A in that his commercial experience in his previous company was the blueprint for the employment system in Company A.

The other key finding regarding the employment system antecedents domain is of the impact that other biotechnology firms have on Founder A’s employment system mental model and on the employment system of Company A. The assumption that founders have perfect knowledge regarding the business environment when building their firms is simplistic and non-productive. As can be seen by Founder A’s mental model, the building of the employment system points to limited knowledge of the impact of the other companies on the employment system of Company A. This impact is largely on the setting of competitive salaries for key employees in Company A. Aside from the acknowledgement of other rival companies within the sector by Founder A, the COO and HR Manager, there are relatively little direct links of the employment system mental model to other aspects of the environment that may impact significantly on the employment system. The extant literature however, has identified important factors in the emergence of the employment system. The literature from sociology, for example, have focused on founders or entrepreneurs ‘cultural’ environments and societies in order to explicate social norms and societies in legitimising individual and collective activities (Geertz, 1963; Waldinger et al., 1990; Weber, 1958). The theories from economics focus on the structures of competition and resources among firms and populations in order to determine the rates of founding and forces for economic activity in these populations (Schumpeter, 1934, 1950). Organisational theorists, on the other hand, have highlighted various approaches to the development of organisations that draw on institutional and environmental factors (Astley, 1985; Barnett & Carroll, 1987; Baum & Singh, 1994; Tushman & Anderson, 1986). While this is a simplified description of each research
stream and more often than not, these theoretical perspectives overlap, the point is, at the level of the individual founder, environmental factors such as the competitive groups that companies identify with may inadvertently influence the formation of the employment system. This fits in well with Romanelli & Schoonhoven’s (2001) idea that the formation of a new venture proceeds not only from the internal capabilities of the firm but also from knowledge about local markets and competitive conditions for new products and services. This indicates that with regards to the building of the employment system, other companies are important as a reference point, both in comparisons as well as models to be emulated, than any other aspects of the company’s environment.

**Employment System Domain**

Twelve standard concepts made up this domain. The standard concepts were find the best, attract people, commitment, best knowledge and skills, fit culture, professional evaluation, peer control, senior management, planning, competitive salary, stock options, and first class facilities. These concepts form the employment system policies and practices that Founder A articulated as important in managing people in the firm. Find the best and attract people standard concepts would be related to recruitment, while commitment, best knowledge and skills and fit culture concepts would be related to selection. Professional evaluation, peer control and senior management are related to performance management. Planning, competitive salary, stock options and first class facilities are other aspects that Founder A emphasised as important. This can be seen in the domain map in Figure 4.3. The features of Founder A’s employment system mental model represents the organisation of work and employment system practices that he finds most appropriate in the building of an organisation. The employment model thus may reflect the ongoing pressures of market forces, globalisation, and technological change that allowed a transformation to the principles of work organisation and worker expectation (Osterman, 1994). As can be seen in the high-technology industry and descriptions of the knowledge economy, work organisation in firms with high knowledge capital requires a flexible structure that emphasises teamwork and greater employee discretion (Proctor & Mueller, 2000). The employment system mental model that Founder A has is a reflection of these pressures in the formation of employment systems and employee expectations.
With regards to recruitment, Founder A had an underlying philosophy in recruiting people for his company and one that is still the philosophy advocated in the company today. Finding the best talent for the company is the utmost importance to Company A. Founder A repeatedly stated his philosophy for getting things done in his company as “finding the best”. Examining Founder A cause map situates this concept as central to the employment system mental model. This emphasises its importance and centrality in the founder cause map.

Founder A
You’re a science company and you’re building an organisation around people and their brains, you hire the best...for me, I just sought out who I think is the absolute best and I hire them and I get and try and grow the job around them.
In terms of recruitment, the methods used are those that represent standard practices of recruitment. The standard practices described by the HR Manager include the use of national newspapers, scientific periodicals, and specialist employee magazines and very occasionally the use of specialist employment databases from specialist recruiters. The HR Manager outlined that the normal procedure for recruitment usually meant finding potential candidates within the company, then nationally before going overseas with a particular emphasis on recruitment in Australia. However, one of the interesting aspects of the recruitment process within this company is the utilisation of Founder A’s networks to find employees. This was also highlighted by the HR Manager and COO of the company as an important source for recruitment. For Company A, the use of the founder’s social capital represents an important source for the company’s labour pool. These networks form the basis for ideas about the social capital of founders and their impact on the firms they create (Burt, 2000). Murray (2004) suggests that academics that start biotech firms bring into the firm their social capital, formed from their local laboratory networks as well as their wider affiliations with colleagues and collaborators. For Company A, the social capital of Founder A impacts on the way in which employees are recruited.

The logical extension of the find the best philosophy in looking for the best talent in their particular field is that selection methods follow from this concept. This concept also leads to another related recruitment practice, that of attracting the best talent to the company. In this case, attracting people to work for the company include a mixture of offering compensatory benefits in the form of a highly competitive salary, stock options and the ability to do high quality research in their first class facilities. As discussed earlier, stock options were devised by legal advisors in the founder mental model. Finding the best also influenced the concept of having professional evaluation as standards of quality needed to be monitored and evaluated. The HR Manager and COO of the company also expressed this in terms of recruiting for the company. The HR Manager outlined several places where the company advertised for employees. While advertisement for positions highlighted the highest of qualifications and standards expected (advertised position from employment periodical, 2001), it is the search that the company goes through that reflects this practice of finding the best talent. The HR Manager stated a typical search for candidates:
Firstly, we would search NZ for any such capabilities. However, if we do not find the candidates we need we would typically go overseas, most often Australia, to find the candidates we need, we’ll use whatever sources we need to satisfy our requirements...sometimes, this comes from (Founder A’s) networks.

The emphasis for finding top talent and stocking his company with people that were exceptional in their job is seen as crucial to Founder A. The idea that founders are cognisant of the links between people and the organisation’s viability and success has always been recognised and described by the literature (Baron & Kreps, 1999; Boxall, 1992). Much of the strategic human resource management literature has shown a link between employees and business performance (Baron & Hannan, 2002). The empirical data collected from Company A demonstrates that Founder A and executives of Company A are highly aware of the need for key employees and scientists to bolster and support the research of the founders. The assembling of a coherent employment system with key employees and the best talent is a basic requirement for the knowledge industry. Assembling the employment system or their laboratory becomes of primary importance and the recruitment of key scientists is crucial in allowing founders to justify their absence and work into the hands of others.

In order to understand the founder’s role in assembling the human and social capital of the company, an understanding of the founder’s social capital is required. Founder A’s networks are a significant source for recruitment of potential employees. The importance of these networks has been looked at in the literature of founder’s social capital. One study that examined the role of founders’ social capital found that this was a significant factor in the survival of the new venture (Shane & Stuart, 2002). Their analysis focused on the role of founders’ social capital as a determinant of these outcomes. Event history analyses show that new ventures with founders having direct and indirect relationships with venture investors are most likely to receive venture funding and are less likely to fail. In turn, receiving venture funding is the single most important determinant of the likelihood of IPO. They concluded that the social capital of company founders represents an important endowment for early-stage organisations (Shane & Stuart, 2002). The idea of social capital and its inherent importance to a start-up venture is not limited to this study, some have argued that the founders’ social and human capital networks are a significant resource for the new venture and innovation (Murray, 2002, 2004). The empirical evidence from this thesis highlights that founders in building their employment
systems at least, utilise their social capital in finding the right kinds of employees for their firms. These resource advantages not only extend to staffing their firms but also represent resources for the building of their laboratories and research infrastructure (Murray, 2004). Shane and Stuart (2002) advance the idea that it is the social capital of the entrepreneurs that forms the basis for making investment decisions. The information used to assess a new venture’s quality incorporates an evaluation of the firm’s founders.

Firm founders are often the leading experts in the relevant area of technology, and therefore are the best informed about the feasibility of a proposed technology (Shane & Stuart, 2002, p. 156).

In some respects, the founders are often looked to for the building of the employment system of the firm for the very reason that they are the experts in their IP and how to develop the science. The perspective of sociology may offer some explanatory mechanisms for the use of founders’ networks as a legitimate pool for employees. Actors rely on social networks to select employees because these networks work on the basis of experience and enforce the reputation and behaviours of players and are sources of verified behaviours (Granovetter, 1985; Raub & Weesie, 1990). Networks serve two purposes, the first is to facilitate the pool of labour that founders and their company may draw on. The second is to facilitate and enforce the quality of this pool by working as a mechanism for information about scientists and forms the way in which these information is relayed to its members (Shane & Stuart, 2002). In fact, Audretsch (2001) found that the role of a well-respected scientist affiliated with the new firm signals the quality of the underlying science. The signal helps to overcome the challenges that investors might have in trying to establish the veracity of the complex and highly specialised science that are presented as investments by the entrepreneurial firm (Audretsch, 2001).

Because information about actors’ conduct in previous transactions diffuses through the connections in a network, actors will know of the past behaviours of the other members of the network within their information spheres, and they will have the power to sanction their transaction partners by disseminating negative information about them in the event of malfeasant behaviour (Shane & Stuart, 2002, p.157).

Recruitment represents an area of concern for the company these days, not just in the global labour markets for biotech (Larbey, 2002), but particularly for Company A. The main issue lies in the inability to find capable scientists with commercial experience. The
COO and Founder A both expressed the difficulty currently in finding specialist skills with commercial acumen.

Founder A

*It’s very difficult at the moment because you advertise for scientists and I don’t know where they all are... but it’s like the pool has dried up. And so, it’s I think harder and harder to find scientists with the sets of skills that you actually want to grow... I think it’s a small market so you have to be opportunistic... at the moment it’s tough, I think that we’re probably at a point as a nation where we would need to look carefully at the skills that we want to import and bring in and be far more selective about doing it.*

Following from the concept of finding the best, selection methods were seen as a natural progression in finding the best talent and selecting employees for the company. The standard concepts of commitment, best knowledge and skills and fit culture represent criteria for employees who would work best in the company. While the concept of best knowledge and skills is obvious in its explanation, commitment and fit culture are seen as important determinants for the suitability of candidates in the company. This is an important distinction as Founder A advocated that commitment particularly in getting the best not only meant the top practitioners in the field but also people who were going to be able to commit to the company was an important variable in selecting people for his company.

Founder A

*I decided right from the beginning that I would not hire staff that were, say 50% University and 50% (Company A)... because I felt that... life’s tough and if you face a tough problem, it’s like within (Company A), then what you’re doing at the University was doing well, you’d spend all your time doing at the University whatever you’re University project was... so I decided that either staff would either commit to (Company A) and become full-time (Company A) employees or I wouldn’t hire them. So I wouldn’t take part-timers...and... there are many people who would like to leave the University and do something but don’t want to leave the security of their job and they want a 50/50 relationship so that if something doesn’t go right then they’d have something to go back to.*

The main practice in selecting potential candidates for the organisation is, according to the HR Manager, through the use of “semi-structured behavioural based interviewing”. While many of the science managers in Company A were still being trained with the use of this, the HR manager stated that this was part of the formalisation of selection practices in Company A and part of the reason he had been brought on. Behavioural based
interviewing was seen by the HR Manager as a novel way of selecting within the company and the industry. Project leaders in Company A have said that the bringing in of the HR Manager to streamline the selection process has greatly enhanced their ability to select the right people. The initial steps of the selection procedure involved going through the Curriculum Vitas (CVs) of candidates and shortlisting based on the identified knowledge, skills and abilities. A short list was then formed whereby; project leaders, senior managers and even the CEO became involved in a series of interviews (most often two) with the HR Manager. Most often, the semi-structured interview would cover the research of the candidates, experience and their ability to fit into the commercial organisational culture of the company. The HR Manager does not use any psychometric testing as the “CEO does not believe in testing”. The HR Manager is heavily involved in training and selecting candidates. Founder A recognised the HR Manager as fitting in his vision for employees in that “we’ve got a good person who I work with well, he believes in the same thing”. Aside from having several hurdles in behavioural based interviewing, there appear to be no other selection methods utilised in this company.

The goal for having a fully committed employee would be the creation of a culture of excellence and a progression to greater teamwork within the company. Founder A saw fitting the culture as an important variable in selecting employees. In terms of fostering a culture of excellence, Founder A saw individuals who work well in teams, excelled in their areas of expertise and were professional as very desirable aspects of potential employees. By finding and selecting on these variables, Founder A hoped to achieve and create a culture that emphasized excellence, professionalism, and working in teams. The HR Manager corroborates a high level of expectations with regards to their employees’ work from the managers and the top management team. In the company’s early days, the selection process involved unstructured interviews and the assessment of the candidate’s work. Interviews were often unstructured and did not follow any consistent format. The decisions for selecting employees rested on the manager’s involved and final decision rested on Founder A. In this way, the early days represented little formalisation and who to hire was very much dependent on the founder.

Founder A

...I and the other (managers) used to sit down and pick those we thought would be good for the company.
Senior Scientist
(Founder A) had the last word...we usually met them and did the normal interviews...always it was their research that got them this far.

The formal practices reflect the requirements of the company with regards to the need for key skills and knowledge and secondly the fit for the demands of commercial life. While the formalisation of the selection within the firm reflect a recent development over the past three years, traditional methods of interviewing more often than not reflected the requirements of the business.

Senior Scientist
...bringing in (HR Manager) was in some ways better for our selection practices, perhaps in the past, we would rely most often on the CV more than anything. It really depended on what we were looking for at the time...whether it was expertise or their ability to bring some technical skills...their CVs told us everything

Chief Operating Officer
...we look at their burn rate...we look at how well they would cope within this commercial business...results speak a lot for us

However, when the company grew and a HR Manager was brought on, the process itself was formalised. When selecting candidates from the available pool for a position, the process involved the hiring managers and Founder A (whenever Founder A was available). Typically, the first step, from the HR Manager’s view, in the hiring process is to first meet with the departments involved and this may include consultation processes with team leaders as well as departmental managers. Once it was confirmed that the role is a required one and cannot be fulfilled by internal candidates, the HR Manager along with the team and managers involved would draw up a competency based requirement for the position highlighting the knowledge, skills and abilities. From this, the position is advertised in a variety of media depending on the role. The HR manager has been crucial in the selection phase of the hiring process, as he brought about the technical knowledge and experience in the selection process. This also involved training and consulting the science managers on behavioural semi-structured interview methods as well as the processes for selecting and informing potential candidates (the HR Manager has been with the company for 3 years at the point of the interview). The selection interview may extend over several phases depending on the importance of the role and typically involved the project leaders, science manager, HR Manager and possibly the CEO. Aside
from the rigorous selection methods discussed with the HR Manager, the COO also corrosorates the requirements of Founder A in selection by emphasising the importance of finding the best knowledge and skills and the importance of fitting into the commercialised environment of the company. The COO mentioned that the process for selection in the company was a rigorous one whereby the potential candidate’s abilities are scrutinised in detail. One important aspect that the COO and HR Manager collaborate on the selection within the company is the involvement of Founder A in selecting for the company.

**HR Manager**

...Founder A likes to be involved in the interviews whenever he can...even if it’s a junior level.

**Founder A**

*If you hire clever people, you don’t hire them to tell them what to do. You hire them to use their brains and they’re abilities. So you’ve got to get good at supporting them even when things don’t go right.*

Founder A expressed that following from “finding the best”, the difference in the commercialization of science is that while there were not a lot of direct control in the work of the employees, there are indirect controls on the projects run in the companies. These include professional evaluations by peers and senior management with senior management making the decisions to continue or pull the plug on projects. By obtaining the best for the company, it also allows the use of these “best skills and knowledge” to provide evaluation and consistency of the best science. Founder A remained an important key figure in these decisions. In this company, “democratic forums” were run every three months in order to evaluate progress on all projects. These forums were attended by everyone in the company, and in these forums project leaders discuss their projects and prognosis and plans for the future of their projects. These forums were run like academic seminars in that everyone presents their research results and goals and help was obtained from others in the companies if there were problems. However, decisions about projects at these forums were made principally by Founder A and his senior management team.

**Founder A**

*Now what we do... for the first...6 years we were very Presbyterian about this...so every...quarter, every 3 months. We would stop work for 3 days and we would have a review. And in the first day, every project leader gets up and they*
prepare a talk about what they’re team has achieved, what they haven’t achieved and what the problems are...so that’s the first day and everyone in the company goes to it and on the second day, the project leader has to get up and discuss in front of the company what they are going to do for the next 3 months and there’s a big discussion about it...and the rules are very simple...If you’ve got problems, you put them up there, if you’ve got problems about what someone else is doing talk about it because at the end of the second day, we agree on the plans going forward. The forum is quite democratic but the decision; don’t make any mistake is quite autocratic because at the end of the day I’ve got to be happy with it.

The performance management system manual supports this process with its emphasis on coaching and mentoring in terms of achieving excellent performance. That the company’s hierarchy is flat and open communication and regular reviews are encouraged is also emphasised by the performance management manual.

Performance Management Manual
This section outlines the basics of coaching. It is addressed to managers/project leaders because coaching is primarily their responsibility. Employees who do not have others reporting to them may like to learn more about coaching and look for opportunities to help their peers.

The performance management system within the company has recently been formalised into a system that was designed by the HR Manager for the company. While the new performance management was brought in to formalise some performance management practices, the new system also represented attempts to bring in a competency based system that would be tied into the organisational goals. The performance management system brought in outlines key performance areas that involve individual assessment of the employees and project leaders and managers.

Performance Management Manual
The overriding goal of the performance management process is to improve the performance of the individual employee and hence the performance of (company A). Staff members are to be appraised by his/her Project Leader or Manager and the Division Head reviews the appraisal records. The key outcomes of the performance management system are:

Each employee understanding the Company’s objectives and his/her role in the achievement of those objectives to ensure that individual effort is focused in the right direction

Each employee knowing what his/her position responsibilities and competencies are and how well thee are being achieved
Each employee is involved in setting achievement targets for himself/herself

Enhancement of regular communication on work performance between the staff member and the manager/project leader.

Performance Management within the company is linked to performance planning, coaching and mentoring, performance development, and review meetings. While the formal performance and review discussion was held annually, informal meetings and discussions of teams were encouraged to be held regularly. The HR Manager believes that the implementation of the performance management system has greatly enhanced understanding and streamlining the management processes within the company. This view that is also shared by the COO of the company. The role of Human Resources in the company is to audit the performance management system on an ongoing basis to ensure that it is meeting the needs of Company A and each division are implementing the system in line with the guidelines. Training programmes are run periodically on Company A’s performance management philosophy and framework. It is recognised that performance management is one of the most important components of the project leader/managers’ portfolio.

The importance of planning was brought up in discussion of these democratic forums including dealing with failures in the projects. In building the culture of the company, Founder A emphasized that while finding the best ensures that good science and organisational strategies are being met, planning ensures that work is being driven towards an organisational outcome. This is related to the democratic forums and the regular control enacted by Founder A.

Founder A

When people…leave, at the end of the review they know what they have to do and where they have to be going…now its no crime not to get there but it just means that every three months, we’re taking stock. And most people would say, god, do you really do this? But its only part of the culture...even today, just before Christmas, my project leaders are putting in place the plan for the start of next year. So when people go home for Christmas, they know which teams they’re in, they know what part they’re playing and what they’re doing....So I would say that we have very strong team organisation and a very strong culture of internally assessing our own progress. And...the culture of the company is quite heavily geared towards project reviews and staffs want project reviews to feel that they’re uhm, teams are doing well.
Planning and constant review allows for a more professionally run company and a high level of communication to exist within the culture of the company. Team members talked to highlight the role of planning in their work. The employees emphasise that with particular emphasis on the three month reviews, efforts were always made to meet the progress of their research by having regular planning meetings to discuss their goals and objectives. In looking at the laboratories at the company, there was a main board of progress and responsibilities in each team section. This emphasised the importance of individual responsibility as well as plans for each member during the project. Planning is an important feature in the organisation as it allows for the progress of research and development of organisational goals. The formal review and planning and democratic forums come quarterly. Furthermore, planning is evaluated at the individual and team level as well as at the project level. Planning is tied into aspects of performance management, work coordination and development. The HR Manager has described that planning is important part of the job from each employee up to the senior managers. The workplace of the organisation also has weekly and monthly goals in their laboratory workplace. With respect to HR Planning, the HR Manager recognises this as aligning himself with the Founder A’s plans for the future. While there is not a lot of future forecasting for human resource within the firm, a lot of the HR planning involves the welfare of the employees in terms of training and development at both individual and team levels.

Compensation and benefits in the standard term of competitive salary and stock options are highlighted by the founder as important aspects of the employment system. In terms of competitive salary, its influence feeds into attracting people to the organisation. The COO of the company corroborates the quality of the compensation in the company as “being very high compared to other relative compensation in other areas”. The company offers highly competitive salaries compared to academic salaries and this is highly regulated by the founder. Highly sought employees appear to be compensated at levels set by the founder himself. There appears to be no hierarchical compensation policies or salary banding within the company. Roles within the company also do not reflect salary levels. Scientists within teams are paid differentially and project leaders may sometimes have lower salaries to team members within their groups. The HR Manager also mentioned that some team members are often paid far more than project leaders and managers. Furthermore, the HR Manager confirmed that compensation is at the Founder
A’s discretion. In some cases, the HR Manager has no idea of the salaries of some of the employees. This reflects the “find the best” philosophy of the company in which key talent are given compensation based on their particular expertise and the needs of the company. Senior managers within the company including the COO highlighted the fact that they paid at a competitive level for the industry, higher in the commercial area than for the academic area where many of the employees come from.

Chief Operating Officer
...we can’t compete globally with our salaries, but they are definitely higher for the commercial industry than they are elsewhere. We pay people well here.

The HR Manager seem to corroborate this evidence as he had access to many market pay surveys and reiterates the views of many of the senior managers.

HR Manager
...our remuneration is very good compared to the other companies...I mean, overall, we are probably also higher compared to other Government organisations and Universities.

Stock options were also an incentive in that offering stock options to employees allowed the employees to be committed to the company and to see their efforts being translated commercially. Founder A in particular recognised this as an innovation in the industry and as an important way in creating responsibility within the company. The HR Manager in discussing compensation divulged that often compensation is related to the role and controlled very tightly by the CEO and founder. In some cases, even the HR Manager was not privy to the amount of compensation offered to some of the scientists in the company. An employee also expressed that compensation levels in the commercial environment were very good compared to academic settings and other research institutions. The same informant expressed the that it was one of the things that attracted her to the company as well as the working environment which was described as “the forefront of technology and being able to do something where results could be directly assessed and rewarded”.

Another related variable to compensation and benefits is that of the first class facilities. Founder A was proud of the facilities they’ve built over the years and represented state of the art laboratories and represents the diversity of interesting research available within the
company. Founder A also saw the link between having the physical facilities and technology to carry out work to a high quality. Life, disability and income protection insurance are paid for by the company. Company A also pays for the administrative charges for programmes in health insurance and retirement savings schemes. Free parking is also available to employees on a first come, first serve basis. Other benefits that the HR Manager and other employees expressed as being an advantage for working in the company included the lifestyle of relocating to New Zealand and its environment while working in a first rate technological company, professional development, and the young and innovative working environment of the company. The reputation of a laboratory particularly a biotechnology company is an important factor in the recruitment of scientists. McMillan and Deeds (1998) found that laboratories that encouraged publication support matter to prospective scientists in deciding whether to join a company. However, the quality of research staff, working conditions and salary were seen as far more important to prospective employees and this has considerable impact on the recruitment of employees (Dasgupta & David, 1994; Macmillan & Deeds, 1998). In Company A, Founder A implicitly acknowledges the importance of salary and facilities for scientists. The impact of Founder A’s employment system mental model on the employment system in Company A can be understood in terms of the considerable knowledge (in all forms) of the founder as the central focus of organisation building.

This research reinforces, in some detail, how founders’ social networks create important “social legitimacy” for employees as well as to stakeholders in building the employment system (Raub & Weesie, 1990). This provides additional importance to social capital in organisation building (Murray, 2002). In fact a great deal is known about how individual networks influence scientific and technical progress (Gieryn, 1983; Jardine, 1999; Kohler, 1976; Latour & Woolgar, 1986; Lenoir, 1995; Merton, 1957; Mulkay, 1972). However, how founders of biotechnology companies contribute to science-based companies and the mechanisms through which their social capital contribute to the shaping of the firm is largely a nascent area with a few emerging works (Audretsch, 2001; Corolleur et al., 2004; Murray, 2004). In Company A, it is interesting to note that while Founder A’s social and human capital networks pose a strong resource for the company’s human resources, Founder A and much of the management of the company also recognises the importance of suitable employment policies and practices to attract staff to the company. Murray (2004) offers an explanation for the impact that founders have on the firm. First
of all, there is the exchange of human capital. This is widely accepted as being in the
transfer of tacit knowledge to the firm (Levin & Stephan, 1991; Stephan, 1996; Winter,
1987). A scientists’ contribution to the entrepreneurial firm is understood to be in the
form of appropriable human capital especially via the scientists’ technical capital through
training and experience. Zucker, Darby, and Armstrong (1996) found that the
performance of early entrepreneurial biotechnology firms was dependent on the close
relationship with the ‘star scientists’ because they held integral tacit knowledge that was
otherwise difficult to transfer to the firm (Agrawal, 2002). Other studies explore the role
of not only human capital but the social capital which ‘star scientists’ bring to the firm
(Bozeman, Dietz, & Gaughan, 1999; Murray, 2004). These researchers argue that the
value of social networks of scientists to the employment system can be seen by the
varying relationships that founders have with firstly their chief scientists and top
management team in creating this complex network and secondly by the building of the
human capital within their firms.

Founder A

Our staff are heavily headhunted by other companies...and...I feel...actually
quite proud of that...so I sort of feel that it's kind of nice to see your own staff
growing, but then being hired by the very best organisations around the place.

Murray (2004) further provides a theoretical framework through which founders’ network
relations in their employment system mental models can be viewed. She builds a picture
of the contribution that scientists make to the firm. By combining a social network and
career perspective, academic inventor’s contribution can be seen as a combination of
human and social capital that forms the complex network that they ply through publishing
networks, scientific board participation and hiring.

My first finding is that the inventor brings his human capital- the range of
scientific knowledge, knowledge of laboratory techniques and expertise in
developing scientific strategy. The mechanisms through which he brings this
knowledge vary widely but typically arise either through joining the firm as
Chief Scientific Officer, or if he maintains a full-time academic position, through
consulting...the second finding is that the inventor simultaneously exploits his
social capital (network) to build relationships between members of his social
network and the firm. Of particular note is the finding that the inventor’s social
capital has two distinctive elements: The first is a local laboratory network that is
shaped by the specific career experiences of the inventor training in different
laboratories and building his own laboratory; the second is a cosmopolitan
network of widely dispersed peers within his field who may constitute the invisible college of the discipline (Murray, 2004, p. 656).

The employment system mental model can be incorporated into these understanding of network relationships between founder and the firm. It appears with regards to the cognitive component of the employment system, Founder A’s experiences in laboratories and his experiences in different academic, technical and commercial settings impact on the building of the employment system through multiplex processes of network building and sharing (Murray, 2004). The consequences for this finding signify that Founder A’s mental model of the employment system and his shared understandings of the networks are important resources that are leveraged in nascent and emerging firms in small industries.

With respect to the formal employment practices in the company, the recruitment, remuneration and compensation, and training and development represent formal management practices that highlight the company’s formal policies and practices of attaching employees to the company. Taking into consideration these policies and practices, Company A appear to highlight love, work and money as the major forms of attachment for employees (Burton, 2001). This highlights a more complex dynamic with regards to the role attachment of employees in organisation building. Founder A emphasises specific practices of the employment system such as competitive salary, fit the culture and planning to encourage a culture of professionalism, teams and communication. Compensation within the company highlights its place in the competitive labour market especially nationally, the variable pay based on merits of individuals appear to reflect the view that individual performance achievement and the value of the talent to be of utmost importance in attracting and retaining their employees. The active promotion of training and development in the form of monetary support and encouragement to partake in conferences and seminars also appear to support the long-term development and retention of the employees. Perhaps, what is highlighted well within the company is the benefits that accrue to the employees by way of the reputation and the commercial environment for scientists. Many of the scientists stated that the reason they worked there was largely for the interesting work and the ability to work in the commercialised environment. This is particularly true for the junior staff scientists and technicians.
Scientist
(Company A) and (Founder A) is well-known (in the industry). good to be working here, I mean the work is good, it’s challenging sometimes and sometimes there can be problems with people here, but that’s like all companies...its good to be in a company with a good reputation... also I get to use my skills in creating something that will be valued.

Junior Scientist
...there aren’t that many biotech companies here anyway and you get to know the good ones. It’s good to start out somewhere known for its research and science. Maybe when I build my own reputation and get some more experience...you learn so much here...maybe I will look elsewhere (to work) but for now, this is a great place to work.

Senior Scientist Project Leader
We emphasise lifestyle here. We are mindful of the fact that people work for more than money and the good thing about this company is that when you get good people, you allow them to develop and take charge of their work. We do good work and we are very proud of that.

Founder A’s employment system domain highlights aspects of employment system policies and practices that the founder finds important in building the employment system and for staffing and managing employees. The model that Founder A emphasises is related to the founder’s philosophy of managing that appears to influence the management of people in the organisation.

Organisational Culture

There were six standard concepts that can be grouped under organisational culture. These represent concepts around the culture of the organisation. The organisational culture was conceived as standard concepts in this area reflect more of a cultural aspect of the organisation rather than a functional employment policy or practice. The standard concepts of excellence, professionalism, communication, working in teams, regular control and dealing with failure are part of the founder’s attempts to realise a working environment that captures an organisational culture or ethic (see Figure 4.3).

Professionalism is associated with achieving a level of excellence in work. This is influenced by having regular controls and fit the culture. Founder A emphasised professional control and peer evaluations as one of the ways work was coordinated and controlled in the organisation. Founder A expressed the need for personal autonomy and
a level of professionalism from his employees that was expected in a commercial science environment. However, he expressed that in order to achieve the levels of excellence, there was need to have peer and professional socialisation in the form of peer control. This formed a kind of regular feedback cycle where professionalism in conducting work and regular reviews allowed the best science to be achieved. In discussing the controls of work within the environment, the COO expressed that there was a high level of professionalism expected of scientists in achieving controls in the organisation. An employee indicated that when you worked at this level, there was an expectation of results and professionalism associated with the kind of work that they do.

Communication was also one of the concepts raised by the founder in terms of the culture of the organisation. In this case, communication forms an integral part of the founder’s cause map as it affects and is affected by all levels of the employment system mental model. Founder A expressed causal links between the organisational strategy of controlling the core information in biotechnology in order to make profits. In this aspect, communication between employees and fostering this communication by having regular democratic forums and professional evaluation by dealing with failure, a high level of excellence can be achieved. This is reflected by the performance management manual emphasis on the ongoing maxim:

Performance Management Manual

Remember, we must accept that people make mistakes. Our aim must be to help (Company A) staff learn and from them.

This is an integral part of the culture emphasised by Founder A.

Founder A

Now, the thing about project review is that you have to deal with failure and so we confronted this very early on and I think this is the hardest thing to deal with, whenever you set up a team and you have a team leader and you have people doing certain things but if in that project review we decide that the project isn’t going well or someone else some where in the world is clearly ahead of us...we terminate projects and our rules for disengagement are very simple, if we pull this project this afternoon, then these people tomorrow will work on something else... People in the teams that are terminated or don’t meet their goals, they are rewarded in most instances in the same way as people who are on successful teams. But I think you’ve got to develop in this sort of business a culture where dealing with failure is no big thing...and the...its not going to leave a black mark on anybody’s soul, or anybody’s record or whatever, And I would say, that
probably most people would have been on successful teams and most have been
on teams that have changed or terminated or whatever so we’ve got past the
…and the culture of your staff has got to reflect the process that you’ve got in
place.

The performance management manual also encourages communication by linking it to
several organisational outcomes.

Performance Management Manual
It is hoped that the new system will encourage managers, project leaders and
employees to communicate more openly about their performance and personal
development issues. If used effectively, it will also hold managers and project
leaders accountable for their ability to manage, ensure that all employees
continually develop their work and life skills, enable (company name) to remain
competitive by achieving continuous performance improvements.

The COO indicated that as it was a flat hierarchy within the company, team members
generally fitted into the culture of communication within the company as this was part of
the expectation for working in this kind of company. There was a great deal of
expectation for communication within the company as evidenced in their informal and
formal reviews of the work. This was communicated to all their employees in a variety of
ways that included the use of memos, emails, poster boards, public seminars and team
building activities that include training together and going to conferences together as well
as social activities at the end of the week.

Performance Management Manual
Annual scheduled meetings and regular informal meetings are part of the
process of reviewing the agreed performance indicators and objectives to
identify any developmental requirements and assistance.

Working in working in teams signifies the organisation’s tendency to work in teams and
to achieve work in a team atmosphere. In essence, the science is the result of teamwork
and sharing of knowledge and information. This is clearly expressed by Founder A in
how he thinks staff should work.

Founder A
I believe in teams, so everybody works in teams. So I think people like working
in teams. And when they come in an environment where there is a team
structure and uh, whether staff are in accounting groups or science groups, or
legal groups or intellectual property groups, everybody works in teams. And I
think its partly opportunity, partly environment, and...part the hope that we can pull of something really big.

As evidenced above in the description of the social structure of communication, socially and professionally, teams are a large part of the way the organisation structures its work. The performance management manual provides evidence of this.

Performance Management Manual
(Company A) values the efforts of teams and fully supports and encourages a team approach to achieving targets and solving problems.

Employees also expressed that they enjoyed and felt comfortable working in teams as it enabled them to enjoy aspects of work. The culture of the organisation has been described by the HR Manager as “being like a family”. While work appears to be a very important source of attachment for the company’s scientists, the culture of the company appear to reflect values that reflect a laid-back and family-like culture and an intense emotional bond with the workforce that would inspire effort and retain highly sought staff. Burton (2001) describes this form of attachment as love; the binding of employees with a personal belonging and identification with the company. In this respect, Founder A has succeeded in articulating his vision of the company as a family-friendly and caring organisation. Many of the scientists at all levels have articulated a sense of belonging.

Scientist
(Founder A) has created a great company. I don’t feel like I work for a company, I feel like I work for him and he is a great person and everyone respects him here.

Chief Operating Officer
We are a young company and many of the staff here have young families and I think that our culture reflects that...People here like coming to work, they know it’s a good place to have a career, its all about lifestyle and career...I come to work not only because its my job, its about the people here too.

Regular control features largely in the organisation as evidenced by the regular review of work within the organisation. Democratic forums are conducted every three months with a view to review and plan the organisational science goals as well as a way to gather cross-sectional expertise in solving problems. The practice of the reviews has been described as “very regular”. The public reviews involved the entire organisation over
three days where each project was evaluated and future goals and objectives were drawn up. While these reviews are generally democratic and allowed both professional and peer scrutiny for the organisation’s work, the final decision for progress in work was mostly based with the founder and CEO and senior management team. Regular control in the form of these reviews and forums was also expressed by the founder as a way for achieving excellent science and keeping up the quality of work within the organisation. In particular, as we examine the formal and informal management practices of the company, there is a high expectation of professionalism expected and proffered by employees. The practices of Company A such as its formal performance management system, planning and development policies and practices highlight ongoing coordination and control mechanisms that regulate many science cultures (Latour & Woolgar, 1986). In particular, the individual employment contracts and job descriptions stress Company A’s commitment to autonomy for scientists.

Chief Operating Officer

So I would say that we have a very strong team organisation and a very strong culture of internally assessing our own progress...the culture of the company is quite heavily geared towards project reviews and staff want project reviews to feel that they’re teams are doing well.

The HR Manager stated that the performance management within the company was based on formal and informal performance reviews. He indicated that performance management within the company was more often tied to training and development needs rather than rewards or compensation. Aside from the quarterly reviews of the science research, weekly and sometimes daily meetings were conducted with teams in order to assess progress and plan.

Performance Management Manual

(Performance management) is all about aligning performance to both the business requirements as well as individual employee requirements for personal growth and development. It is about development of the individual, as well as the development of (company A). It is a continuous process, performed throughout the year on a day to day basis and includes the reinforcement and management of people’s work performance and behaviour. In fact, it is what we normally refer to as managing staff. The difference is that the new process will make managing easier by improving communication between employees, managers and project leaders.
The standard concept of **excellence** represents an expectation for high level quality of work. This was referred to many times by the founder in what he hoped to achieve with the different employment system policies and practices. Several important links from the employment system can be seen with this standard term. In Founder A’s cause map, selection of the best talent (including commitment, having the best knowledge and skills and fitting into the culture) combined with communication, a team based and professional working environment allowed the achievement of excellent and high quality science. This standard term is of utmost importance as building a culture of excellence allows the achievement of organisational outcomes such as getting science results and commercialising products. One other important feature about this standard term is that it also represents a central concept that the employment system mental model is trying to achieve. From maintaining and achieving a high standard of excellence in work quality, science results and commercial products may result. The COO appears to support the CEO’s vision about the essential requirements of having a culture of excellence. In talking about the culture of the organisation, the COO expressed that there was little need to have controls in terms of managing employees as there was an expectation in the company that they worked in a culture of excellence, not only for achieving results but also in terms of maintaining a high standard of doing science that will stand up to close scrutiny.

**Scientist Project Manager**

*We have regular scientific meetings and we work out our problems there, its fairly democratic however, (Founder A) and a lot of the senior managers get the final say in the way the project is carried on. However, people are fairly committed to the work they do and they know what is required of them.*

**Chief Operating Officer**

*...planning is very important in what we do, we have meetings in teams, individually, with (Founder A), senior managers, technicians...we have to continually assess our work and make sure that we are working towards a goal...we don’t tell people how to work, they know what they need to be doing...if you hire smart people, they will be able to assess their own work...there is no need for management.*

With regards to other modes of coordination and control, a recurring theme from many of the informal discussions and the formal interviews is that direct control by the founder is very important in assessing whether a project is continued or aborted. The role of the scientific managers and Founder A is continually mentioned in assessing difficult or
particularly problematic projects. It would appear even when the company grew and formalisation of the company’s policies and practices become institutionalised, the influence and expertise of the founder is seen as a leader figure in the evaluation of science.

HR Manager
...some people find (Founder A) autocratic...some people do not agree with (Founder A) at times but he is the boss...at the end of the day, he is in charge of this company and the direction of the science...he has a lot invested into this company.

Chief Operating Officer
We try to support our employees in terms of maintaining an excellent level of work whether it brings us results or not, as long as they have this level of excellence and professionalism, we can be assured that even failed science results will help us move forward in terms of our company’s goals.

One of the junior scientist expressed that,
...the culture makes (me) feel that I’m doing something important” and being at a “top company” in terms of research and development.

While the organisational culture domain deals with the consequences of employment system policies and practices. The causal linkages between many of the employment system concepts with the organisational culture concepts suggests that Founder A’s employment system mental model understands the causal links between specific practices and their consequences. Founder A was able to articulate aspects of organisational culture in which they wanted to emphasise for the employment system of their firm. For example, Company A in general reflects the Founder A’s philosophy of communication and working in teams for the betterment of the organisation. This culture of team work and ongoing dissemination of information between all levels of the company is tied into formal as well as informal management practice and supported by the general management team.

The psychological basis of culture lies in its construction of the norms of legitimate social standards for behaviours to be evaluated within a firm (Birenbaum & Sagarin, 1976). Norms are the regular stable behavioural patterns that are expected by group members
and influence the interaction, processing and problem solving of people within the firm\(^{57}\) (Bettenhausen & Murnighan, 1991). Perhaps it is not surprising to learn that organisational culture and group norms have an important part to play in the employment system. Studies have found that organisational culture and expectations of group norms have a profound effect on job behaviours and work environments (Bettenhausen & Murnighan, 1991; Collins & Porras, 1994; Johnson & McIntye, 1998; Sheridan, 1992). The implications for building a strong organisational culture are immense. Strong organisational cultures are reflective of the ability to achieve bottom-line performance and ongoing success in executing strategies (Chatman & Cha, 2003; Collins & Porras, 1994; O'Reilly, 1991). The form of organisational culture and employment practices may be of crucial importance in the early days of the firm (Baron et al., 2001; Hannan et al., 1996). 

An organizational culture depends for its existence on a definable organization, in the sense of a number of people interacting with each other for the purpose of accomplishing some goal in their defined environment. An organization’s founder simultaneously creates such a group, and by force of his or her personality, begins to shape the group’s culture. But that group’s new culture does not develop until it has overcome various crises of growth and survival, and has worked out solutions for coping with its external problems of adaptation and its internal problems of creating a workable set of relationship rules (Schein, 1983, p. 13)

As the quote above demonstrates, Schein (1983) believes that the founder has a profound impact on the organisational culture of the company that is formed. This is supported by studies that emphasise the influence of founders on the creation of enduring cultural legacies in their firms (Boeker, 1989; Boeker, 1988; Ogbonna & Harris, 2001). This research provides additional evidence that founders, in creating their employment systems, attempt to create a preferred organisational culture that reflect founders’ assumptions of ‘the nature of the world, the role their organisation will play in the world and the nature of human nature, truth, relationships, time, and space’ (Schein, 1983, p. 17).

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\(^{57}\) Organisational Culture in itself is a wide ranging topic that will not be comprehensively covered here. It is recommended that interested readers refer to the work of culture theorists (Martin, 1992; O'Reilly, 1991; Schein, 1990). However, we will focus our discussion of organisational culture with the relevant works, most notably in the creation of culture in start-up companies and the role of founders (Schein, 1983, 1991, 1992).
Employment System Goals

Two standard concepts make up are grouped under employment system goals. Science results and commercial products are the end result for the organisational outcomes that the founder expressed as important in the evaluation of the employment system (see Figure 4.4). Science results typically signify readily available science data and laboratory work that pushes the innovation and ideas sales. As opposed to commercial products, science results embody an ongoing research programme of useful information that may be used in the development of commercial products. Science results represent the stepping stones according to the different requirements of the project goals. These steps may also be sold or licensed out to several of the partners or be used to develop projects for further commercialisation. Commercial products correspond to products and IP that are readily available to be sold. These are more end products that are available to be sold and licensed. Commercial products are the more tangible aspects of the organisational science outcomes. These commercial products results may be clinical trials of various products or discovery based genomic science results for the possibility of immediate use of the commercialisation of products.

Figure 4.4. Organisational culture and employment system goals domain map of Founder A
The performance management manual perhaps provide the most compelling evidence for the outcomes of the employment system goals by linking performance with key results areas (KRAs). These key result areas include areas such as sales, quality control, market share, productivity, staff development, profit, customer service and management information.

Performance Management Manual

*Every employee must deliver results, which contribute to the results of (Company A) as a whole. His or her effectiveness is ultimately judged by the extent to which he or she achieves expected results. Key Result Areas specify exactly which areas of operation the company expects outputs from, for each employee. The emphasis of Key Result Areas is on results, not on activities* (emphasis from manual)

In addition to this, the COO and HR Manager often drew links to employment system features to science results and commercial products. When asked how they know if an employment system practice or policy was working, they often drew links to the organisational outcome of the company, in this case pointing to approval for further clinical trials or IP licensing agreements with partners. In asking about the founder’s blueprints for the company, the COO remarked that one of the reasons he moved to the company was the founder’s vision for how science could be commercialised and the founder himself. This is also expressed by the HR Manager, in terms of describing the founder’s blueprint and philosophy for the employment system.

HR Manager

...(Founder A) is really on to it when it comes to making this company work. His vision is amazing and he has some really good ideas about how things should work here. I mean, he’s really involved with the strategic direction...the company.

Chatman and Cha (2003) discuss how leadership can enhance and influence the organisation by leveraging employment practices and philosophies. They identify three sets of managerial practices that allow CEOs and leaders to influence and manage innovation within organisations. These include recruiting and selecting employees for culture fit, intensive socialisation and training and the use of formal and informal rewards to leverage culture for success. A look at Company A shows that Founder A adopt these varieties of management practice in addition to others to build the culture in their organisations. Company A recruits and selects on the basis of Founder A’s ideas for
obtaining, managing and retaining key employees. In addition, Company A reflects management practice that is intended to impact on employee’s behaviours and actions within the firm. Supporting Chatman and Cha’s (2003) framework, this study provides evidence that founders are able to leverage the kinds of culture they build by focusing on aspects of employment practice that are relevant.

Organizational culture can be a powerful force that clarifies what’s important and coordinates members’ efforts without the costs and inefficiencies of close supervision. Culture also identifies and organization’s distinctive competence to external constituencies. Managing culture requires creating a context in which people are encouraged and empowered to express creative ideas and do their very best. Selection, socialization and rewards should be used as opportunities to convey what’s important to organizational members (Chatman & Cha, 2003).

Founder A appears cognisant of the impact that employment systems and their practices may have on the culture of the company. Employment system building is not relegated to the realm of practice; it appears to be an ongoing exercise in influence and control58.

The meaning that people draw on the organisation of work and what employees come to expect from the workplace is in part culturally determined as well as individually constructed (Bowles, 1989; Casey, 1995; Erez & Earley, 1993; Pauchant, 1995; Peters & Waterman, 1982; Sievers, 1994). The work in organisational culture draws on how people find meaning in their lives with work organisations as the basis for providing them with a sense of meaning and shaping the meaning of their lives (Peters & Waterman, 1982; Watson, 1994). It is suggested that in a like manner, people who build organisations have a cognitive model or idea about the ways in which work should be organised and give meaning to employees. This thesis provides some preliminary evidence that the elusive nature of shared meaning (Weick, 1995), may be centred in the ability to share cognitive beliefs held by employers and employees.

58 It is prudent at this stage to highlight the fact that the organisational culture and performance linkages remain a controversial affair (Siehl & Martin, 1990). However, there is a litany of research that examines the concept of organisational culture from a managerial perspective (Deal & Kennedy, 1982; Ouichi, 1981; Peters & Waterman, 1982; Uttal, 1983). From this perspective, culture has been described as a social glue (Martin & Siehl, 1983), or as a certain style of doing things (Kilmann, 1984).
SUMMARY AND CONCLUSION

In general, the results of the analysis of this case study has identified that the founder has a model of the employment system that is influenced by a variety of sources that include external partners, organisational strategy, the founder’s background and other companies. This in part influences the employment system features of the company in the organisation building process. In particular, the influence of several external partners on the employment system is palpable both in terms of the organisational features of the company as well as Founder A’s employment system mental model. For example, the influence of Founder A’s legal advisors was on the introduction of stock options in the company which was then a unique practice in biotechnology companies in New Zealand. The influence of Founder A’s employment system mental model demonstrates the impact of key stakeholders and influences on the formation of the employment system mental model. The formulation of the company to some extent is derived from various interactions with these stakeholders that further refine some of the ideas of Founder A’s employment system mental model. The case study also highlights the importance of a general organisational strategy in the employment system mental model. The causal links in directing a biotechnology company commercialising science impacts on the need for controlling information and building the human capital of the firm. Lastly, other companies in Company A’s competitive environment impact on some aspects such as setting the competitive salary and as a model for employment for the region.

Evidence can be found from the analysis of the founder’s mental model and the case study evidence that substantiates Founder A’s influence in a variety of employment system aspects. This appears to be the founder’s mode of building a company that closely reflects his ideals or vision for the company. Table 4.2 highlights some of the linkages between Founder A’s employment system mental model and the employment system of Company A. Founder A’s employment system mental model also represent an organisational model of the employment system in terms of managerial policies and practices. Founder A’s employment system mental model reflects finding the best talent and selection based on merit, commitment, and fitting the company culture. These standard concepts represent the founder’s influences on the staffing of his company. The selection methods of Company A was formalised by the HR Manager, however, Founder A still maintained a lot of influence to the hiring of employees in the company. Final...
decision on the hiring of employees always rested with Founder A. The coordination and control of work in Company A represents Founder A’s model for managing in Company A. In Company A, Founder A works closely with the senior management to review and plan the activities of the company. The objective of this was to build an organisational culture that perpetuates the standards required for scientific research in commercial settings. Founder A had very specific ideas about the organisational culture of Company A, he emphasised excellence, teams, regular review of work and a high level of professionalism. Founder A’s employment system mental model builds on these causal links in order to achieve science results and commercial products.

However, not all aspects of the company’s employment system are featured in Founder A’s mental model. Some aspects, particularly the formalisation of certain practices, is brought about by the HR Manager. In general, while the founder mental model emphasises recruitment, selection, compensation, control and coordination and planning, other aspects of the employment system such are brought by the HR Manager. However, the formalisation of the company’s employment system is actively influenced by Founder A. Founder A is still considered by many within the company at all levels to be a significant influence on the employment system of the company.
Chapter Five
Company B

COMPANY DESCRIPTION AND HISTORY

Company B is a private, venture capital-backed biotechnology company based in Auckland, New Zealand. It is a spin-off from a local university and was founded in 1995 to capitalise on commercialising the research of one of its founders. The company has two founders, Founder B1 and Founder B2. Company B has several products in clinical trials and a pipeline of intellectual property at the discovery stage. The company organises specific expertise around four main project areas with two at the discovery stage, one at the preclinical stage of development and one at the phase one stage of clinical development. It was privatised in 2000, and their shareholding consists of private and institutional investors, a local university, as well as staff and consultants from New Zealand, Australia and the USA.

Company B forms equity and collaborative partnerships to fund new opportunities and to undertake pre-clinical studies and clinical trials. The company has established links with the American financial world including having an overseas-based chief executive and having a prominent venture capitalist as its director and treasurer. The company is also currently targeting several Asian pharmaceutical companies to bring its products to market. Company B’s operating expenses rose from NZ$3.4 million in 2000 to NZ$8.6 million in 2001. The decision to halve staff numbers was as part of the response to halve the company’s ‘burn rate’ pending clinical trials of its first potential medical drug. In late 2002, the company sold its technology rights to another NZ-based company but remains linked with that company by providing R&D services. Company B owns 85 percent of the joint venture.\(^59\)

Company B’s organisational structure is managed by the top management team followed by the senior scientists and technical and scientific staff. One of the founders also serves as the CSO while his co-founder is currently not involved with the company. Since then the company has grown in size, accommodating more than 50 staff. However in recent

\(^{59}\) Source: company annual report and New Zealand newspaper business section.
years, staff members were cut down to about 20, with some of the scientists leaving and others transferring to the research institute that the company shares laboratories with. Employees in the company work within the four major project areas and consist of technicians and scientists. Project team leaders are assigned to the four main project areas and oversee all the science and development within those groups. Company B is located near the local university medical school. It shares laboratory facilities with a university-based research institute which it has close links with. The institute is one of the premier medical research institutes in the country. It has a dedicated and separate building close to the local university of which 40% of its space is wet laboratory space.

**DESCRIPTION OF THE DATA COLLECTION**

The data collection took place on site over a period of ten months (this included six site visits of the company, and several interviews conducted at the new workplace offices of Founder B1). There were two identifiable founders of the company. Founder B1 was no longer involved with the company. However, Founder B2 remains with company B as the CSO. Access to the company was obtained through meeting the founders of the company. Initially the researcher approached Founder B1 through personal university networks. Founder B1 was interested in the research and supported the researcher in making contacts with members of Company B. The researcher was then introduced to several key members of the organisation through this initial meeting with Founder B1. From this initial contact with members of the organisation, a meeting was scheduled with Founder B2 (who was away many times during the period on fundraising activities for Company B during the research). A research information package (Appendix C) and a follow-up telephone call to Founder B2’s personal assistant was also made following the initial contact with Founder B2. Formal semi-structured interviews were conducted with both founders as well as with members of the top management team including the business development manager and the science manager⁶⁰. In each formal interview, participants were asked to sign a consent form (Appendix C). These interviews were also digitally audio-taped with the participant’s permission. Informal interviews were conducted with the CEO, technical and scientific staff and the junior PhD student

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⁶⁰ The top management team of Company B comprised of principal or senior scientists such as the business development manager and the science manager who were also team leaders in their particular research areas as well as corporate managers.
researcher who was the most junior and recent member of the company. These informal interviews were not digitally audio-taped although field notes were taken during these informal interviews. Interviews with the two founders, business development manager, and science manager were digitally audio-taped and transcribed. Aside from these meetings, informal discussions were also held with other members of the organisation during site visits including the administrative staff.

Aside from access to the organisation and its employees, written documentation was obtained in the form of company reports, an incomplete induction manual and a standard employment contract. As this was a small and fairly new company, many of the formal and informal policies and practices were not yet in writing or in a basic unfinished form. Most of the written documentation were shown to the researcher or described in detail. In addition to this, the researcher was given a tour on two site visits to the company’s facilities and working laboratories. The researcher was also allowed to observe several employees in their laboratory stations during the working day, including their office spaces and break room.

As with the previous case company, archival evidence about the founders was easily obtained from a variety of sources including magazine articles, newspaper articles, company profiles, websites and professional periodicals. This was due to the high profile that both founders had in the scientific and business media, and in the community. Archival documentation about the company was obtained from several sources including public seminars, lectures, media articles and economic periodicals. In addition, the researcher was invited to attend several public lectures by the company’s scientists and Founder B2, as well as, business presentations and research seminars.

As there are two founders in this case study, the presentation of the data for this case will diverge slightly with each founder details and their cause maps presented separately before presenting an integration of their cause maps for the within-case analysis. The

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61 The informants were one technician and two scientists. The junior Phd student researcher is supported on a stipend from Company B.

62 While there was significant archival evidence about the founders, the researcher only managed to obtain 1 private company report, 1 public company annual report, and 6 newspaper articles about the company itself. However, most of the information from newspaper articles was about the science of the company rather than the company itself.
within-case analysis will discuss elements of the founders’ mental models of the employment system and contrast these with the employment system of Company B.

In general, the main findings of Company B are the interaction of the founder’s roles and their employment system mental models on the employment system of Company B. Founder B1 and Founder B2 had varying impact on the employment system of Company B. Founder B2 as the champion scientist and the originator of the company’s IP had a far greater impact on the employment system of Company B than Founder B1, who was the fundraiser and “business-side” founder of Company B. Another finding is the role that founding experience of one of the founders had on the relative impact that external stakeholders have on the employment system of Company B. Founder B1 had previous founding experience while Company B is Founder B2’s first company. The nature of this experience had a moderating effect on the employment system of Company B. Founder B2 was also found to have a direct impact on the employment system by his emphasis on direct control of the science of the company. Other findings include the emphasis of Company B in relying on a core group of employees and managers in carrying out its core business, the utilisation of a “buy” form of employment system where peripheral and contractual expertise is utilised, and the unique resource allocation and barriers in influencing the employment system of Company B.

FOUNDER DESCRIPTION AND BIOGRAPHY

Company B had two founders, Founder B1 and Founder B2. The impetus for the company came as an opportunity to commercialise the intellectual property of Founder B2. Founder B1 was involved as a co-founder because Founder B2 had met him through the commercialisation arm of the local university. Although Founder B1 had started the company with Founder B2, Founder B1 was no longer part of the company. Founder B1 ceased involvement with Company B a year previous to this thesis research. Founder B1 is currently a CEO for a business commercialisation firm. Founder B1’s background is in chemistry, having earned a PhD in the area. Prior to founding Company B, he had been the head of research and development for a large conglomerate in the USA for seven years. Following from this, Founder B1 has been the CEO for several research and

63 The founders’ history and biography, as with Company A was summarised from interviews with the founders as well as archival evidence about the founder from sources such as newspaper and magazine articles, and company profiles.
development businesses and founded many new ventures over the past 14 years including several well-known NZ and American companies. Prior to being involved with Company B, Founder B1 was the CEO for a commercialisation company.

In contrast to Founder B1’s background, Founder B2 is one of New Zealand’s most recognised scientists. Founder B2 graduated with a medical degree and had won several prizes in several different medical areas such as community health. Founder B2 specialised in paediatrics and endocrinology in the USA, where he was an assistant professor. Following his time overseas, Founder B2 returned to New Zealand to establish a centre for research at the local university. Founder B2 also serves as the director of a research institute and holds a Chair at the local university. Founder B2 is an inventor named on many patents and an author of over a hundred scientific reviews and 600 presentations at international scientific meetings. He has also authored over 350 refereed papers of which 100 are in his field of expertise. Founder B2 is the Chief Scientific Officer of Company B and is involved with the running of the scientific aspects of the business including the business aspects of the company. In addition, Founder B2 held the position of CEO previous to the current CEO. Both founders are 50+ years of age. As with the case study A, both founders were high profile scientists and businessmen, Founder B1 being well-known in the industry as a business leader while Founder B2 has been on the editorial boards of several prominent medical journals and organising committees of international scientific congresses.

In early 1994, Founder B2 recognised that there was an opportunity to develop some important intellectual property (IP) into working drugs. This impetus for the company came from Founder B2 realising that the only way in which to develop and obtain funding for this commercialisation was through establishing a company to develop the IP.

Founder B2

The company formed because I had IP which I wanted to develop. Seemed to me that it had great commercial upside. The emphasis came from my judgment from well, it had two impetuses, I had persuaded (university) that it was well to circumscribe this IP in a separate structure from (university) itself...and then secondly the impetus came when I clearly needed the funds and one angel investor appeared who was prepared to help support the origin of the company and getting it off the ground.
The progression of this idea was further enhanced from this chance meeting with an angel investor. From this meeting, Founder B2 decided to raise funds and build a biotech company spin-off to develop this IP. It was with that in mind that Founder B1 was brought into the scene.

Founder B2
*I met (an Angel investor) and he was interested in commercialising my research. At the time, I thought it was the only way in which to use this research and develop it further...It was a good opportunity.*

Founder B1
*...to attract further investors for clinical trials for the drugs the school set up (Company B). It was the first serious and viable attempt to kick-start the country's research and development industry. It's very expensive to develop these (IP) but the potential gains are enormous.*

Founder B1 and B2 founded Company B in 1995 after a lengthy search for further investment capital following the initial investment by the angel investor. Both founders worked together in the early stages of the company to build a spin-off from the university by utilising the intellectual property of Founder B2.

Founder B1
*At the very start I guess you could say that (Founder B2) was the “champion scientist”. He took care of the scientific side while I took care of the finances and fund-raising. We had very very good potential with this company and you could say that you have to find a good scientist who can sell their research and be able to understand the business side of things. It’s the results that sell the company.*

Founder B2 saw an immense opportunity to develop his IP into drug therapy but did not want the IP to be sold off just to reap the royalties.

Founder B2
*... (we) are not content to sell the IP and rest on the modest royalty flow. It’s better to retain the IP and take it as far as possible along the path to market before selling it.*

Joining forces with Founder B1, both founders set off to fund the company obtaining seed phase one funding of the company. While the company was founded in 1994, it was not until the year 2000 that the company was spun-off and privatised. The team that was
assembled in the initial stages of the company formation consisted of scientists that were working at the research institute founded by Founder B2.

Founder B2

There were many fits and starts, it’s very hard to pinpoint when the company came into being as there are a lot of factors that needed to be organised before privatisation. Always it’s about the money and your ability to deal with the limited resources. There are a lot of meetings, travelling and selling the ideas. But we had very good potential and the initial signs were very good from the science side of things.

Founder B1 saw himself as a businessman in building Company B. He saw the potential of building a good and robust company from the discoveries of Founder B2 and commented that it was this robust science and the potential gains that made him work tirelessly for the company at the initial stages. Founder B2 also expressed the initial potential of the IP to be commercialised as the impetus for founding the company. He saw the potential benefits from commercialising the IP not only from a financial viewpoint but also from a humanitarian viewpoint.

Founder B1

...in order to develop these drugs. You need lots of money. The only way in which to help people with this research is to be able to fund it and creating a company is the only way in which we can sell and fund the research.

Founder B1 and B2 worked together to form the company. Founder B1 saw his role as the fundraiser of the company while Founder B2 continued his work as CSO and director of the research institute. In its initial funding round, the company now consisting of Founder B2’s laboratories, managed to raise enough money to employ more scientists full-time in the new company. The funding was achieved through the joint efforts of the two founders utilising the University’s networks and private and institutional investors.

CAUSE MAPS OF FOUNDER B1 AND FOUNDER B2

In this case study, both founders’ cause map will be presented separately and then analysed using comparative cause mapping (CMAP2) of both founders. This is to facilitate comparison of both founders’ employment system mental models and to articulate comparisons with the employment system within the company. The comparative cause mapping analysis will firstly discuss the central standard concepts
used by the founders including the shared standard concepts of the two founders. Then, the employment system will be examined in detail using comparative cause mapping to illustrate both the founders’ thinking in their organisation building efforts. Finally some overall observations are drawn.

Table 5.1. Founder B1 and B2 Standard Concepts

<table>
<thead>
<tr>
<th>Standard Concepts</th>
<th>Founder B1</th>
<th>Founder B2</th>
<th>TF</th>
<th>Domain Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Legal Advisor</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>Employment system</td>
</tr>
<tr>
<td>2. Angel Investor</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>antecedents</td>
</tr>
<tr>
<td>3. Venture Capitalists</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4. Co-Founder</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5. Science as a business</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6. Fundraising Activities</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7. Focused Pipeline</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8. Technical Background</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>9. Commercial Background</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10. University Background</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>11. Founding Experience</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12. Other Companies</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

| Employment system antecedents          | 1          | 1          | 2  |                       |
| 2. Attract People                      | 1          | 1          | 2  |                       |
| 3. Commitment                          | 0          | 1          | 1  |                       |
| 4. Best Knowledge and Skills           | 1          | 1          | 2  |                       |
| 5. Fit Culture                         | 0          | 1          | 1  |                       |
| 6. Professional Evaluation             | 0          | 1          | 1  |                       |
| 7. Senior Management                   | 1          | 0          | 1  |                       |
| 8. Direct Control                      | 0          | 1          | 1  |                       |
| 9. Planning                            | 0          | 1          | 1  |                       |
| 10. Development                        | 0          | 1          | 1  |                       |
| 11. Competitive Salary                 | 1          | 1          | 2  |                       |
| 12. 1st Class Facilities               | 0          | 1          | 1  |                       |
| 13. Work itself                        | 0          | 1          | 1  |                       |
| 1. Excellence                          | 0          | 1          | 1  | Organisational Culture|
| 2. Professional                        | 0          | 1          | 1  |                       |
| 3. Working in Teams                    | 0          | 1          | 1  |                       |
| 4. Regular Control                     | 0          | 1          | 1  |                       |
| 1. Science Results                     | 0          | 1          | 1  | Employment System Goals|
| 2. Commercial Products                 | 1          | 1          | 2  |                       |
| 3. Shareholder Value                   | 1          | 0          | 1  |                       |
| 4. Viable Company                      | 1          | 0          | 1  |                       |

*TF: Shared standard concepts, 2 indicates shared concepts, 1 indicates idiosyncratic concepts

A total of 20 standard concepts for Founder B1 and 27 standard concepts for Founder B2 were obtained from the transcriptions of the interviews. Of these standard concepts, 14 are shared by both founders. Table 5.1 shows the shared and idiosyncratic standard concepts of both founders. Cause maps were drawn separately for each founder. This allows for an examination of the founder’s individual employment system mental model
and to examine visually the complexity of the causal links between the concepts for each founder. Figure 5.1 shows the cause map of Founder B1.

Founder B1 cites legal advisor, angel investor, venture capitalists and co-founder as important influences in his conceptualisation of the employment system. Other standard concepts include organisational strategy concepts such as having a focused pipeline and science as a business. Fundraising activities and other companies appear to also influence aspects of the employment system. Founder B1’s personal background also appear to feature strongly in the founder’s cause map. These include concepts such as the founder’s technical, commercial and university background as well as his founding experience.

Founder B1’s cause map is also interesting in that there is relatively fewer concepts in the employment system domain (Figure 5.1). Find the best, attract people, best knowledge and skills, competitive salary and senior management are the main features of the employment system. There are no concepts relating to organisational culture although Founder B1’s cause maps do indicate organisational goals such as shareholder value, commercial products and viable company. This is a reflection of the role of Founder B1 in the company, he was brought on to help create the start-up and the business running, rather than for the ongoing management and operational running of the business.

Figure 5.2 shows the cause map of Founder B2. Founder B2 has a total of 27 standard concepts. Similar to Founder B1, Founder B2 cites angel investor, venture capitalists and co-founder as important influences in his conceptualisation of the employment system. Organisational strategy concepts such as having a focused pipeline and science as a business appear to also be part of the founder’s employment system mental model. Founder B1’s personal background also appear to feature in the founder’s cause map. These include concepts such as the founder’s technical, commercial and university background. Other companies appear to also influence aspects of the employment system.
Figure 5.1. Employment system cause map of Founder B1

Find the best, Attract people, commitment, best knowledge and skills, fit culture, professional evaluation, direct control, planning, development, competitive salary, first class facilities, and work itself make up the employment system domain of Founder B2’s employment system mental model. Founder B2 appear to have distinct ideas about
specific employment policies and practices and links them with aspects of the organisational culture and goals of the company.

**Excellence, professionalism, working in teams, and regular control** are concepts associated with the culture of the organisation. These concepts appear to be linked towards achieving the ultimate goals of the company, which are **science results** and **commercial products**.

As with the previous case study, a brief analysis of the comparative cause map of both founders will precede presentation of the organisational case study evidence. Comparative cause mapping utilising CMAP2 software allows for the systematic and rigorous analysis of both the founders causal thinking of the employment system. The systematic steps of the comparative cause mapping approach allowed an analysis of the founders’ knowledge base as well as their causal thinking around these concepts (Laukkanen, 1990). Figure 5.3 shows the analysis of the cause maps of the employment system for both founders. As stated in the methodology chapter, comparative cause mapping does not aggregate the causal thinking of both founders, instead, it shows the shared standard concepts and causal linkages of both founders. A total of 14 Standard concepts were shared by the two founders. These are: **angel investor, venture capitalists, co-founder, science as a business, focused pipeline, technical background, commercial background, university background, other companies, find the best, attract people, best knowledge and skills, competitive salary, and commercial products**.
A further analysis can be performed using the comparative cause mapping approach where the number of linkages between standard concepts show the centrality (or importance) of each standard concept. Table 5.2 summarises the top fifteen concepts according to the number of indegrees and outdegrees from each node that is in its immediate domain. The number of indegrees and outdegrees and their total not only
indicate cognitive complexity but also the local complexity of particular nodes. It is a method for identifying the core constructs and shared linkages of both founders. This indicates important constructs in the founders’ mental models.

Table 5.2. Key terms and phenomena referred by Founders B1 and B2

<table>
<thead>
<tr>
<th>STAG</th>
<th>Standard concepts</th>
<th>Id</th>
<th>Od</th>
<th>Td</th>
</tr>
</thead>
<tbody>
<tr>
<td>A06</td>
<td>Science as a business</td>
<td>11</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>B02</td>
<td>Attract People</td>
<td>5</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>A05</td>
<td>Co-Founder</td>
<td>1</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>B01</td>
<td>Find the best</td>
<td>4</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>D01</td>
<td>Science Results</td>
<td>7</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>A03</td>
<td>Angel Investor</td>
<td>1</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>A09</td>
<td>Focused Pipeline</td>
<td>4</td>
<td>2</td>
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</tr>
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<td>B06</td>
<td>Fit Culture</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>D04</td>
<td>Viable Company</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>A04</td>
<td>Venture Capitalists</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>B05</td>
<td>Best Knowledge and Skills</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>A13</td>
<td>University Background</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>A15</td>
<td>Other Companies</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>C01</td>
<td>Excellence</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>D03</td>
<td>Shareholder Value</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

*Id = Indegree; Od = Outdegree; Td = Total Degree*

From Table 5.2 above, the top two central phenomena are science as a business and attract people. Both founders demonstrate a high degree of centrality for both concepts in their individual maps. Following from that, the co-founder, find the best and science results also have high shared degree of centrality as phenomena in the founders’ employment system cause maps.

From the analysis of both founders’ standard nodes and the causal standard units (CSUs) utilising the domain map analysis function in CMAP2, a cause map can be drawn that shows the shared causal thinking of both founders. Figure 5.3 show the shared cause map of both founders. Analysis of the within-case section will examine both the founders’ individual cause maps as well as the comparative cause map of both founders as these show the shared causal thinking of both founders.
From Figure 5.4, it can be seen that both Founders B1 and B2 share most of their causal thinking around the employment system antecedents and around the concepts of find the best and attract people to the company. Founders B1 and B2 both share technical and commercial backgrounds that inform their organisation building efforts. This feeds into their conceptualisations of organisational strategy of science as a business and the need to find the best for their business and attract people to the company. Aspects of the employment system in their individual cause maps around organisational culture and goals are not shared. This indicates that both founders do not share ideas for how the employment system affects building the organisational culture and of its goals. As with the previous case study, the cause maps of Founders B1 and B2 will be broken down into its domain maps and an analysed separately in order to focus on both founder’s mental models and their effects on aspects of the employment system.

WITHIN-CASE ANALYSIS

The within-case analysis of Company B will follow a similar organisation to the employment mental models of the founders as with Company A. In discussing the
founders’ employment system in Company B and aspects of the employment system of Company B, the four areas of employment system antecedents, employment system, organisational culture and goals will be used to organise the within-case analyses. The next section will discuss Founder B1 and Founder B2’s employment system mental models and contrast these with the evidence from the case study. The objective of this analysis is to triangulate the three methods of data collection in order to explicate the founder’s impact on the employment system they have build. The in depth analysis of the each domain of the employment system mental models articulate the influence of founder’s mental models on the employment system of Company C.

**Employment System Antecedents**

Figure 5.4 displays Founders B1 and B2’s employment system antecedents. A total of twelve standard concepts were identified as influencing the founders’ employment system mental models in Company B. These include external stakeholders such as angel investor, and venture capitalists; pre-founding activity such as fundraising activities; the organisational strategy such as having a focused pipeline; both founders’ individual background such as technical, commercial and university background as well as founding experience; and other companies. These concepts form important antecedents to the employment system mental model. A total of nine of these standard concepts in the employment system antecedents domain are shared by both founders, while legal advisor, fundraising activities and founding experience were important to Founder B1 but not Founder B2. Figure 5.5 presents both the shared and individual standard concepts and causal links (SNT/SCUs) of both founders graphically in the employment system antecedents domain. This facilitates a visual comparison of Founders B1 and B2 and their shared as well as their individual causal thinking of the employment system.
Figure 5.4. Employment system antecedents domain map of Founders B1 and B2

As with Company A, a number of external stakeholders influenced the employment system mental models of both founders. In Company B, the angel investor concept and the venture capitalist concept are important stakeholders in the company that influence the direction of the company’s strategy as well as a source for advice and support for both founders. The angel investor concept was particularly influential in creating networks with the venture capitalists that would fund the company as well as setting the strategic direction of the business. Both founders agree that meeting the angel investor led to the venture capitalists and viewing the commercial impact of the IP. The chance meeting of the angel investor and talks with Founder B1 allowed Founder B2 to realise the commercialisation of his IP.

Founder B2

*The company formed because we had IP which I developed. Seemed to me that it had great commercial upside...emphasis came from my judgment from, well, it had two impetus; first, I had persuaded (university) that it was well to circumscribe this IP in a separate structure from (university) itself...so that's when (Company B) was formed. The company as a separate entity wholly owned by (university). And then secondly the impetus came when I clearly needed the*
funds and secondly...(angel investor) appeared who was prepared to help support the origin of the company and getting it off the ground.

Founder B1
I believe that Company B is already probably in the top 20 or 30 prospects in the world right now of its type – an early-stage biotech company going into clinical trials this year...initially, we needed to have the support for it to get going...(angel investor) helped direct this requirement

The shared standard concepts and causal thinking around those concepts help show the ways in which the co-founders share the employment system mental models of their firm (Figure 5.4). In the case of Company B, both founders show that an angel investor whom was known to the founders helped conceptualise the approach that they would take in commercialising the IP. The angel investor also had a role to play in finding the right venture capitalists for the company and thus funding the venture of Company B. For Founder B1, the angel investor caused him to join forces with Founder B2 in realising the commercialisation strategy of Founder B2’s IP. This formed a strategy to focus on a concentrated pipeline of drugs based on Founder B2’s IP. This is corroborated by a comment from

External partners such as this angel investor, may help new firms and are an important influence (Suchman et al., 2001). Much like Founder A, the founders of Company B link financial investors such as the angel investor as a significant influence on the company’s strategy of seeing the commercialisation of Founder B2’s science. The influence of the angel investor in Company B also capitalises on the growth of social networks in the organisation building process (Burt, 2000). With regards to Company B, the angel investor was also important in setting up networks with other financial investors and business expertise. Shane and Cable (2002) postulate that the relationship between investors and entrepreneurs are influenced by social ties. They propose that seed-stage investors normally rely on social relationships to select which ventures to fund. In particular, direct and indirect ties between entrepreneurs and investors are thought to influence seed stage venture finance decisions. Social ties provide an advantage to entrepreneurs who seek to obtain resources from investors in situations of information asymmetry. Social ties provide investors with access to private information about the actors and their opportunities. This allows investors to remove ambiguities from whether to invest. Second, direct and indirect ties between parties may create social obligations between parties, which cause them to behave generously towards each other. Social ties
provide a mechanism by which investors obtain information, thereby allowing entrepreneurs without high-capital endowments to obtain resources to pursue business opportunities especially at the seed stage of the business (Shane & Cable, 2002). In the case of Company B, knowing the angel investor was precipitous for the founders as it led to other venture capitalists. This is important for realising the strategy of the company. This was corroborated by one of the scientists comments that the angel investor was very early on involved in a lot of meetings and collaborated highly with the founders at the start of the company. The influence of venture capitalists becomes important because they may belong on the board of directors, have special expertise, and useful networking connections (Rosenstein, Bruno, Bygrave, & Taylor, 1993). Venture capitalists may also contribute to the process of creative strategy making (Wijbenga, Postma, Van Witteloostuijn, & Zwart, 2003). Wijbenga et al (2003) present a model of venture capitalists value adding activities and their effects on the new venture’s strategy. These value adding activities include networking, monitoring and strategy-making. While, the integrative model presented by the authors was a theoretical one, Company B presents some preliminary evidence for the influence of financial investors on the employment system strategy of the founders.

While the founders may agree on the antecedents of their employment system mental models, the idiosyncrasies between the founders also form an important point for analysis. As was the case in Company A, the relationship between financial investors such as venture capitalist and the entrepreneurial team usually extends beyond the simple provision of capital (Busenitz, Fiet, & Moesel, 2005). Other studies have found that most venture capitalists have played an active role with the companies including representing the interests of the syndicate on the board or directors or in other less formal ways (Gorman & Sahlman, 1989; MacMillan et al., 1985; Timmons & Bygrave, 1986). The case studies analysed so far has provided a role in which venture capitalists may play in the organisation building process. Not only do they serve in a financial capacity but ongoing investment within the company may also direct the required need for VCs and financial investors to invest in the employment system of firms. The case studies so far both demonstrate however, that the role that these financial investors play at pre-founding is on the strategic direction of the company rather than through direct means. There is evidence from the literature on VC and entrepreneurial teams however, that continued
involvement with VCs have different implications for the employment system of the firm following growth of the company (Higashide & Birley, 2002).

In contrast to the shared standard concepts and causal thinking, Founder B1 utilised his legal networks and advisors in forming the commercialisation strategy of Founder B2’s IP. The legal advisor that Founder B1 received drove Founder B1 to set the strategic approach of company B by focusing on specific aspects of Founder B2’s IP. Founder B1 remarked that the idea for a spin-off from Founder B2’s IP required a structured focus on specific aspects of Founder B2’s IP. Founder B2 along with legal advisor from Founder B1’s networks decided to focus on specific technology of Founder B2’s IP which were readily marketable. On one of the visit to Founder B1’s current office, the researcher was introduced to his legal advisor and whom commented that Founder B1 and himself still worked closely together on a variety of projects and not just in Company B. The influences by external stakeholders in Company A and B thus, reflect a general influence on the employment system strategy of the firm. The issue of organisational strategy on the employment system of Company is important because it signals to potential investors of the value and commitment of the new venture (Busenitz et al., 2005). In terms of the company’s employment system, the structure and organisation of the laboratories of Company B is seen as a potential signalling device in the absence of information. This is the foundation for signal theory in new ventures (Certo, 2003; Levy & Lazarovich-Porat, 1995; Spence, 1974). New ventures are thought to communicate to external parties such as venture capitalists and other potential investors the value of their firms through mechanisms such as investment by the founding team (MacMillan et al., 1985).

However, although one study (Busenitz et al., 2005) found little support for the role of signalling in new ventures, the authors do suggest that the signals that external parties hone in may be far more complicated. The results of these case studies suggest that the strategic direction of the company and its employment system may serve as an important signals to external parties and thus becomes an important part of the organisation building process. Thus the imperative for strategising and building the employment system may represent an important signal to the potential value of the company and it’s IP⁶⁴.

⁶⁴ This is a particularly salient issue as both Company B and Company C were relatively concerned about the need to maintain confidentiality regarding their companies and the employment system. Comments from the founders and the top management team often reiterated this as “what you (this thesis research) say may impact on our fundraising”.
Management is important, you need to find people who have the reputation and the experience...that’s all they (investors) want to see that you have got a handle on the science and the results and your management team represents that.

While the significant impact of external stakeholders on the strategy of the employment system has been examined in Company B as well as Company A, the interaction of having two founders and their organisational building efforts is significant in Company B. Both founders share the same causal thinking that their individual background such as their commercial background and their university background are important influences of the employment system. These concepts also feed directly into thinking of science as a business. These concepts allowed them to think about the commercialisation of science and the demands of that for the organisation of the company. In Company B, the commercialisation of Founder B2’s IP, which were significantly developed at the discovery stage before the company was launched, required careful thinking as to the type of employment system that is developed. However, the role that Founders B1 and B2 play in the employment system begins to diverge around their employment system mental model and this is reflected in the differences in the employment system antecedents domain. For example, founding experience was an important concept for Founder B1 and this impacted on the concept of science as a business. Having founded other companies allowed Founder B1 to formulate the organisational form of Company B. Founder B2 on the other hand, cited co-founder as a significant concept for developing the strategy of the company. Nohria (1992) sees this as a dependence on significant others as a lack of legitimacy and the need for resources. Founder B2 had never founded a company before. Founder B2 realised that in order to commercialise his IP, he needed to have the help of Founder B1 whom he knew through his university contacts.

Founders B1 and B2 offered a complementary role for each of the founder that would go on to have a significant impact on the divergence of the employment system domain for both founders. However, for both founders, technical and commercial experiences of working in laboratories significantly affected the
formation of their employment system mental models. Cooper (1985) found that previous experience is likely to be related to organisation building models. This experience, also seen in Company A, brings about knowledge of different organisational models as well as an appreciation of how employees fare under different alternatives (Burton, 2001). This sets out the founders’ conceptualisation of how to run a science company as a business that influences aspects of the employment system. Shane and Khurana (2001) suggest that past career histories constrain or openly available opportunities. They point out that sociological theory point to various factors as to how careers influence firm foundings. Careers influence people’s position in social structure and this provides access to both opportunities and resources (Granovetter, 1974). People tend to start businesses in industries and technical fields in which they have prior experience (Freeman et al., 1982). This prior career experiences encompass knowledge learnt and relationships forged that influence the subsequent strategies of firms (Baron et al., 1996; Boeker, 1988). For the founders of Company A and Company B, technical, commercial and university background provides the backdrop for ideas about the employment system that were turned into employment systems for the companies.

While the experiences that Founder B1 and B2 have in their technical, commercial and university background allowed them to be exposed to forms of employment systems in their particular industries and professional areas, Founder B1 had the added experience of founding other R&D companies previously and this was to be a significant concept for the Company B. Stinchcombe (1965) stresses the role of individual’s social experiences in the decision to found an organisation. Building on Stinchcombe’s (1965) ideas, Shane and Khurana (2001) theorise that previous experience in founding provides role familiarity and skills that are not developed through more traditional career processes. This impacts on the entrepreneur’s access to resources, which is based on their relationships to resource providers (Aldrich & Zimmer, 1986). A finding that has been supported by other studies (Larson, 1992; Shane & Cable, 2002; Waldinger et al., 1990).

Founder B1

...you have to have credible people first...and if you’ve got credible founders, and if you have one in the science background then you have to have the market and a robust technology...and robust technology means you have to have good data, you know this from your past experiences...
As with Company A, Founder B1 and Founder B2’s technical background, which forms the basis for their experiences, reflected their beliefs in how science was organised and research was to be achieved.

Founder B1
\textit{You need to understand what is going on (with the science)}

Founder B1 and B2’s university background also served to function in the same capacity as Founder A in that it was from these networks that ties between the key players in Company B were formed. These ties and networks formed the basis for finding investors and scientists. Having commercial background for both founders also afforded them an insight into the demands for commercialising science and the imperatives for the employment system.

Founder B2
\textit{Science in the commercial world is different from academia.}

In Company B, these experiences form the basis for building the employment system according to the strong expectations of previous commercial and technical experiences (Aldrich & Von Glinow, 1992). For the founders of Company B, these experiences help form the strategy of the employment system as well as allowing networks to be built on how to action the human and social capital implications of these strategies (Murray, 2004).

As with Company A, other companies in terms of rival biotechnology companies and network companies represent ways in which to attract people to come work for the company. Other companies was also a concept associated with the employment system mental model. Other companies in Founder B1 and Founder B2’s mental model relates to the impact of rival biotechnology companies within Company B’s sector. Similar to Company A, other companies in Founder B1 and B2’s mental models are sources of finding talent required for Company B.

Founder B1
\textit{There’s a shortage of people here in NZ...you have to look overseas...well, in NZ, not all that well...overseas, these people are recycled from time to time in these companies...}
Founder B2
You’re going to find that the people (with knowledge and skills) are already working for other companies.

For Founder B1 and B2, other companies represented sources of knowledge regarding the labour markets and their ability to attract staff into Company B. However, Founder B1 only described other rival companies as impacting on Company B’s ability to attract staff. Founder B1 was only concerned about the impact of attracting the right people for Company in as much as it signals the value of Company B’s ability to do the science.

Founder B1
Well, you see we push them (other companies) for our company, and it’s the investors that worry, the investors get involved with who they hire...but the people really have to come from overseas...most of the good ones do...you’ve got to have people who work together as a team. For me, it is only good business if you have the right kinds of people working for you.

In contrast to Founder B1, Founder B2 listed two additional links of the impact of other companies on the company. For Founder B2, other companies also impact on the competitive salaries within the sector. This is corroborated by the business development manager who stated that salaries within the company was set within New Zealand standards in the biotechnology industry and was “competitive”. Additionally, Founder B2 also cites the impact of other companies on work itself. For Founder B2, other companies impact on the work for Company B by impacting on the way in which the company modelled itself within the industry. With respect to Company B’s competitive environment, Founder B2 felt that looking at other models of biotechnology companies in Auckland (of which Company A is also a part of) helped develop the business model of Company B in terms of how he felt employment and the structure of work should be. In the same sense as Founder A, Founder B2 thought of other companies within his competitive environment as rival biotechnology companies that represented a model for contrasting similarities and differences in employment. In this case, Founder B2 felt that other companies influenced the work structure and organisation of the science in the company. This is an issue that has implications for the employment system domain of Founder B2’s employment mental model. Founder B2 perceived other companies as competitors not only in salaries and the ability to attract potential talent but also as competitive groups to emulate or avoid (Porac & Thomas, 1990; Porac et al., 1989).
Founder B2
But I think (Company B) represented the first spin off from the university that was a true “spin-off” out of the university and there was a lot of naivety about that. (Company A) went out all the way out, it was the university’s first “spin-out”...(Other Company) also was something we looked at carefully...And we learnt everything then

A point of divergence from the first study, Company A from Company B is the involvement of two founders of Company B. One main finding from a comparison of the two founders’ mental models are the significant interaction effects of founding experience, and the role of each founder in the organisation building process. Founder B2 cites Founder B1, as his co-founder, and as significantly influencing his understanding and knowledge about the commercialisation process. Founder B2 had no previous founding experience and depended on Founder B1 to lead the way in terms of founding Company B. This is confirmed by the cause map of Founder B1 who cites his founding experience as a significant influence on the organisation building process. The firm founding experience of potential founders impacts organisational founding by influencing expectations of the liability of newness (Shane & Khurana, 2001). As they argue, careers may be an important class of social processes which link individuals to firm foundings. This view is shared by others who think that understanding individual career experiences may elucidate the individual level processes for firm foundings (Hannan, 1988; Haveman & Cohen, 1994). Founder B2 rely on Founder B1’s prior founding experience to guide the strategy and direction of the company, while Founder B2 is allowed to attend to the science of the company. This plays a significant role in the employment system antecedents in building the employment system of the company. This case study builds on the findings from previous studies (Burton, 2001; Cooper, 1985; Finkelstein & Hambrick, 1996; Fligstein, 1987), of the way in which founding experience in top management team may play in the organisation building process (Carpenter, Geletkanycz, & Sanders, 2004; Hambrick & Mason, 1984). The role of Founder B1 with his founding experience was as company fundraiser while the “champion scientist” was played by Founder B2. These roles that each founder played had a significant effect on the key decisions made about the employment system and forms the basis of Hambrick and Mason’s (1984) treatise of the effects of decision making in the upper echelons as being a reflection of their values and experiences. In this case study, the role that each founder played as well as the founding experience of one of the founders allowed the decisions about the employment system to be directly influenced by the “champion scientist”.

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Founder B1

*I leave it to (Founder B2), he’s the “champion scientist”!* 

Summarising the main findings represented in the employment system antecedents domain draw on Founder B1 and B2’s shared causal thinking around some key standard concepts. These influences include the founder’s own background such as their commercial and technical background, the influence of external advisors such as an angel investor and venture capitalists, the strategy of commercialising science, and other biotechnology companies. The employment system antecedents of both founders’ mental models show the similarities of key causal activities that are informed by each others’ experiences and background. In Company B, the founders’ experiences and their financial networks impact strongly on the evolution of the employment system they build. This lends credence to Burton’s (2001) theoretical propositions that experience has a significant impact on the organisational model. Company B, however, brings up another significant new concept for the role of experiences in organisation building: that of founding experience. In Company B, Founder B1 had previous founding experience and this caused Founder B1 to lead the strategic organisation of the company along with the operational and financial running of the company. Founder B2 who had no previous founding experience depend largely on the experiences of Founder B1 to lead the formation of the organisational objectives and strategy. The implications from Company B suggest that founding experiences form part of the formative influences on one founder’s mental models of organisation building and this has significant impact on the other founder when the co-founder has no prior founding experience. The role of founding experience was not examined in detail in Burton (2001). However, the role of founder’s experiences and the types of experiences are likely important to the competence and decision making ability of the entrepreneurial team (Kor, 2003). As with Founder A’s mental model, Founder B1 and Founder B2 both point to the impact of other companies on the employment system of their companies. Founder B1 and B2 confirm the observation that other companies are important as a reference point, both in comparisons as well as the significant competition for labour.

**Employment System Domain**

Five standard concepts make up Founder B1’s employment system domain. The standard concepts are find the best, attract people, best knowledge and skills, senior management,
and competitive salary. In contrast to this, Founder B2 had twelve standard concepts that include find the best, attract people, commitment, best knowledge and skills, fit culture, professional evaluation, direct control, planning, development, competitive salary, first class facilities, and work itself. The disparity between the two founders is interesting and will be discussed in the ensuing section. With regards to Founder B1, the standard concepts in his employment system mental model represents the recruitment and selection of people within Company B, and the control of work through senior managers. Competitive salary is seen as a way in which to attract the best knowledge and skills to the company. Founder B2, on the other hand displays a more elaborate model around the employment system domain. Founder B2’s employment system domain is similar to Founder A’s employment system domain in which there was also twelve standard concepts. These concepts also reflect concepts that form the employment system in terms of how employees are managed in the company. Founder B2 articulated the important aspects of recruitment and selection (evidenced by find the best, attract people, best knowledge and skills, fit the culture, work itself, first class facilities, commitment, and competitive salary), as well as the coordination and control of work in terms of utilising professional evaluation, planning, and development. Figure 5.5 shows the employment system domain map of both founders’ employment system mental model.
Figure 5.5. Employment system domain map of Founders B1 and B2

Founder B1 and B2 share the imperative for the employment system to have the right kinds of people with the best knowledge and skills. Both founders highlight the importance of finding the best talent for their company. This includes the core belief that in order to find the best, you would need to attract people with the best knowledge and skills to the company. As with Company A, this is a central foundation for the founders’ employment system mental model. Ramirez (2005) found support that technology intensity and cultural factors shape the recruitment practices of high-technology versus low-technology firms. From the evidence presented so far, the recruitment of best knowledge and skills represent a central requirement for biotechnology companies.

Both founders agree that finding the best people for the company was an important concept. This linked to selecting the best people based on the best knowledge and skills and the ability to attract people to the company. A look at Table 5.1 provides some support for the importance of this concept for both founders as it places third as the most central concepts of both founders maps. However, as can be seen from Figure 5.5, Founder B2 expressed further concepts to attracting people including the specific culture
of Company B, the laboratories of Company B, and the research being done in Company B.

Founder B1
Investors don’t invest in technology, they invest in people…you need to get people everyone knows…and you need money for that.

Founder B2
You’re a biotechnology company, you need the top people…it’s important you attract those people that are leaders in their field or have the best skills…to carry on the research. You have problems when they can’t do the job or don’t know how to do the job in this environment.

...we get people because of the work we do.

...our laboratories are the reasons why people work here.

The methods for attracting people and selecting them can be contrasted with evidence from the case study. The Business Development Manager and Science Manager emphasised that there was a process for recruitment and selection in the company that involved consultation with senior scientists and Founder B2 who was the CSO. In Company B, the channels used when recruiting included using professional trade magazines, newspapers and scientific periodicals. Specialist outsourced agencies are not used. The search for specialist employees typically for the industry utilised international and national searches. Depending on the type of research staff, the recruitment process was more international were the position for highly specialised scientific position as opposed to the technical and administrative roles. However, due to the recent downsizing activities in 2002, there had only been one new employee for the company. This was because much of the science work was contracted out to the research institute that Founder B2 was also a director of. The networks of both founders as with the other case study were employed as significant resources that the founders both draw on (Murray, 2004). For example, with regards to management and drug trial staff, Founder B1 utilised specialised networks and industry magazines in order to network with the people required for their expertise in taking the company to clinical trials.

Founder B1
I know all these people, you see, I know him... and her, I met these people at a recent conference. It’s a small world the biotechnology industry globally...and
everyone ends up working for other people. The difficulty is in getting them to want to work for us...its all about money, money, money.

This can also be seen in the influence of Founder B2 on the recruitment of scientists to the firm. The majority of employees in Company B consist of employees that were already working in the laboratories of Founder B2. Founder B2 utilised his networks extensively. Many of the scientists talked to were already working in the laboratories of the research institute that Founder B2 was a director of. The recruitment of these scientists was from Founder B2’s personal networks as well as other conference networking. This included specialist staff that he knew of from previous professional or working experience or post-graduate students that were working in his laboratory. This represents a very significant resources for founders utilisation of their social capital in building the knowledge base of their companies (Arrowsmith, Cregan, & Sisson, 2001; Calabrese et al., 2000; Podolny, Hannan, & Stuart, 1996). There is literature that examines the contribution of founders as not only contributing tacit knowledge (Winter, 1987) but also in the transfer of the relationship of “star scientists” to the firm (Agrawal, 2002; Zucker et al., 1998b). Audretsch and Stephan (1996) believe that the role of these star scientists is to signal to investors the veracity and quality of complex and highly specialized scientific ideas presented as investment opportunities by scientists and entrepreneurs. The results of this thesis adds to that stream of research by suggesting that the specific role of founders is also to build the human capital of the firm which also signals value to firm investors. The recruitment of scientists and their employment in these biotechnology firms are thus not only an imperative in developing the knowledge capital of the firm but also as a signal of the capabilities of the firm itself (Bozeman et al., 1999; Chandler & Hanks, 1998; Cooper et al., 1994; Corolleur et al., 2004).

Akin to Founder A, Founders B1 and B2 also appreciated the limited ability of their company in attracting people to work for them due to the limited finances of the company. Founder B1 believes that the underlying attraction of people to the firm is tied into the salaries and financial incentives as previous quotes show. Founder B2, on the other hand, believes that the influences of other similar biotechnology companies compete on the basis of competitive salary and the nature and quality of the work (Figure 5.5). In that sense, Founder B2 believes that the work itself may attract scientists to be part of Company B.
Founder B2
*We have the technology, if you’re in the area...this is one of the few companies which will give you the experience necessary...*

Founder B2’s employment system domain map is much richer in terms of the number of standard concepts and causal links between them. Founder B2 states that in order to attract people to work in the organisation, they not only have to offer a competitive salary but also need to offer first class facilities and ensure the quality of research done at the company. This is related to concepts of commitment and getting people who fit into the culture of a commercial science company. In terms of attachment, the utilisation of research work and commercialisation experience as the main and most obvious reasons for many of the employees working in Company B.

Although both founders emphasised that selection was based on knowledge and skills needed, the selection requirements in the company was most often not based on finding the top talent for permanent employment. The approach to selection was most often based on “required as needed” basis for the company. The required expertise would often be obtained from its senior scientific team and its scientific advisory boards. This is corroborated by Founder B2 who admitted that they would rather ‘buy’ the required expertise rather than develop them for the company.

*Founder B2*
*...we don’t spend a lot of time looking around for people, we have what we need already.*

*...You get good ones (employees), you get bad ones, you move the bad ones on and good ones you support. We get consultants for anything else...there’s no need for more when it’s available for a price.*

Science Manager
*We look at project plans. We do preclinical work very well and there’s a lot of expertise there. What we’re doing is the clinical development process. None of us have done that before. We outsource most of them. And the regulations and requirements require us to actually need to do them elsewhere*

Business Development Manager
*Anything we do is outsourced now, if people leave generally we contract those set of skills.*

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The key concepts around both founders’ selection concepts are particularly interesting as both founders highlight selecting people based on the best knowledge and skills. Selection in Company B is made based on the candidate’s CV, scientific background and burn rate. Interviews were also conducted with the senior scientists and the Science Manager. Depending on the level of the job, semi-structured interviews over “several hurdles” were conducted. The initial meeting was between the senior management doing the hiring and the Business Development Manager. After that senior scientists and the Founder B2 was consulted before final hiring took place. For administrative positions, the hiring manager and business development manager conducted the interviews and final decisions rested on the hiring manager. For a small company, selection was described as based on the required knowledge skills and abilities while the fit into the culture of the company was based on informal discussion around preferences for work. The Business Development Manager and senior scientist both emphasised that while they had not done any recent hiring since they downsized, the company in general selected on the basis of previous backgrounds and the best knowledge, skills and abilities they could get.

Business Development Manager

…I’ve done or been part of the selection of people in this company… I guess you could say I’ve also been the HR Manager in this company, and we try to formalise and use the best methods as possible…most of the time, we look at their past performance…their CVs…referees…we pick the best from that.

However, other than those criteria, Founders B1 and B2 both do not articulate further selection criteria for finding the best talent. In contrast to Founder A who stated the importance of fitting into the commercial culture, and commitment as key areas for selection, the founders of Company B do not link finding the best with these other selection criteria. However, Founder B2 does link the importance of fitting the culture, and commitment; not on finding the best talent, but as part of attracting people to the company. And important point of difference for Founder B2 is that the desire to work for the company or in his laboratories as being just as important as having the best knowledge and skills.

Founder B2

I think that’s why people go into private sector you see. At the end of the day that’s what people want. Funnily enough I think it’s easier to manage people in the private sector than in the academic setting. I think people in academia are very confused about what their role is. They don’t have any sense, they are less
collegial, more selfish, they don’t have corporate goals. But in companies...in companies, that collegiality and corporate spirit is easier to build. And you get better cooperation and I think the research done in the corporate sector is a lot better done than in university because of that. Other than being the best people for the job, you want them to want to work here first.

While money remains an important and obvious motivator for attachment in this company, many of the informants within the company highlight skills gained and experience both in the form of research and commercialisation as the reasons why they worked there. Informal discussions with employees such as scientists and technicians underscore the benefits of working in a top research facility and the commercialisation environment as the best things about working in Company B. Senior Scientists highlight work and money as important in attaching employees to the company. The compensation and remuneration of the company is seen as reflecting industry rates although considerably lower than for overseas markets. As such, concepts of commitment, and fitting into the commercial culture are associated with attraction of employees to the company rather than on finding the best people for the company. Before a more in-depth exploration of the divergence between founders’ models of selection and attraction of staff to the company is discussed, an examination of the shared links (in both founders’ mental models) between recruitment and compensation is warranted. Compensation with regards to finding the best is important to both founders. As with all industries, and particularly in knowledge based ones, compensation was seen as an important employment system practice (Duncan, 2003; Martin & Moldoveanu, 2003). The compensation within the company was based on industry standards in New Zealand. All staff members are on salaries. The Development Manager and Science Manager believe that their salaries are on par with other companies and research institutes in New Zealand. The Business Development Manager highlighted that salaries were based on the finances of the company and this was at the discretion of the Chief Financial Officer. Both Managers highlighted that while they could not compete globally with other salaries overseas, it was the lifestyle in New Zealand and the work that were part of the attraction to potential employees and current employees. In addition to the levels of compensation, work itself becomes part of the attraction of working with Company B. The Science Manager highlighted that there was no other company in the world that was similar to Company B in terms of its research and niche. This provided a compelling attraction in his eyes to working in the company.
Science Manager
...people work here because there probably aren’t a lot of companies like us, we have the facilities, we do great research and people are attracted to that...in some ways, it helps with their own careers to have worked within this area and in this lab.

Business Development Manager
...in New Zealand, we are probably one of the first companies to commercialise research and to get this ball going in the biotech industry...there’s not a lot of places in which you can get such experience.

The Business Development Manager also mentioned that other benefits of the company were its ability to treat each employee on an individual basis and tailor the work and job around the employee. She emphasised that while there was work to be done, there was a lot of flexibility in catering to the employees in terms of how they wanted to work. This, she thought was one of the benefits for working for the company and one that they highlight in job interviews. Other forms of compensation included the use of bonuses that were tied into the performance management of staff in Company B. Bonuses were written into their contracts and tied into achievable goals for scientists in the company.

Science Manager
Performance management is twelve months and they are appraised by their line manager, and it is really... it’s represented in their contract with bonuses. But normally they can get more money tied to their performance.

The compensation attraction for working in Company B as envisioned by Founders B1 and B2 was thus supported by the practices of the company. However, the range of recruitment practices in the company was reflected only by Founder B2’s mental model. Founder B1 was only able to articulate employment system concepts around recruitment and selection. Various aspects such as the scientific work, the facilities, and the commercial culture of the company were also seen by Founder B2 as important in attracting potential talent to the company. Previous studies examining founder’s social capital in the success of firms have found important links to the performance of firms as discussed in the previous case study (Shane & Stuart, 2002). However, social capital in the form of networks of potential employees form not only part of the organisational endowments for the company but also as a signalling mechanism as to the importance and value of the underlying research and science (Busenitz et al., 2005; Murray, 2004; Shane & Cable, 2002; Shane & Stuart, 2002). The divergence of founders employment system
domains form an interesting dichotomy that may be based on their roles within the company as suggested earlier. The implications of this is that certain founders in the founding team, in this case, the “champion scientist” becomes the key founder who drives the development of the employment system. The reasons for this are understandable as Founder B2 holds valuable human and social capital around the IP that can be leveraged in a structure that is envisioned and understood by the founder to commercialise these ideas. This case study offers further evidence for the impact and importance of building the employment system of biotechnology firms. In order to elucidate the founders’ organisational building efforts, a full analysis of the context in which Company B’s employment system is necessary.

The staffing issues in Company B is interesting due to a number of factors that help shape the evolution of the organisational employment system from the founders’ mental models. Recruitment as mentioned earlier was stalled pending further development in the clinical trials of the company. The funding and development of clinical trials for the company’s flagship drugs directly affected much of the changes to the recruitment and selection within the company. As such there had been a freeze on recruitment for the company since it downsized its staff levels in 2002.

Business Development Manager

*There has been a freeze for recruitment lately, we found that contracting out (science services) to (research institute) is much more feasible than to have the running costs being seen by the company. This way, we are able to pursue our science goals.*

This forms particular constraints and boundaries in the evolution of the employment system from two points. Firstly, the preceding roles of each founder in the founding team appear to affect the emergence of an employment model that is based on one particular founder. Secondly, the mediating variables around issues of employment such as the rerouting of funds towards clinical drug trials rather than employment issues help shape the evolution of the employment system in Company B. These two points will be discussed in further detail in the next section.

A visual and quantitative comparison of both founders’ employment system mental model shows that Founder B2’s employment system mental model appears far more complex than Founder B1’s employment system mental model. Founder B1’s
employment system domain thinking reflects senior management in managing a viable company. However, Founder B2’s employment system domain thinking is far more elaborate with linkages to attracting people and professional evaluation that includes development and planning. As mentioned previously, Founder B2 had far more complex thinking about the employment system for this company than Founder B1. This is reflected by the case study analysis which emphasises the participation of the management of the company to be attributed to Founder B2. Founder B2 is also far more actively involved with the day-to-day operational running of the company than Founder B1. Founder B2 is the “champion scientist” of the company and the work in the laboratories of Company B is centred on continuing his research work. As such, control of the science is paramount to him.

Founder B2

I oversee the science of the company.

Founder B2 further emphasises the practices of development and planning in the company as well as the professional evaluation of the work. This is related to the direct control of Founder B2 to managing the research and managing the scientists. Founder B1 in contrast admits to not dealing with the issues of managing people in the company. In fact, Founder B1 prefers to leave the employment issues of the company to its senior managers and Founder B2.

Founder B1

…I don’t bother with the human issues of the company.

This is corroborated by the case study evidence. When asked about the relative influence of the founders, it was mostly Founder B2 that got a range of responses in the management of the employees, from senior managers to employees. On the other hand, Founder B1 was often associated with the fundraising activities of the company and its financial and business running rather than any dealings with the employees.

Scientist

...(Founder B1) works with (Founder B2)...he doesn’t have much to do with our everyday operations.
Founder B2 on the other hand is credited for establishing the initial practices of Company B.

Science Manager
I’ve been here since it was privatised and you had many people working in (Founder B2)’s labs. The way it works is how (Founder B2) has managed the science in his labs for many years...he has a lot of direct control and his way of dealing with things. But he also allows a lot of consultation and feedback.

However, while Founder B1’s employment system causal thinking appears to be far less than Founder B2, with a focus on allowing the senior management of the company take care of the business, Founder B1 understands the importance of people in the company.

Founder B1
...Investors don’t invest in technology, they invest in people...and if you don’t have a good CEO, you won’t get US$6 million. I actually first heard from a conference in Boston and we had lunch a couple of times and asked him and he said yes...you have to have credible people first...and the inventor and his lab has to be credible...so if you don’t have that then its difficult...it must be fashionable...because VCs aren’t sort...they hunt in packs and they only do things that are fashionable and they talk like crazy among themselves...it was the same a bit with (Company B).

When asked to comment on his role in the employment system of the company, Founder B1 established the importance of recruiting high quality employees and attracting employees. Aspects of the employment system such as other practices and policies, and the organisational culture of the company, were unarticulated despite discussions around the other aspects of management.

Founder B1
Look, I leave it all to (senior manager)...or (Founder B2), its better they handle all that. There’s no science in handling that...you can just buy the expertise or knowledge of creating all this (HR) stuff.

As previously discussed in the employment system antecedents section, the founding experiences of Founder B1 helped him conceptualise many of the structures for the organisation particularly the strategy of Company B, Founder B2 on the other hand, relied on Founder B1 as his co-founder to provide him with advice and resources not available to similar non-experienced founders such as Founder A. The initial assignment of functional roles within the founding team may have significant impact on the subsequent
employment system formed. However, this is at the level of the strategy of Company B rather than on the specific employment practices and policies. Founder-run organisations are generally characterised by centralised decision-making processes (Dyer, 1986; Geertz, 1984). However, the interaction between founders both adopting specific roles within the company seem to work well with regard to the running of the company. The specific roles that founders play in the founding team appear to be important (Eisenhardt & Schoonhoven, 1990). Company B demonstrates that the interactions of founders are important as well as the specific roles that founders take in the organisation. The founder’s functional role remains important and reflect their identity as founders and key decision makers of the firm (Weber, 1968). This is supported by the perceptions both founders had of one another:

Founder B1

...(Founder B2) is the one with the science.

Founder B2

...(Founder B1) is the business side of things.

While Founder B2 has significant ideas about the employment system of Company B, one of the key discrepancies in examining Founder B2’s employment system domain thinking and the data collection of the company is the lack of congruence between Founder B2’s ideas about the employment system and the evidence from the case study. For example, development is seen as an important aspect of Founder B2’s employment system mental model. However, development from the case study analysis is not a feature of Company B’s employment system.

An examination of the training and development practices in the company shows that Company B is not particularly proactive in encouraging employees’ development. Rather, as the Science Manager succinctly puts it,

...we rather get the skills we need rather than develop them...we hire people whose skills and knowledge we need...we have a very defined programme and if we need those skills we look for them and get what we can

Founder B2

We can always buy skill if we can afford it but the issue is if we can afford it
Business Development Manager
...we have gaps that we can fill by consultants. So for example this trial, we will find a consultant for that, we only need to learn how to do this and we only need them for a short period of time...we will consult them and use them that way. With the next round of funding we will probably address the gaps but at the moment with the cost effectiveness of the company, we would be best to use it this way.

...we’ve outsourced and then we get promoted to clinical trials and my role now has developed to pre-clinical development...the goals are to get the compounds to clinic as quick as we can. We learn from them.

This is congruent with the company’s association with the research institute with which it is based with. Many of the scientists originally working for Company B have been absorbed by the research institute during the period of downsizing. By having close links with the research institute which Founder B2 is the director of, the company is able to leverage its ability to obtain required knowledge and skills through the resources of the institute.

Science Manager
...at the senior level, there has been quite a lot of career development. People manage being scientists or being scientist managers or being scientists to intellectual property managers...development quite a lot of leadership at the technical level and at the junior level you buy what you want and develop them.

At first glance, this discrepancy is largely seen as the result of the lack of formalisation of training and development practices in the company. However, the development espoused by Founder B2 is seen at the more senior levels of the company and an informal practice particularly in the sense that it was a “crucial need” for the company at the time.

Business Development Manager
We contract out to the (Research Institute)...the only problem we have with regards to expertise would probably be...with the commercialisation process but... we’re learning that and we’re developing those skills along the way, we do what we can in this company.

This reflects what Atkinson (1984) terms the building of the core-periphery workforce. Therefore, in terms of Company B, Founder B2 espouses the employment system based
on the core staff or top management team. Swart and Kinnie (2001) show that knowledge intensive firms require professional qualified employees that often have little time for training and development where the prime need is to acquire these expertise from external markets and then to keep them in the firm. In terms of training and development in the company, all the staff are encouraged to attend conferences and write papers in their particular fields. The Business Development Manager described the training and development in the company as individually based and the onus was on the staff to be proactive in their own development. The Science Manager stated that there were funds available for other staff to manage their own training and development in the form of applications for conference funding as well as training courses for specific computer or laboratory skills; however, these funds was largely on “very important need” basis. While the Business Development Manager and the Science Manager recognised the importance of training and development in this knowledge intensive industry, they admitted that the company did not play a large part in the development of their staff. As many of the current research work are contracted out to the research institute, it was expected that either the research institute or each particular staff member would manage their own careers to their advantage. The company had a PhD student on stipend however, the Science Manager stated that that was the only PhD student they employed and were willing to develop and there were no plans to employ entry level scientists.

Science Manager

…the time we need to get things done is quick so we don’t want to have students, they are on learning curves. We need to get things as costs effective as possible...We prefer to get the research we need out of experienced people and as such we don’t put a lot of emphasis on training and development although we do have it. We already have what we need in terms of getting the work done.

Founder B2

It’s complex. The problem is that there aren’t enough funds to do what it needs to do. And there’s too much diversion of senior staff into fundraising... all the time, given the crappy capital markets in NZ from the lack of consistent support from government for the sector.

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65 Budgets are made available for individual scientists employed fulltime in Company B, while much of the contracted staff are looked after by the research institute they worked for or employed their own resources.
Much of the demands and tensions associated with employment system can be attributed to the demands of keeping the company viable. The formalisation of the employment system and the need for implementing policies and practices are thus, of low priority.

Founder B2

...there was an ambiguity in that (Company B) started employing its own staff to do its research...having its own research labs. There was a limited amount of contracting from the (university) such as areas in medicinal chemistry and for my time. In fact, from that model, we have been intent on employing our own staff although it’s got more fluid and more employment of university staff part time...or contracting staff from the university as time has gone on the discovery side. But the other side as the company goes on through drug development, it’s been outsourcing offshore to parties more experienced in drug development.

This affected changes to the employment system as Founder B2 leveraged the relationship between Company B and the research institute that it had an employment relationship with. The utilisation of strategic alliances increases the company’s external capabilities as well as its operational effectiveness (Kickul, Belgio, & Green, 2004). Founder B2 is able to build on his strategic alliances and social capital to develop the employment system of Company B. The lack of expertise in Company B’s localised region, as was the case with Company A, compelled Company B to focus the development of the employment model around a core staff with particular emphasis on contracting expertise (Atkinson, 1984). Boxall (1998) calls this workforce segmentation as an “inner core” that may demonstrate high levels of functional flexibility and a reliance on firm-specific competency and knowledge. In his theory of human resource advantage, Boxall (1998) describes the strategic problems that all firms face in order to maintain viability.

Common sense suggests that it is not really possible to argue that all employees or contractors associated with a firm- particularly a large one- constitute a source of rare value. The resource-based view of the firm inevitably drives us to make a distinction between ‘core’ employees who are critical to value creation and ‘peripheral’ groups...the inner core consists of those managers, technical specialists and strategically located workers who are responsible for valuable innovations or for successful imitation (Boxall, 1998, p. 268).

The choice of employment system has been shown to be influenced by a variety of factors that include the financial, social, and legislative as well as on the specific condition of the external labour market (Boxall & Purcell, 2003). In that regard, Company B outsources
expertise around areas of need such as the clinical trials and some technology aspects (as evidenced by using consultants from the research institute where they are located next to). Boxall and Purcell (2003) sees the adoption of external employment as an emergent strategy associated with internal and external capabilities and requirements. Ward et al (2001) identify six factors from a detailed study of why a bank and a telecommunications company came to use agency staff for their customer service work and the difficulties encountered. They identify greater numerical flexibility due to an increased uncertainty associated with technological change, new forms of competition, a response to changes in the external labour market conditions, the coupling of corporate performance targets to employment levels leading to a need to mask true staffing statistics, corporate-level pressure to reduce labour costs, the generation of internal flexibility to meet job security and redeployment targets for core staff, and the provision of cheap screening process to assist recruitment and selection procedures as the reasons for this choice. Company B faced similar pressures in that there was corporate pressure to reduce labour costs, and internal requirements to focus on flexibility, as well as the limitations of the external labour market for expertise. These combined to affect the form of employment system in Company B.

Several functions within the company are outsourced to other companies and research institutions. In addition, several years after its founding, the company downsized from 50 down to about 20 employees. Many of the scientific staff was absorbed back into the research institute that they formerly worked for before transferring to the company. As such, much of the research in the company is outsourced to this research institute. Aside from research work, clinical trials and the legal and administrative requirements for clinical trials were also outsourced to consultants. These represent areas in which the company had no previous expertise and relied heavily on these consultants to get their products and drugs through the clinical trial process and administration. The ability of Company B to do this is due to Founder B2’s human and social capital in leveraging his position and networks within specific research institutes (Bates, 1990; Bozeman et al., 1999; Corolleur et al., 2004; Lepak & Snell, 1999). The following quote by the Science Manager is typical for many of the scientists in the company,

66 Evidence was obtained from interviews with the founders, science manager, business development manager, and the scientists. The evidence was also obtained from the company annual reports and one newspaper business article regarding the downsizing of Company B.

67 Evidence from Science Manager and Business Development Manager
I was brought in by (Founder B2). I’ve known him and worked with his research institute a couple of years in (research institute). And the contract there was about to end when it was being privatized. ...and I spent a lot of time with (Founder B2) and his research when he was in (research institute).

The implications of this suggests the ways in which a founder’s social capital can be used to influence the employment models in knowledge intensive firms (Starbuck, 1992; Swart & Kinnie, 2001, 2003). This idea of core employees within the firm as being part of the firm’s competitive advantage has been discussed in the literature (Atkinson, 1984; Boxall & Purcell, 2003; Lepak & Snell, 1999). In Company B, the structure of the employment system demonstrates the reliance on core employees: that of the top management team and the senior managers\(^{68}\). The evidence from Company B shows the reliance on key members of the top management team to administer to the employment system needs of the firm. These key members of Company B are expected to learn from consultants used in the clinical drug trial process. The ability of Company B to leverage a “buy” form of employment system is partly dependent on the close relationship that the company has with the research institute it has links with. Expertise for the company can be bought and used according to their needs due to the mobility of the scientists from the company and its close links with the research institute\(^{69}\).

While entrepreneurial insight is the necessary element in the ‘inner core’ of the workforce, it is not, however, sufficient to ensure successful navigation of the establishment phase: firms must also be able to recruit, develop and retain a wider group of employees who collectively expand the entrepreneur’s concept of the business (Boxall, 1998, p. 274).

The importance to founders in developing high-potential employees that can perform multiple roles under various stages of organisational growth has been discussed by Heneman and colleagues (Heneman, Heneman, & Judge, 1997; Heneman, Tansky, &

\(^{68}\) Atkinson (1984) shows a model of the core-periphery employment that can be used to understand flexible models of employment systems. In short, it is the core employees that we would expect to see high levels of functional flexibility and a reliance on firm-specific competency and knowledge. Boxall and Purcell (2003) offers a thorough analysis of the implications of this model on strategic human resource management. They indicate that empirical research (Cully, Woodland, O'Reilly, & Dix, 1999; Osterman, 2000) show that it is rare for firms to exhibit highly planned and coordinated core and periphery strategies simultaneously. This case study provides some evidence for the conditions in which the core-periphery model may arise.

\(^{69}\) Marsden (1999) suggests that managing complete core-periphery flexible employment system are difficult because employment systems are socially and institutional embedded in the societies which they are a part of. The social and economic costs may be too high to manage such a system. However, this form is seeing a rapid growth in industrialised countries due to changes in the labour supply and rise of contingent workers (Boxall & Purcell, 2003).
Camp, 2000). The challenge of most new ventures is in “selecting someone who fits with the organisational culture, who is able to perform new duties as they are added to the current job, who is able to handle multiple jobs as needed, and who has the ability to take on future jobs as they arise in the organisation” (p. 18). In Company B, the reliance on core employees is vital for the founders to concentrate on fundraising efforts. This is tied into the development of the core employees within the company. The Business Development Manager stated that when the company started, she started off as the executive assistant to Founder B2 and eventually graduated to the role of the business development manager. Throughout her time at the company, she had done almost everything that was required.

Business Development Manager
As a small company, everyone pretty much had to learn how to wear many hats in this company, we were doing everything ourselves and a lot of the time, we were learning on the job. It was sink or swim but it gave you the skills and knowledge needed and you benefit so much from all of it...I started out as an assistant and I pretty much managed a lot of the HR issues and research issues from the start. I think if you talk to people who have been here as long as I have you’ll find that they all would have had a hand in everything.

Scientist
You do what needs to be done here, we’re a small company

Because Company B emphasises an ability to buy the required expertise, the control and coordination of work is an important aspect of the employment system in Company B. As much of the coordination and control of work within the company is based on Founder B2’s employment system mental model, much of the ensuing discussion will focus on Founder B2’s model. Founder B2 believed that in the commercial environment of a biotechnology company, there had to be a lot of controls regarding the way in which research and development should be done. As stated, Founder B2 was involved in the active and daily running of the research. Founder B2’s employment system mental model shows a direct link between professional evaluation and direct control, over planning and development in the company. The management of performance in the company is fairly formal. Everyone in the company is given a job description and employment contracts that are drawn up by the Chief Financial Officer and the Chief Operating Officer with advice from the legal representation of the company. Performance appraisals are done annually for permanent staff. However, performance management in the company is
based on mutually agreed goals and performance indices with individuals rather than any overall formalisation of the performance management system. The Development Manager stated that while there were plans to draw up a formal documentation for their performance management system, this was still in the development phase and a performance guideline in the broadest sense was included in the induction manual. These guidelines highlighted general expectations of behaviours for employees and the hierarchy of reporting to the individual. However, Founder B2 retains much control over the direction of the research and its employees,

Founder B2

*At the end of the day, I’m the CSO and I can only advise...but strongly...get rid of the bad employees.*

Founder B2 links control around the development and planning of the research in Company B. In terms of the direction of research, management of research consists of weekly scientific meetings conducted by the senior scientists in the company. The weekly meetings are centred on science planning and evaluation. Senior and junior staff members are managed individually although there is some team evaluation in their performance appraisals. Company B follows a hierarchical performance review system where senior scientists or supervisors evaluate the performance of those under them. The executive management of the company meet monthly and were involved with the running of the company including the overall scientific planning and evaluation of the company’s science. In addition, the Scientific Advisory Board met annually to evaluate and advice on the directions of the company. Founder B2 is involved at many of the steps of the evaluation of research and can be hands on with regards to management of the employees’ research efforts. Informally, individuals in the company are evaluated largely by their peers and supervisors. However, many of the scientists work independently and run laboratories that are under their own control. When asked about the performance evaluations, the Development Manager said,

*We employ a lot of scientists here from the university that are used to looking after themselves so we don’t really oversee the work that they do. Most are experts in their areas and have a high level of professionalism so in that sense we are confident that they are able to do the job we require of them.*
Science Manager

*I think that the commercialised environment really is easier in some ways than academia in doing work that you want to be working. In some ways it makes the goals clearer to some of the scientists...however, some of the problems we usually have...to do with making some of these academics understand that we are directed research and that they realise that they have to be working within a team and not follow their own agendas.*

This was corroborated by a scientist, who stated,

Scientist

*Don’t really see the other people working here that much, maybe when we have our meetings... but normally, we get on with it.*

The junior scientist interviewed informally discussed the fact that a lot of her work was directed by the supervisor and senior scientists. She felt that the company was good in the sense that there was a lot of support and direction for her development as a scientist. She felt that as it was a small company, many of the way people were managed on an informal basis and there was a lot of direct control from the senior managers and Founder B2. This was corroborated by Founder B2 who stated the importance of a personal approach in directing the research directions:

Founder B2

*In terms of their research, some of them actually have and most by and large they are doing directed research which is a particular cultural issue. But with one or two of them...the problem is that they still think they are academics and do their own thing...I need to remind them that they’re there to develop a product and they soon get that message.*

With regard to Founder B2’s employment system mental model (Figure 5.5), Founder B2 regards professional evaluation as being part and parcel of the direction of his research work. This arises from the expectation of fitting into Company B’s culture where everyone is expected to work towards the company objectives. This uptake of the core-periphery model appears to suggest what Marsden (1999) describes as employment systems being part of the social and institutional societies in which they are part of. With regard to this case study, employment systems also owe much of its genesis to the professional norms and expectations of work (Ben-David, 1971; Crane, 1965; Friedkin, 1978; Gilbert & Mulkay, 1984; Harrison, 1974; Zucker & Darby, 1997). This professional expectations and norms of work can be seen in the reasons for attachment in
Company B. Work is regarded as the more rewarding aspect of working for Company B. As stated, employees highlighted the research work and commercialised environment as key aspects of their employment.

Scientist
...once I get my commercial experience, I’ll be in demand

Junior Scientist
...I work with (Founder B2)...he supervises me and even though he’s incredibly busy, I know that I’m doing cutting edge research...that’s really exciting.

Company B also stress the taken for granted mode of professional control expected in highly socialised professional scientific settings (Zucker & Darby, 1996). The employment contract and performance appraisal of employees in Company B reflect professional coordination and control by emphasising the lines of reporting in terms of research work and output. Scientists work in project areas and report to senior scientists and project leaders. They in turn report to the Science Manager and Founder B2. This organisational structure allows a close control over the research done in the project sites and areas. The employment contracts of the employees are general and reflect legal obligations of the company in the workforce rather than clear efforts to control employees. The employment contract specifies the tasks and duties of technicians although for the scientists there are no clear guidelines aside from the clear reporting of the research and output and clear areas of responsibilities.

Science Manager
...most report to me. Early on, we were doing a lot of the preclinical research and experimentation. The last 18 months we’ve been preparing for clinical trials. We’re shooting for pre clinical...clinical development and manufacturing compounds and clinical trials. That’s what we’re trying to do for the past couple of months.

Founder B2
It’s where the management has to be much more passive I think they understand that there’s a big goal there which is to develop a drug and to make money. And I think they appreciate the teamwork and collegiality and the sense of common mission far more so than the ambiguous nature of the university.

Performance evaluation in the company is quite formal with an annual review. However, informal performance evaluation is carried out regularly as needed to ensure that work is
always evaluated and headed in the right direction. Scientists in the company manage work and their colleagues in an informal capacity reviewing each others work and planning in their project areas. Most of the work is overseen by the project leaders and the Science Manager.

Science Manager
...we have weekly science meetings. Strategic decisions are made and carried on with that. Executive group meets every Monday. That’s where we discuss the science. And the scientists also get together and once a year or day to meet and plan

In discussions with technicians and scientists, it was found that while there was a lot of freedom in their everyday activity, control of work is achieved by close communication both formal and informally with line managers and project leaders. Founder B2 is actively involved in the process as science and research advisor. This lends credence to the vast human capital contribution of Founder B2 to Company B. Star scientists are able to leverage their human and scientific capital in start-ups (Bates, 1990; Becker, 1962; Bozeman et al., 1999; Chandler & Hanks, 1998; Cooper et al., 1994; Corolleur et al., 2004; Davidsson & Honig, 2003). In the case of Company B, tacit knowledge embodied in these star scientists may be diffused within the organisation and facilitates the transfer of knowledge (Almeida, Song, & Grant, 2002; Kim, 1997). With regards to the employment system, the models to which scientist founders facilitate the transfer of knowledge from founder to others in the organisation. The importance of building an employment system thus is vital to knowledge intensive firms. The management staff were who employees in the company looked to the top managers and Founder B2 for direction and feedback.

Scientist
... they’re usually easy to approach or discuss any problems with. It helps with the direction of research and essential in this business.

The development of the core management staff to administer to other staff within Company B stands out as a crucial issue for the influence of the founders (particularly Founder B2) on the employment system of the firm. Swart and Kinnie (2001) found evidence to suggest that knowledge intensive firms that grow rapidly require a growing number of professionally qualified employees and often have little time for internal training and development. These types of organisations will tend to have employment
systems based on markets. In Company B, there is evidence to suggest that the development of the employment system from the founders’ models (especially Founder B2), is mediated by a number of crucial factor that includes the founders’ social capital, resource environments, and the increasing demands and pressures on the founders and the top management team. There is suggestion that as the company grows, the need to move from a market-based acquisition mode to one that builds internal development and commitment becomes imperative (Boxall & Purcell, 2003).

This case provides significant evidence that details the degree of the founders’ influence on the employment system of Company B. In Company B, it is interesting to see that Founder B2’s use of social capital is similar to that in Company A, in that such networks remain an important variable for the building of the employment system (Audretsch, 2001; Corolleur et al., 2004; Murray, 2004). However, the relative impact of the founders’ employment system mental model in Company B is mediated by a number of environmental and interactive elements that strongly suggests the contextual environment of the founder’s organisation building efforts as being an important factor in the emergence and evolution of the firm (Romanelli & Schoonhoven, 2001). Such mediating factors in the way in which the employment system of the firm emerges represent an important contribution for the development of theory around founders’ organisation building efforts. Founders’ mental models of the employment system do not get directly translated into working models of the firm; however, they remain important influences in the direction of the employment system for the firm (Burton, 2001). Company B is also important in how it highlights the interaction of founders in the founding team with regards to the organisation building process (Carpenter et al., 2004; Ensley & Pearce, 2001; Zucker, Darby, & Armstrong, 2002a). Eisenhardt and Schoonhoven (1996), for example, demonstrate the link between prior experiences of the top management team with the firm strategy. This suggests the importance of examining the extent of influence of founders’ experiences in building the employment system. The influence of Founder B2 on the employment system policies and practices of Company B is greater and far more important than Founder B1. This is the result of the founders’ respective roles in the company and experiences prior to the formation of the company. Thus, for the employment system domain, Founder B2 has significantly more influence on the employment policies and practices of Company B as he was the “champion scientist”, while Founder B1 played the role of “business” partner.
The extent of influence from Founder B2’s employment system mental model on the employment system is largely dependent on his immense human and social capital. This significant aspect of Founder B2 allowed him to build an employment system based on a core cadre of employees. Aside from practical reasons such as the founders being on fundraising trips, the segmentation of the workforce in Company B is largely dependent on Founder B2’s role in other research institute. Similar to Founder A, Founder B2 was able to utilise his networks to build the employment system of Company B. However, in contrast to Company A, Company B as a small high growth company targeted the use of core employees to resolve the labour market constraints of the human pharmaceutical biotechnology industry. Marsden (1999) recognises this growth of using contingent labour as being due to labour market changes. The ability of Company B to channel resources from Founder B2’s social networks is due to the relationship Founder B2 has particularly with one research institute. External pressures such as the tight labour market conditions, new forms of competition, corporate-level pressure to reduce labour costs, and the generation of internal flexibility to meet job security and redeployment targets for core staff provided significant pressures for the founders to modify the employment system of Company B. While Founder B2’s model around the employment system domain retains some significant features on the employment system of Company B, this was reserved more for the core management staff rather than for all employees.

The formal employment practices in the company reflect some aspect of the founders’ employment system mental model. Both founders’ agree on selecting the best knowledge and skills around finding the best employees and the ways in which to attract them to the company. Compensation is agreed to be a significant factor in luring employees to the firm. However, attachment of employees to the company represents money and work (Burton, 2001). Money represents a significant resource for attracting people to Company B, however, work also represents a significant factor to why employees work there. The benefits that accrue to employees in Company B include the experiences of working in a commercial environment and the reputation of working in Founder B2’s labs. This is also similar to the reasons why many employees worked in Company A. However, with regards to many aspects of the employment system domain, both founders are different in their employment system mental model. Founder B2 has far more elaborate model in the employment system domain and recognises this aspect of
attracting people to the firm. Founder B2 is also a significant influence to the development of the employment system in Company B. This is not surprising considering that much of the company’s capabilities are built on Founder B2’s human and scientific capital which are based on his prior experiences (Bozeman et al., 1999). Due to management of a large number of contingent staff and consultants, direct control and evaluation of research are the prime ways in which work is controlled and coordinated. Founder B2 emphasises development and planning as important in managing the science research of the company. The mode of controlling and coordinating work is largely due to expectations of professional norms and direct influence from Founder B2 and the top management team. This is typically seen in many star models of employment systems in biotechnology and research companies (Burton, 2001). Founder B2’s employment system mental model highlights some of the important variables and relationships in building the employment system. This highlights the relative influence of the founders on the employment system of the firm.

**Organisational Culture**

Founder B1 had no standard concepts in his cause map while Founder B2 had four standard concepts. The standard concepts in Founder B2’s organisational culture domain, as with Founder A, reflected cultural aspects of the employment system mental model. The standard concepts were excellence, professionalism, working in teams, and regular control. These concepts form Founder C’s ideas about the working environment of Company C including its organisational culture.

The interesting feature of the organisational culture domain map\(^{70}\) (Figure 5.6) is the lack of organisation culture concepts in Founder B1’s employment system mental model compared to Founder B2’s. In Figure 5.6 of the Founders’ combined employment system mental model, we can see that both founders share only aspects of the employment system antecedents and employment system itself but share very little causal thinking of ideas around the organisational culture and goals. A focus on the domain maps of both founders in Figure 5.6 show the causal thinking around the organisational culture and goals that both founders were trying to achieve.

\(^{70}\) The organisation culture and employment system goals domain maps were combined to graphically display the differences in thinking around these two domains by the two founders.
Founder B1’s employment system mental map concentrates on the organisational goals of the employment system and will be discussed in the next section. As highlighted in the previous sections, Founder B1 admitted that the employment system of the company and its ensuing employment relations and management were beyond the scope of responsibilities and interest of this founder. Founder B1 saw his role as developing the company into a profitable business and getting the research of Founder B2 to the commercialisation stage.

**Founder B1**

*I’ll be doing that week after week...well I see a biotech company has to spend half of its time...you have to spend half of your time with investors...planning the next round...working on the next round...and the fact of the matter is you often can’t get enough time or patience in a place like this for that (the employment system) ... contacts in the field is quite helpful but it’s all about the business for me.*
As such, his employment system mental model emphasised the organisational goals of the company with little causal thinking around aspects of the employment system policies and practices and more on the building of a viable and successful company that would create and build on shareholder value (to be discussed in the employment system goals section later). Founder B1’s ideas of the employment system was on giving the role of management of people in the company to its senior managers and Founder B2. The lack of causal thinking and complexity around the employment system aspects of the mental model displays suggests (and we must interpret this cautiously) that Founder B1’s ideas about the employment system are neither important for his role nor important in his conceptualisation of the business.

Founder B1
If they say it's a 60 million dollar deal...at significant risk...Well, you see we push them out there and it’s the investors that worry...but not for me, this is something that has to be dealt with but you have to have people who know the science...you’ve got to have people who work together as a team so I think that (Founder B1) and I have to perform that function well.

This reflects that Founder B1’s functional background as fundraiser in the company necessitate a focus on the fundraising activities and financial running of the company rather than a focus on the daily employment and employee management activities.

Founder B1
Important to have a business plan...we have to secure an Australian investor that is well known overseas and we’ve gone to the UK and US...its in the discussion, some will fall by the wayside but most of them these days will look closer...looking for exit investing after about 3 years so its hard... not only my stocks but investors are just more fussy and it is not good to invest in New Zealand because we are too far away from everyone else, investors like to think they can go round and have a cup of tea at the company and you can’t do it here...so the fundraising, the money...the constant capital search is far more important than anything else in this company, (Founder B2)...the managers...they take care of everything else

In contrast to this, Founder B2’s organisational culture domain does emphasise several more standard concepts around organisational culture concepts such as excellence, professionalism, working in teams, and regular control. The organisational culture concepts appear to highlight some of the expectations and goals that the employment system is designed to achieve. Causal thinking around the employment system policies
and practices are related to achieving these organisational culture concepts and ultimately
the goal of producing science results and commercial products.
When contrasted with the case study evidence, Founder B2 appears to have a larger
influence on the employment system of the company. Founder B2 also stressed elements
of excellence to the work that is expected in the company.

Founder B2
*We manage our own science so we expect that our employees give use their best.*

The Science Manager revealed that a high standard of excellence was expected of the
employees in terms of work and research output.

*Science Manager*
*...but the expectations we have for everyone is that they produce excellent work in keeping with the reputation of the lab.*

The standard concept of excellence is similar to the expectations articulated by Founder
A. This expectation of high quality work was related to the employment system practices
in the employment system domain. In Founder B2’s cause map, the attraction of people
to the company in terms of fitting into the commercial culture having commitment, and
the first class facilities to do the research work was paramount to doing excellent work.
This was also supported by the Science Manager who commented that working in the
company was about trying to achieve excellence in their particular fields. Much of the
work in science firms thus, represented cultures or expectations inherent in the form of
professional work (Bunderson, 2001; Fox & Stephan, 2001; Goldberg & Kirschenbaum,
1988; Leicht & Fennell, 1997). This is important because it not only links the mental
models of employment system practices to developing a culture in firms but also
highlights the important elements of building a science culture (Ben-David, 1981;
Cotgrove & Box, 1970; Friedkin, 1978; Merton, 1973; Meyer & Rowan, 1977; Mulkay,
1972; Oliver & Ramati, 2003). As seen in Company A, the standard concept of
excellence was a minimal expectation of employee’s efforts in the company and a central
element in Founder A’s mental model. The same is true for Founder B2. Excellence is
the most central concept in the organisational culture domain for Founder B2. This
concept can be tied to expectations of professional work and norms (Bunderson, 2001;
Harrison & Rosenzweig, 1972). Certainly, the role of organisational culture and social
norms in the employment system is strengthened in the similarities of Founders A and B2 around the organisational culture domains. These expectations of building a science culture also includes elements already discussed in the first study. The importance of building the social structure and the culture in Company A is also repeated in this case study. As in the first case study, elements of the organisational culture in the mental models of biotechnology founders include several other key concepts that inform on the coordination and control of work. Team-working is also a key concept that Founder B2 identified as important in building a culture in his company.

**Working in teams** is one way in which the company appears to coordinate work over the four project areas. However, Founder B2 while stressing the importance of working in teams treated this idea from a more functional perspective.

Founder B2

*It's important for them to be working in teams, they need to share their particular expertise and achieve the results together.*

This is in contrast to Founder A, who associated working in teams with building a “family-like” attachment among employees. With regards to this, it appears that Company B is reliant on the scientists to work in their own areas with care and professionalism most often having to disseminate knowledge and work on their own.

Science Manager

*We work on a team basis so we try and do that there but there’s no overall thing we do with planning. Teams we do informally. We do everything here informally. There are official processes here but we try and do things as we go along.*

Scientist

*There is no blueprint here about what needs to be done… so it’s an interesting experience. We work on it as we go along and learn as we go. We try to share the knowledge and keep things going as a team.*

However, despite the attempts for the scientists to work in teams, scientists often worked within their own laboratories and have their own independence regarding their research.
A lot of people try to find what’s going on with the company. And we keep people updated but people usually have goals to work with and their own projects to run so people tend to keep to themselves.

While the expectation of working in teams is one that the founder articulated, the organisational culture of the firm and its locations is different from Company A in that there were very clear delineations between its laboratories and research areas. Teams worked well within their particular areas; however, there appeared to be lack of integration between the various departments or research areas. Working in teams as opposed to the first case study represented functionally advantages rather than on building an organisational culture. As the Business Development Manager stated,

*When the company grew and the projects were spread out across different labs, there was less interaction. They sometimes work in isolation. But its how we worked, we needed to split up the areas and contract out to (research institute).*

People tend to keep to themselves, we have goals and we have plans to fulfill.

The meaning of teams between Founders A and B2 have significant differences that reflect on the value of teamwork in their organisations. Founder A is able to build the use of teams into managing a culture that is “family-like”. In contrast to this, Founder B2 articulates the use of teams as functional and transactional. This is analogous to the differences in meaning that is attributed to the types of teams that are described in the literature (Belbin, 1981; Katzenbach & Smith, 1992). Katzenbach and Smith (1992) for example, has described the importance of delineating the differences between working groups and teams in rhetoric and characteristics, and the differences in outcomes for both types of groups. Belbin (1981) similarly suggests that team composition and structures have different implications to the organisation and may impact on the productivity and success of teams. One useful framework that has been used to describe the importance of building teams in firms (Boxall & Purcell, 2003) is the framework by Hart and colleagues (Hart, 1992; Hart & Banbury, 1994). They suggest that the style of strategy-making in firms have implications on the role of top management and organisational members (Table 5.3).
In the case of Company A, the use of teams was driven largely by Founder A’s mission and vision for the future and reflected “the nurturing of a shared vision, shared values, and an emotionally appealing corporate vision or dream” (Hart, 1992, p. 337). In contrast, Company B, the use of a “buy” strategy necessitated the emerging strategy for providing direction and control of work.

Table 5.3. Styles of Strategy-making

<table>
<thead>
<tr>
<th>Descriptors</th>
<th>Command</th>
<th>Symbolic</th>
<th>Rational</th>
<th>Participative</th>
<th>Generative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Style</td>
<td>Imperial</td>
<td>Cultural</td>
<td>Analytical</td>
<td>Procedural</td>
<td>Organic</td>
</tr>
<tr>
<td>Strategy driven</td>
<td>by leader or small top team</td>
<td>Strategy driven by mission and a vision of the future</td>
<td>Strategy driven by formal structure and planning systems</td>
<td>Strategy driven by internal process and mutual adjustment</td>
<td>Strategy driven by organizational actors’ initiative</td>
</tr>
<tr>
<td>Role of top management</td>
<td>Commander: provide direction</td>
<td>Coach: motivate and inspire</td>
<td>Boss: evaluate and control</td>
<td>Facilitator: empower and enable</td>
<td>Sponsor: Endorse and support</td>
</tr>
<tr>
<td>Role of Organisational Members</td>
<td>Soldier: Obey orders</td>
<td>Player: respond to challenge</td>
<td>Subordinate: follow the system</td>
<td>Participant: learn and improve through self-evaluation against agreed criteria</td>
<td>Entrepreneur: experiment and take risks</td>
</tr>
</tbody>
</table>

*Source: Hart (1992)*

The framework presented above suggests the need to take into account the strategy making styles of founders when examining the critical decisions around the employment system. The kind of employment system that emerges represents the influence of founders’ mental models in response to external demands and internal processes. The evolution of the culture in Company B thus was also a reflection of some of the professional norms and changes in the organisational structure of the company. Therefore, it is important to take into account the influences of Founder B2 and the mediating factors that interplay with strategic decisions around the employment system. Fitting into the organisational culture was not seen as a big issue within the company, technicians and scientists are spread out over several laboratories within the research institute as well as the medical school and the hospital facilities. When asked to talk about the company in terms of its social and cultural make-up, the Business Development Manager indicated that as the company is spread out geographically and most staff would be working in isolation within their projects, there was very little social activity apart from work. Senior management interviewed and spoken to expressed that expertise and
skills were far more important for the company than the ability to fit into the company’s culture. However, one telling comment by the Science Manager was particularly interesting when asked to elaborate about the company and traditional academic settings from which most of the scientists come from.

Science Manager
...the difference sometimes, and this is a problem...some of the scientists don’t understand the need for focus or directions in their research...they don’t understand the demands of the commercialisation...sometimes; you need to push them or get them to re-evaluate their priorities.

Founder B2
...they don’t have the same autonomy as people in university. In terms of their research, some of them actually have...and most by and large they are doing directed research which is a particular cultural issue...but with one or two of them. The problem is that they still think they are academics and do their own thing. I need to remind them that they’re there to develop a product and they soon get that message.

History and key decisions at the time of founding have profound consequences on the firm establishing patterns of behaviour that is not easily changed. Founders may subsequently precipitate powerful cultural and family dynamics that affect the evolution of their firms for better or worse (Goffee & Scase, 1985; Handler, 1990). Analysis around the organisational culture domain of the founders’ employment system mental model can also be made Burton’s (2001) typology of employment systems.

While the concepts of excellence and professionalism has been commented upon and represent scientific cultures around a particular profession, the issue of regular control are formal and informal ways in which organisations coordinate and control work. With regards to the influence of Founder B2 in coordination and control of the research, The Development Manager revealed that,

...very few people would interact now but when we were a smaller company we would interact more. When the company grew and the projects were spread out across different labs, there was less interaction. They sometimes work in isolation but (Founder B2)...the executive team keeps an eye on things.

The direct control of the senior management team and Founder B2 appears to also be related to the regular control of the science by the senior echelon. Many of the work is
coordinated and controlled by the Founder and his team of senior scientists. Founder B2 had a unique view about management of people in his firm. Founder B2 sees the technical aspect of the management of people as a formal and a hindrance to getting things done. It would appear that the choice of control for Founder B2 is subject to variables that tie into the nature of the tasks, relations between segments of occupational groups or workforce segments, occupational groups and the environment (Simpson, 1985). Others however, identify choice of employment systems with costs associated with the environmental context, environmental constraints of such factors as the labour market, employee expectations and organisational life cycles (Boxall & Purcell, 2003). With respect to his involvement in employee matters, Founder B2 relies greatly on his personal experience in managing people and the work in the company.

Founder B2

You oversee ones that work. Science doesn’t move that fast. Once a week meetings for progress is best. Yeah at the end of the day I’m an employee and CSO and I do try and avoid conflict, I advise the staff and the other people manage the staff. To avoid conflicts of interest about the staff. It’s just a technical matter to deal with the employment contracts.

Scientist

(Founder B2) is very savvy at managing people, he tends to show me (work) on an informal basis, it's more of a mentorship relationship, I think that's why he's so good to get along with, he may be incredibly busy but he's very giving and supportive.

Examining the forms of work control also relate to the types of social control that become dominant within a given organisation (Edwards, 1979). Studies of types of work control have looked at analyses of industry and professions (Burawoy, 1979; Kusterer, 1978). Sociologists have identified influences of these types of control that include variables such as the labour market (Burawoy, 1983), professionalism (Krause, 1982), and tasks and relations (Simpson, 1985). The forms of work control in Company B are a combination of the availability of labour markets, professional expectations and direct control of the management team. This is congruent to the amount of coordination needed, and the uncertainty or variability of technological processes, and environmental pressures for Company B (Simpson, 1985). This in part is explained by the lack of resources available to Company B in terms of its labour pool and finances. The organisation of work and people are thus a form of control for these resources (Aldrich & Pfeffer, 1976;
Bidwell & Kasarda, 1985). This gives credence to the ability of Company B to control their scientific resource which also allows Company B to monopolise unique knowledge or control over crucial and uncertain parts of an organisation’s technology (Crozier, 1964; Simpson, 1985). This theory has received some support in professions although far less support in studies on lower-status workers (Simpson, 1985). However, the organisation of the company was not only related to the forms of direct control on the employees, teams are also seen as important to the organisation of people in the company for a variety of reasons.

Summarising the organisation culture domain of Founders B1 and B2, the results show a combination of dependence on the research institute from which Company B originated from. The attachment and selection strategy of Company B relied on a “buy” strategy, finding the expertise necessary and maintaining relationships with consultants brought on in the commercialisation process. Founder B2 who has a far more complex organisation culture domain map than Founder B1 has specific ways in which the standard concepts causes the ultimate goal of science results. Founder B2 believes that working in teams, and a culture of regular control, professional evaluation and excellence leads to science results. In this sense, Founder B2 is similar to Founder A in Company A. Both are scientists with very similar causal thinking around their employment system mental model. Founder B1 on the other hand manages the finances and business aspects of the venture creation. The functional roles of both founders in Company B are split into that of scientist manager and financial fundraiser.

As with Company A, Company owes much of its organisational culture to the norms and understandings of scientific work and the nature of science (Etzkowitz, 1998; Latour & Woolgar, 1986). However, the findings from this case study support the initial findings from Company A that founders are able to articulate causal links between the functional management practices of the employment system with building a culture in their organisations. While compared to Company A, Founder B2 articulates only four key concepts around the organisational culture domain, these conceptualisations are congruent to his philosophies on managing people and strategic thinking around people such as those represented by Hart (1992). This second case study provides further evidence for the role that founders have in creating the organisational cultures and the influential

**Employment System Goals**

Founder B1 and B2’s mental model of the employment system appear to be in agreement about the organisational goals of the company. Founder B1 and Founder B2 share the ultimate goal of commercialising drugs and products from the company’s research. Figure 5.6 shows the focal map of both founders’ shared SNTs/SCU in organisational culture and goals. The map displays in a graphical sense, the shared and idiosyncratic thinking about the company’s culture and goals. Founder B1 appears to focus on the company’s bottom line and goals far more than Founder B2. The main highlights of both founders’ mental models are the shared thinking around commercial product. The points of divergence between Founders B1 and B2 in the employment system goals are Founder B1’s focus on the company’s shareholder value, and the company viability and Founder B2’s focus on science results.

The analysis of the employment system goals will begin with an examination of the shared key concepts of both founders. Organisational goals that are shared by both founders are the goal of commercial products. While Founder B2 emphasises an articulation of how his employment system mental model achieves this, Founder B1 relies on the management of shareholders as well as processes in maintaining a viable company as far more important aspects of achieving this. Founder B1 emphasises the recruitment and reliance on key players within the company in achieving the goal of commercial products.

**Founder B1**

*The world market, the whole world investment has really changed...not only my do the stockholders want different things now, they also need to see that you have the valuable people, other than that, they want to see a return on their investment...nothing else matters.*

It would seem that in Company B, the roles that founders play once again impact on their mental models of employment. Founder B2 is the ‘champion scientist’, a pivotal role with regards to the selling of the IP, while Founder B1 is the manager founder, interested in creating a viable and successful company.
Founder B1
You need to show the results that shareholders want...you need to show them that you are running a company that can take it all the way...then you can call yourself a “successful” company!

Shareholder value, viable company and commercial products are a key highlight in the organisational goals of Founder B1. As the quote above highlights, Founder B1 was comfortable talking about the ongoing business needs and the goals of the company without specific mention to its human resources. As mentioned, Founder B1 did not see the management of human resources as important. A reliance on Founder B2’s management of his laboratories was taken for granted.

Founder B1
At the end of the day, the finances need to please the shareholders and to show them that our work is progressing towards products we can sell.

The roles of the founders appear to have significant impact on the employment system goals of the company. With regards to the science of the company, Founder B2 clearly has the largest influence in the daily running of the employment system. Founder B2’s influence especially in the regulations of the science is an important aspect of the employment system building. As we can see from the organisational domain and employment system goals cause maps of the founders (Figure 5.6), Founder B2 has linked aspects of the organisational culture domain to science results in his mental model. This in turn is causally linked to commercial products. In this sense, Founder B2 is similar to Founder A in that the commercial products which are the main results of science results will come out as tangible outcomes for the company. The Science Manager commented that aside from the direct controls from Founder B2 and the senior managers of the company, science results were important in the scientists’ brief in the company

Science Manager
Our scientists are appraised by their line manager, and it is really...it’s represented in their contract with bonuses. But normally they can get more money tied to their performance...we don’t give them every year it depends on the how we’re doing...and it’s a discussion of what and how they’re doing.

The differences in the roles of both founders offer some insight into the organisation building of a team of founders. This is seen in research that examines the complementary
roles of the top management team (Carpenter et al., 2004). The relationship between founders is at the heart of the employment system building in Company B, in particular those between the two founders. Roberts and Stiles (1999) found that splitting the roles is only successful if individuals can work their way through to a complementarity of roles. In their study, the splitting of the chairman and chief executive roles places a co-operative relationship at the heart of the organisation, displacing to some degree the hierarchical model of the organisation that the duality of roles embodied. In a similar way, the complementarities of Founders B1 and B2 form a significant cooperative relationship to the organisation building process. Corolleur et al (2004) offer an insight into this cooperative relationship. Their study highlights how founders’ human capital is valorised into financial stocks. Less well known scientists are able to manage the science and technology competencies of their firm, while “star scientists” are able to easily valorise their existing human capital into new ventures effectively building links between universities and the firm. In Company B, Founder B1 effectively manages the financial side of the new venture creation while Founder B2 is important in the selling of the potential of the business. This is in fact signalling to potential investors the potential and viability of the company’s scientific research. The founders of Company B demonstrate the differences between the employment system mental models they used to create Company B.

SUMMARY AND CONCLUSION

The within case study of Company B highlights some important issues in the building of the employment system. Foremost among this is the question of the founder’s influence on the employment system when there is more than one founder of a company. The CMAP2 analysis revealed some interesting distinctions between the two founders in terms of how they conceptualise the employment system in their firm. While Founder B1 had a less complex cause map compared to Founder B2, Founder B1 appeared to emphasise more of the company’s financial and business operations. Founder B2 as the “champion scientist” on the other hand, had a more complex employment system mental model that appeared to articulate employment system policies and practices and the organisational culture and goals the founder was attempting to capture. Both founders however, appeared to share similar concepts in their employment system antecedents and the goals of the company. Both founders depended on each other to deal with the
different areas in which they were expert in. Founder B1 took care of the business aspects of the company as he had previous experience in founding companies and ongoing capital viability, while Founder B2 took care of the running of his laboratories and the science aspects of the business.

In general, the case study analysis also contributed to the understanding of each founder’s influence on the employment system mental model. It highlighted the areas of influence and continuing influence of each founders on the employment system and management practices of the company. Key issues around the company’s employment system included the ability to manage a small company and ensuring that everyone in the company managed and worked in various areas. Founder B2’s influence in terms of the management of science was an important aspect of the building of the employment system. However, while the influence of Founder B2 was a significant aspect of the building of the employment system, Company B managed to build on formalisation of the employment system that relied on outside sources of knowledge and expertise and the influence of some of the top management team.

This case study is interesting in that the way the founders influence the building of the employment system in the company appeared to be related directly to one of the founders, while the other founder appeared to take care of the ‘business’ side of things. Company B highlights the interaction of teams of founder in the creation of the employment system. The results point to important implications for the understanding of functional roles in top management teams, and the interaction of mental models in the organisation creation process.
Chapter Six
Company C

COMPANY DESCRIPTION AND HISTORY

The five year-old Company C is a world leader in the discovery, development and commercialisation of pharmaceutical treatments. The company is a spin-off from a local university and is largely driven by the founder, a distinguished professor who had previously founded a successful biotechnology companies in the United States. The company’s business objective is to have a strong clinical focus and is dedicated to moving its therapies rapidly into clinical use. The company’s strategy is to perform Phase I and Phase II trials in New Zealand which has a low cost structure for clinical research. Company C’s combination of a drug discovery programme and its own clinical drug trial expertise has received international recognition for the development of a number of new therapies. Company C was founded by Founder C in 1999. The impetus for founding the company was to commercialise the intellectual property and scientific research streams of the founder. He believed in the potential benefits of commercialising the research and thought that the only way to move forward with the research is through a commercialised biotechnology company.

Following encouraging results for a novel compound at the discovery phase, Founder C began plans to raise enough capital to commercialise the product. After good results from its phase one trials, Company C was developed to commercialise the product as well as other potential new therapies of the founder’s IP. In 2001, Company C began commencement of Phase 2 trials for this new drug. The 12 month clinical trial programme for the drug candidate showed great promise in the treatment and prevention of the target disease. Due to the potential success of this trial, Company C was recognised as a successful new biotechnology company.

Newspaper Article
(Company C) developed momentum right from its beginning and obviously has a very experienced management team. Although established only recently, (Company C) already has a potential product in Phase I trials and three compounds at the pre-clinical stage.
Company C assembled a team of leading physicians who have designed and participated in numerous international clinical trials. The company has several developmental drugs and compounds in development. It has an extensive pipeline of drugs, including one potential ‘blockbuster’ drug already in Phase 2 trials and about to enter multi-national Phase 3 trials. This ‘blockbuster’ is capable of generating annual revenue of US$750 million or more. In addition, there are three compounds in the pre-clinical phases with two more compounds in the discovery stage. The company’s business strategy deliberately uses New Zealand expertise in drug discovery and utilises its association with a local university. It integrates academic student research into focused discovery programmes, leading to employment opportunities. This strategy allows linkages between academia, medical and financial expertise while being focused on directed research.\(^{71}\)

Company C consists of three main clinical divisions that cover the areas of directed academic research.\(^{72}\) It is a science-driven biotechnology company that is focused on clinical development endpoints. Its organisational structure consists of the founder who is also the CEO/CSO, the top management team in medical and corporate areas and senior scientists and scientific staff. Company C maintains a close link to the local university by sharing laboratory space and clinical expertise. There are about 70 people working in the company in its various laboratories, clinical office and corporate services office. The majority of people employed are scientists and they are mainly located in the shared laboratories of the local university. The company also leases office space around the metropolitan area of Auckland. The company reflects an international diversity with over 15 nationalities represented. Its founder is also holds academic position as well as being actively involved with Company C.

Company C is managed by its founder who is the company’s CEO and CSO. Aside from this its management team comprises of two other financial and business directors and a chief operating officer. In addition, Founder C assembled an international Scientific Advisory Board comprising 12 prestigious scientists. Company C has more than 50 researchers and graduate students as its core research staff. The rest comprise

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\(^{71}\) Source: Archival evidence including newspaper articles, business magazine articles and company website.

\(^{72}\) These divisions are grouped around areas of research expertise and technology. The specific divisions and expertise are excluded to protect the identity of the company.
administrative and office staff. Company has close ties with the local University, as it is a spin-off venture. Company C’s discovery laboratories remain within the local university while its corporate offices are located in the central business district close by.

DESCRIPTION OF THE DATA COLLECTION

Access to the company was obtained by contacting the founder, who was also the interim CEO and Chief Scientific Officer (CSO), through biotechnology networks negotiated through the personal university contacts. Data collection occurred over ten months at the company site (in total there were three separate visits to the company and two visits to the founder’s lectures and investor presentations at different locations). Founder C was contacted by email and a full description of the description of the research protocol was sent to Founder C (Appendix C) who agreed to be interviewed. Founder C requested that a list of the semi-structured interview questions be sent before the interview. The founder agreed to participate in the research as long as the company would not be identified and as long as the founder was allowed to vet any information that was used in the research. Founder C allowed his interview to be digitally recorded. Before the interview, the researcher was invited to a company presentation at the local university involving the founder. Informal discussions and interviews were conducted with Founder C, Chief Financial Officer (CFO), and a venture capitalist involved with the company at this meeting and field notes taken. During the early stage of the research, the company was on a fundraising drive following good results from one of their clinical compounds, and access to the company was delayed. Further data was gathered through contact with other members of the organisation following the interview with Founder C. Formal interviews were also conducted with members of the top management team including the research manager and a senior scientist in the company. The research manager and senior scientist team leader were interviewed four months after the initial interview with the founder. The research manager and the senior scientist team leader declined to be digitally recorded for their interview. However, field notes were taken during the interviews. In addition, a venture capitalist involved with the company was interviewed although this interview was not digitally audio-taped. Informal discussions were also conducted with
several scientists in the company including several PhD students working in Company C\(^73\). Access to written documentation within the company was limited due to Founder C’s insistence on confidentiality about the company. However, the researcher was allowed to examine some of the documentation on site which included a sample standard employment contract, company research report and a monthly internal newsletter for employees. Observation of the employees in their work environment was limited. While the researcher was not allowed to access any of the laboratories, during a site visit to interview the senior scientist, the researcher was allowed to observe the laboratory in which the senior scientist was a team leader. However, interviews and discussions were conducted in the offices of the senior staff and the staff room of the company. As with the previous two companies, the availability of archival evidence of the founder and the company was considerable. Archival evidence was obtained from a variety of sources which included internet searches, popular media, scientific journals and financial magazines. Information was also obtained from a variety of public lectures and seminars conducted by Founder C and the top management team\(^74\).

In general, one of the main findings of Company C is the main role of Founder C in building the employment system of Company C. Founder C relied on his personal knowledge and experiences in building the employment system of Company C. The important role of his own personal knowledge and experiences including his founding experience played a significant part in building the employment system of Company C. Founder C had a definite plan for the employment system of Company C and his previous experience of founding successful biotechnology companies mediated the role of stakeholders’ influence on the employment system of the company. In short, the employment system of Company C reflects Founder C’s own philosophies on the development of their own talent and the direct control of the science through the management structures and key managers of the company. Founder C relied on his previous experience and the gathering of the top management team of the company to

\(^73\) These informal discussions were conducted with two scientists and two PhD students working for the company during the site visits, and two meetings with the CFO at conferences which the researcher attended.

\(^74\) These seminars include Founder C and several of Company C’s scientists’ seminars and conference presentations, as well as a business model seminar of Founder C organised by the local university business school.
administer his own vision of the employment system. Founder C’s influence on the employment system not only came from organising the structures of the employment system, but also through building the human capital of the firm and the collection of like minded people in his company that reflects his philosophies and management style. This case study is interesting because of the lack of dependence on external stakeholders by the founder on building the employment system of his firm.

**FOUNDER DESCRIPTION AND BIOGRAPHY**

The founder of Company C, Founder C is aged 50+. He is the current interim CEO and CSO of the company and maintains an active participation in the daily running of the company. Aside from Company C, Founder C also holds a chair at the local University. In addition to this, he is a prominent member of several scientific and medical boards, and numerous scientific and medical associations.

Founder C holds a degree in medicine and a PhD in biochemistry and molecular chemistry from a leading European university. Trained as a doctor, it is during his time as an intern in which he developed an interest in research and his specialty area.

Founder C  

_During my time as an intern, I saw the impact that (disease) had on people…this stirred my interest and passion for doing research and continuing to find solutions…_

Following this, he was awarded several fellowships for doctoral studies in biochemistry and molecular biology. It was while during one of these fellowships, at an overseas university, that he discovered a specific compound that was a key factor in the development of a medical disorder. Following this discovery, he developed a therapy that intervened in the development of the disorder. This was to be a new successful therapy. He successfully patented his discoveries and in the late 1980s founded a company to commercialise his discoveries. Subsequently, he founded a successful biopharmaceutical company based in the US.

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75 As with the two previous case studies, the founder’s history and biography is summarised from interviews with Founder C as well as archival evidence about the founder from sources such as newspapers, magazine articles and company profile.
Founder C
*I saw the potential IP of my research and thought that it would do well commercially. I knew there was great potential in forming a company around it...You learnt a lot of things when forming a company and this was to be a very successful company, this represented a breakthrough both professionally and personally that would make a difference in a lot of lives including my own.*

After success in patenting his discoveries and founding a large biopharmaceutical corporation in the US, Founder C returned to New Zealand in the early 1990s to take up a post in the local university. He established and funded the several research initiatives including upgrading the research laboratories at the local University. Since then he has written further patents, most of which have now been vested in Company C. Founder C is listed as an inventor of many US and European patents.\(^\text{76}\)

Founder C
*I felt that New Zealand had done well by me, and so I should return to try and make a contribution here rather than stay in America or go back to Britain.*

Founder C was appointed a chair in his field at the local university and served many years developing the laboratories and research facilities in that position. Founder C continued to research within his area and subsequently founded further commercial potential for his work within the university. In 1999, Company C was founded to commercialise the research of the Founder C.

Founder C
*Following the discovery stage, I realised that there was very distinct possibilities to develop the therapeutic potential...from (clinical trials), the (compound names) lent itself to very specific properties that looked to me as being very clear road to commercialisation.*

Studies conducted initially before the company was formed gave very encouraging results to the use of its key compounds. This signalled to Founder C of the immense importance of establishing a commercial company to market the commercial value of the intellectual property.

Founder C
*(Founder C’s clinical results) is an important first for New Zealand science and means that market approval for (compound) in the designated indication could*

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\(^{76}\) Due to the ease of obtaining specific information about the founder from the internet and other various sources, the exact number of patents and details of the founder were kept suitably bland.
be rapidly developed and the gains will be enormous...forming a company would extend the benefits of studying (compound) in respect of clinically important results as well as financially for many benefits

Despite the clear potential value of commercialising the intellectual property77, Founder C took several years before the company was launched. Founder C personally funded his own research in the time prior to launching Company C and worked towards developing the platform for Company C. Over the years before Company C was launched, Founder C garnered more financial and operational resources for creating Company C. Founder C understood the rigours of developing and launching a new company and took his time in developing the IP.

Founder C

*It was all about timing and being ready...I knew the time was right...I had the resources...*  
...*what I learnt in the previous company...this research was always going to lend itself to commercialisation*

Through his experiences and knowledge of the commercialisation process, it had always been Founder C’s intent to build a company around his research. Through its association with the university, Company C established its position by integrating scientists from Founder C’s university laboratories to lead focused discovery programmes within a commercial company structure. The difficulty of commercialisation research was learnt early by Founder C in his past experiences of founding a biotechnology company overseas.

Founder C

*While, I wanted to develop the company in New Zealand...Getting a drug to market is a long-term project which can take many years and require substantial on-going funding...I knew that from the last one...it was prudent to wait and get the required capital and discovery to a level that was required before the time was right*

In the late 1990s, Company C was launched. In establishing the company, Founder C is largely considered as a pioneer in the development of specific biotechnologies and the building of biotechnology companies in New Zealand.

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77 Direct quotes from archival evidence such as newspapers and articles were omitted due to the need to maintain confidentiality. Instead, the evidence from these sources was paraphrased.
CAUSE MAP OF FOUNDER C

The organisation of the Founder C’s cause map follows the structure of the previous case studies in that standardisation of the key concepts in Founder C’s mental models were able to be organised around the domains of employment system antecedents, employment system, organisational culture and employment system goals. The within-case evidence from Company C is used to elucidate the relationship between Founder C’s mental model of the employment system with the employment system of Company C. Figure 6.1 presents the cause map of Founder C. Founder C produced 28 Standard concepts and 100 SCUs in his employment system mental model. Founder C’s standard concepts is represented in Table 6.1. Founder C’s employment system mental model, as with the two previous case studies; contain concepts that can be considered as influences or antecedents on the employment system and their causal linkages. Founder C’s standardisation of his employment system mental model contain concepts that are important to his conceptualisation of the employment system. These concepts also reflect the same standard domains in the previous two case studies.

Table 6.1. Founder C standard concepts

<table>
<thead>
<tr>
<th>Standard Concepts</th>
<th>Domain Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Science as a business</td>
<td>Employment system antecedents</td>
</tr>
<tr>
<td>2. Focused Pipeline</td>
<td></td>
</tr>
<tr>
<td>3. Technical Background</td>
<td></td>
</tr>
<tr>
<td>4. Commercial Background</td>
<td></td>
</tr>
<tr>
<td>5. University Background</td>
<td></td>
</tr>
<tr>
<td>6. Founding Experience</td>
<td></td>
</tr>
<tr>
<td>7. Other Companies</td>
<td></td>
</tr>
<tr>
<td>1. Find the best</td>
<td>Employment System</td>
</tr>
<tr>
<td>2. Attract People</td>
<td></td>
</tr>
<tr>
<td>3. Hiring the Wrong person</td>
<td></td>
</tr>
<tr>
<td>4. Commitment</td>
<td></td>
</tr>
<tr>
<td>5. Best Knowledge and Skills</td>
<td></td>
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<tr>
<td>6. Fit Culture</td>
<td></td>
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<tr>
<td>7. Professional Evaluation</td>
<td></td>
</tr>
<tr>
<td>8. Peer Control</td>
<td></td>
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<tr>
<td>9. Senior Management</td>
<td></td>
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<tr>
<td>10. Direct Control</td>
<td></td>
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<tr>
<td>11. Planning</td>
<td></td>
</tr>
<tr>
<td>12. Development</td>
<td></td>
</tr>
<tr>
<td>13. Competitive Salary</td>
<td></td>
</tr>
<tr>
<td>14. Stock Options</td>
<td></td>
</tr>
<tr>
<td>15. Work itself</td>
<td></td>
</tr>
<tr>
<td>1. Excellence</td>
<td>Organisational Culture</td>
</tr>
<tr>
<td>2. Professional</td>
<td></td>
</tr>
<tr>
<td>3. Working in Teams</td>
<td></td>
</tr>
<tr>
<td>4. Regular Control</td>
<td></td>
</tr>
<tr>
<td>1. Science Results</td>
<td>Employment System Goals</td>
</tr>
<tr>
<td>2. Commercial Products</td>
<td></td>
</tr>
</tbody>
</table>
One of the interesting aspects of Founder C’s employment system mental models is the lack of external advisors on the creation of the employment system. Founder C’s individual background such as his technical, commercial and university background appear to inform the building of the employment system as well as Founder C’s founding experience. Organisational strategy such as science as a business and the founder’s focused pipeline of drugs appear to also be important factors in the influence of the employment system. Other companies appear to impact on some aspects of the employment system.

Find the best, attract people and hiring the wrong person deal with the recruitment and attraction of people in the company. Commitment, best knowledge and skills, fit culture are concepts associated with the selection of people for the company. With regards to other employment system policies and practices, professional evaluation, peer control, senior management, planning, and development are practices Founder C emphasise as important in managing the workforce in his company. Competitive salary, stock options and work itself are concepts that are related to the benefits and forms of reward in the company. In addition, direct control is also seen as an important concept. Founder C sees this concept as the management of the research and important for the work life of the people in his company.

Founder C also articulated excellence, professionalism, working in teams, and regular control as important organisational culture aspects that the employment system practices were designed to achieve. Founder C had specific ideas about the organisational culture of his company and drew direct links between employment system policies and practices with these cultural expectations. Founder C also linked these organisational culture domain concepts with the employment system goals of achieving science results and commercial products.

A visual examination of Founder C’s cause map for centrality shows find the best and direct control as the two most central concepts in the cause map. A quantitative analysis of centrality reveal a total degree of find the best is nine while direct control has a total degree of eight. Both concepts also appear to be important concepts to Founder A’s employment system mental model. An analysis of the founder cause map and the
employment system of the company will be made around these broad areas of the employment system in the within-case analysis.

As with the previous case studies, the full cause map of Founder C will be broken down into its domain maps and an analysis of the linkages and relationships with the employment system of Company C will be discussed separately in order to focus on the founder’s mental model and its effects on aspects of the employment system.

**WITHIN-CASE ANALYSIS**

This section integrates the three dominant methodologies in the discussion of how Founder C’s employment system mental model impact on the employment system of the company he built. As discussed in Founder C’s cause map, 28 concepts can be subsumed under the labels of employment system influence, employment system, and organisational culture and employment system goals. These domains represent Founder C’s employment system mental model. An analysis of this cause map with the case study evidence and archival information about Company C will elucidate the influence of this mental model on the employment system that Founder C built. The following analysis begins with an in-depth analysis of this employment system mental model and its impact on the employment system. Much like Founder A, and Founder B2, who were the “champion scientists” of their companies, Founder C’s employment system mental model had specific and elaborate ideas about the employment system’s policies and practices. The analysis begins with a look at Founder C’s employment system antecedents.
Figure 6.1. Employment system cause map of Founder C

Employment System Antecedents

Seven standard concepts were identified as influencing Founder C’s employment system mental model in Company C. These include the organisational strategy such science as a business, and having a focused pipeline; the founder’s own background technical,
commercial and university background, founding experience; and other companies. In contrast to the first two case studies, Founder C did not identify any stakeholders as being influential to his mental model. Founder C identified organisational strategy, the founder’s individual background and other companies as a basis for the employment system antecedents. One of the most prominent revelations by the founder throughout his interview was that he had a strong organisational blueprint in mind before the company was founded. Figure 6.2 shows the employment system antecedents domain map of Founder C.

![Figure 6.2. Employment system antecedent domain map of Founder C](image)

The analysis of Founder C’s employment system antecedents begins with an examination that diverges from the employment system mental models of the first two case studies: the lack of external stakeholders influencing the employment system mental model of Founder C.

**Founder C**

*I started the company before any of the venture capitalists or others got into it...none of the aspects...including systems and practice...plus I already knew...*
Founder C had a very determinant organisational model in place before he began the company. Interviews with the research manager, who had been with the company since its inception and before that had worked as a research administrator for Founder C, supported the fact that Founder C had very little help in setting up the company including its employment system. In probing this particular issue of the involvement of external stakeholders in the building of the company, the research manager explained that Founder C had set up the company long before there was any involvement with any outside sources including investors. The research manager added that Founder C had carefully planned the launch of Company C and the commercialisation of his IP long before the company was founded. Informal discussions with the CFO supported the relative prominence of Founder C’s influence by revealing that Founder C had already set up many aspects of the company including utilising Founder C’s own personal financing, long before it was launched and had already been a major influence on the structure of the laboratories at the university. Archival evidence supports the role of Founder C in establishing many of the company’s practices before launching into a company. A university newsletter supports the description of Founder C’s endeavours in launching this company by stating the personal contribution of Founder C as well as the contribution Founder C provided to the university through his professional expertise and business and management acumen. In particular, one newspaper article described Founder C’s organisation of the research division of Company C as coming from Founder C’s initial organisation of the university department when he was brought on as a professor. This same publication details the introduction of specific biotechnology processes and technologies to the university by Founder C and the setting up of these specialised departmental laboratories including the introduction of several new scientists to the university.

Founder C

Yes, I’m directly responsible for the work we do...You just continue with what you’ve been doing for years...I made sure it was set up properly before launching the company.

Given the theoretical notion that external partners may play a significant part in the influence on very young firms (DiMaggio & Powell, 1983; Haunschild, 1994; Nohria,
1992), this case study is significant for its lack of stakeholder influence. The literature that has been described so far in the previous case studies have shown that important external partners such as venture capitalists have an important influence on the structure of new firms (Suchman et al., 2001). However, Burton’s (2001) study also did not find any significant influence from external actors such as lawyers and venture capitalists. Her analysis considered several explanations for the lack of significant influence of these external partners. The first was that the salience of particular external actors may vary both by industry and by strategy in her sample (Burton, 2001). She found that experienced executives who are part of a functionally well-rounded team were most likely to deviate from the industry’s dominant or well understood archetypes in their employment systems. She posited that this may be driven by the presence of industry outsiders and may in fact be mediated by particular strategic or industry variables. Another explanation she gave was that external influences are not directly in the form of partner relationships (as was defined in her study) but through indirect means such as executive migration (Boeker, 1997). However, one explanation she offers that finds parallels here is that external stakeholders become important when founders lack legitimacy or experience.

Another interesting possibility is that external partnerships may be most important when founders lack experience or legitimacy, as do founders who are young scientists and engineers. These founders are most likely to adopt an industry dominant model and are least likely to have venture backing. The process of choosing that model may or may not be related to the influence of external partners (Burton, 2001, p. 35).

With regard to our sample in the biotechnology industry, the influence of external stakeholders may be associated with the perceived legitimacy of the founders and their founding experience. This thesis has provided some evidence that the employment system that emerges in firms are associated with the founders’ mental models of the employment system and mediated by the interaction between external partners, co-founders and founding experience. The factors for the role of external partners in building the employment system may be far more complex than typically imagined (Sonnenfeld & Peiperl, 1988). From the evidence presented in this research, explanations favouring the lack of legitimacy perspective as suggested by Burton (2001) appears to explain the lack of external stakeholder influence. In Company A and B, the employment system and the mental models of the founders that emerged had significant influence
(particularly at the strategic level) from external stakeholders such as lawyers and venture capitalists. Founder A had no previous founding experience and relied on his external partners to guide the building of his company while although Founder B1 had previous founding experience, the influence of external influence was mediated by his role in Company B (fundraiser versus champion scientist which was fulfilled by Founder B2). In Company C, Founder C had previous founding experience (of a successful biotechnology company) and this limited the influence of external stakeholders. Another explanation for the lack of stakeholder influence is the possibility that the nature and sum of these founding experiences may be far more salient than is generally understood (Erikson, 2003; Reuber & Fischer, 1999). Founder B1 for example, while having founded several high technology companies, had always been part of a founding team in which he played the fundraiser or business side founder. Founder C on the other hand, had very specific experience of driving the commercialisation of his own IP which was the basis for the last successful company he founded. Westhead, Ucbasaran, and Wright (2005) suggest that an explicit distinction between prior independent business ownership experience and other types of experience may have distinct consequences on the ability to exploit opportunities and asset liabilities endowments. They found that the different types of experiences that novice, serial and portfolio entrepreneurs have a significant effect on their cognitive mindsets. For example, portfolio entrepreneurs (entrepreneurs who have several business ownerships at once) were more likely to be associated with experience that provides greater understanding around why and how they have equity stakes in several independent businesses at once and the significance of human capital resources for their firms. The notion that experiences influences entrepreneurial thinking has been explored in the literature (Fiske & Taylor, 1984; Hillerbrand, 1989; Reuber & Fischer, 1999; Ucbasaran, Wright, Westhead, & Busenitz, 2003b; Westhead et al., 2005). Experience is thought to provide a framework that can be used to process information (Fiske & Taylor, 1984; Hillerbrand, 1989). The implications of both lines of research suggests the need to concentrate on the varying abilities of different types of entrepreneurs and the important role of their past experiences on their ability to utilise the resources available to them. This suggests the importance for underscoring the previous experiences of founders in understanding their approach to the building of the employment system. Utilising the links between founder’s career experiences may highlight the rationales for organisation building. As Shane and Khurana (2003) stated, careers are important not only for their effect on social ties (Granovetter, 1974), but also
as a means for learning (Carroll & Mosakowski, 1987). The career of Founder C subsequent to building Company C facilitated this role in building Company C. As evidenced by discussions with several members of the top management team (including the CFO and a venture capitalist involved with the company), Founder C “had the experience and the knowledge to see this through. He knows how to build a company”78. Founder C was resolute that the idea or the organisational blueprint for the employment system mental model was a mixture of his own experiences founding other companies as well as the organisational strategy and direction of his new company. Of this, Founder C emphasised his founding experience as “models of how to do things”.

Founder C

I’m a serial founder and the model that I had was based on these experiences...of things that I knew would work and of things that happened in the previous companies that didn’t go as planned. I wanted to get what I learnt previously (from founding other companies) and avoid the bad things that happened last time.

The organisational blueprint for the company was evident in the company presentations that the researcher attended79. The specifics of the company’s strategic development were also evident in the company presentation. The CFO also stated that Founder C was “the initiator and the driver” of Company C. The CFO and venture capitalist interviewed at the public lectures for Company C both indicated the perception that the structures of Company C as envisioned by Founder C would enable the rapidity of commercialisation. Founder C also expressed that his own way of doing things and doing things successfully that was the template in which he organised people in the company. The founder’s technical, commercial and university background also enabled a large network of resources to be created by the founder. Aside from the company, Founder C’s reputation and success record was an essential part in the building of Company C. The founder would continually draw on this network and resources throughout the company’s beginnings and this continues to be a valuable source for the founder (Corolleur et al., 2004). This is a recurrent theme in all the case studies discussed so far. These standard concepts impact on the strategy of Company C and the control of science in Founder C’s company. Founder C expressed that aspects of his technical, commercial and university

78 From informal discussion fieldnotes
79 seminar for biotechnology industry
background helped him think of the organisational and human resource strategy of Company B.

Founder C

*I learnt this from working with (previous biotechnology company that he founded) and it really...really made me realise that you have to be very firm with how people are going to use your research...*

*...it’s work...it’s what you’ve done before, everything comes from that...*

Burton (2001) found that some founders in her SPEC sample had deliberate modes of choosing employment models based on default, ideological or strategic reasons. The majority of entrepreneurs within her sample operated in the default mode of choosing an employment system. This mode highlights dominant models within an industry whereby the entrepreneurs do not give attention to details of decisions on the employment system. Some entrepreneurs in the ideological mode, on the other hand, expressed considerable distaste for the models used in the firms with which they had experience and a desire to create organisations that was the polar opposite. The strategic mode on the other hand, expressed modes of organisational building that is based on creating a distinct position within an industry. It would seem from the evidence presented so far from the three case studies, the modes of choosing particularly in a knowledge intensive industry such as biotechnology become important for the viability and perceived success of firms within this industry. Founder C expressed a mixture of strategic and ideological reasons for building the employment system and ties this into the strategic initiatives of the employment system. This approach can be linked to key strategic aspects of the firms studied. The other key concepts in the employment system domain of Founder C included science as a business, focused pipeline, and other companies.

Organisational strategy has been an important factor for the previous case companies’ employment system models and remains an important factor for the building of the employment system in Company C. Science as a business in Founder C’s employment system mental model was a precursor to the building of the employment system. Founder C saw that the commercialisation of his research required directed research in his areas of expertise. The standard term of a focused pipeline is a strategic approach by the founder to market the commercial applications of his IP. When framed as a focused pipeline
approach to drug development, Founder C thought that it was easier to obtain capital and financing for the idea of the company.

Founder C
I think that we have a very early and different technology platform and we have a very early and good, pragmatic development in (technology), so we needed to get (technology) people on board quickly... so I think that we've got the staff to get to the development of this company...

...you need to be clear to the investors what that (technology) is all about and organizing around those (technological) objectives... this...helps them (investors) understand

Consistent with Founders A, B1, and B2, Founder C was able to express the links between formation of the strategy of his organisation with the building of the required employment systems to develop and fulfil those strategies. Aside from the organisation of work previously touched on around specific technologies above, the strategic direction of the company was to utilise a focused approach around the technologies for commercialisation. In this way, the founders in the case studies all understood the potential value and meaning that the organisation of the laboratories may signal to outside investors (Busenitz et al., 2005). Founder C had very specific ideas about the strategic direction of Company C and worked towards organising the company around these ideas.

Founder C
Well, we have a very definite strategies around our people and organize this around the technology we use...really, the way this company is organized, its all about the technology and the research...you need to build a system that achieves this company's goals...and people are important in achieving that.

...the compounds are promising...you need people that understand this and are able to get the results required...

This required a focus on building a company by employing the best as well as developing the knowledge and skills for the company. The founder also emphasised that the commercialisation of the pipeline he saw required certain skills in the top management team and senior management of the company. This required a specific vision for the company and how it was managed.
Founder C
The goal was to take this IP and the future developments of my research as far as it would go. I needed to find people who were passionate about the research and passionate about its commercial value.

...its hard to find people with the right skills. We had people from the US come out but they had unrealistic expectations, but you need to keep finding the top ones, you can’t settle for less than that...

The employment system issues for Company C are an important precursor to the commercialisation process. Other companies were also a large influence in the building of this company’s employment system. Founder C expressed that this present company was the leading expert in providing novel therapies based on the IP of the founder. However, he maintained that they must ever remain vigilant in terms of what other companies are doing. Founder C expressed an interest in what other companies were doing in terms of their research and the people involved.

Founder C
We’re probably at the forefront for the moment in terms of our commercialisation and drugs but we have to keep our company and what we do top secret as this may be the difference between leading and having all our efforts go to waste. I think that there are other companies that are very interested in what we do and how we do it and this is why we have to always be aware of them. It’s better to have our people happy and fulfilling their potential than for them to go away once we’ve developed them. I hope we’re doing that.

This key concept in Founder C’s employment system mental model represents the list of other biotechnology companies within the founder’s competitive field. This is similar to the other founders in the previous two case studies. Other companies are the network of rival biotechnology companies that impact on the pool of talent that Company C draws on. This represents for Founder C, the requirement to develop a strategy around the people of the company. This represents the competitive groups that influence the strategic direction of the company.

Founder C
While we’re unique in what we do...but it’s a race...it’s competitive...we have to develop our own way of doing things...you have to stand out especially when you require ongoing funds.
For Company C, other companies also expand on the its strategic designs for the people. The impact of these strategic designs will be discussed in the next section of the employment system domain map of Founder C. However, the results of Company C support the findings from the previous two case studies regarding the impact of competitive groups have on the formation of the employment system.

To sum up the findings of Company C and Founder C’s employment system mental model around the employment system antecedents, Founder C had very specific ideas around the building of the employment system. These influences or antecedents of the employment system mental model include the founder’s unique background, the strategy in commercialising science and the influence of other biotechnology companies. One unique finding from Company C is the lack of influence from external stakeholders in the building of the employment system and their influence on Founder C’s mental model. Elements such as Founder C’s technical, commercial and university background including Founder C’s previous founding experience allowed Founder C to build the employment system without undue influence from external stakeholders of the company. The implications from the results of this case study suggest the impact of prior experience on the organisation building process. Organisation building, particularly of the employment system, represents a mixture of the utilisation of prior experience and knowledge to capitalise on the legitimacy of the founders as well as the role of these individual backgrounds in driving the organisation building process (Burton, 2001; Shane & Khurana, 2003). These prior experiences are important in the understanding of cognitive mental models because they provide a means to which mental model emerge or change including its utilisation in the organisation building process (Alvarez & Busenitz, 2001).

The other key findings from Founder C’s employment system antecedents include the important role of commercialisation strategy of the firm. This provides an important role of founder’s mental models in the translation of strategy. This supports the view that knowledge-intensive firms such as biotechnology companies may form the strategies for their human resources as a critical decision mechanism for success (Boxall & Steeneveld, 1999). A further finding from Company C is the support that other companies remain an important antecedent in the development of the employment system strategy of firms within the biotechnology industry. Founder C highlighted the role of these rival
biotechnology firms in helping organise the employment system in the company via conceptualising the commercialisation process as well as through their impact on the limited pool of labour talent within the industry. Other companies remain an important reference point for founders in terms of their competitive activities (Porac & Thomas, 1990; Porac et al., 1989; Porac, Thomas, & Emme, 1987) as well as the environmental constraints it places on firms (Barnett & Carroll, 1987; Daniels et al., 2002; Johnson, Daniels, & Asch, 1998).

**Employment system**

Twelve standard concepts were grouped under the heading of the employment system. This mirrors some of the concepts that were discussed in the other case studies. The standard concepts of concept bases were find the best, attracting people, hiring the wrong person, commitment, best knowledge and skills, fit culture, professional evaluation, peer control, senior management, direct control, development, and competitive salary. Founder C had very specific ideas about the employment system. These standard concepts in the employment system can be seen in Figure 6.3. Founder C’s employment system domain is similar to Founder A and B2’s in that some of the standard concepts in Founder C’s employment system domain are similar to some of the standard concepts in Founder A and B2. Aspects such as find the best, attract people, best knowledge and skills, commitment, fit culture, professional evaluation, peer control, senior management, planning, competitive salary and development are shared among the three founders while hiring the wrong person diverges from Founder A and B2.

In contrast to the other founders, Founder C specified that he had a definite employment model in mind when he built Company C.

**Founder C**

*Well, I founded a company before and I had very definite ideas about how this company should look...I wanted to avoid the mistakes I made with the last company and make sure that this company would be how I think would work best. This means that I needed to put certain ideas in place about the people I want and managing them.*
One of the key standard concepts in Founder C’s employment domain that differs from the other founders is hiring the wrong person. The standard concept of hiring the wrong person was one that Founder C talked about for some length of time. In the aspect of selection, Founder C found hiring the wrong person to be one of the best lessons learnt in creating an employment system.

Founder C

*The worst thing about (selecting people) for the company was getting the wrong people in and having to move them on. It absolutely (expletive) the whole business if you have the wrong person working in your company. I think the most I have learnt about (the employment system) is from this lesson, taking your time to find the best person for the job is crucial...I wanted to avoid making those mistakes in this company.*

This represents a concept in which Founder C learnt about establishing the employment system. One of the key lessons that Founder C learnt building his previous company was the consequences of not having specific policies and practices around getting the right people into the organisation. This, he maintained was one of the most important lessons in establishing an employment system.
Founder C

Well, it had to do with the hiring... be very very careful with how you hire...plus getting rid of the wrong person can be very costly and finding replacements takes a long time for that. I can’t stress how crucial it is to avoid this problem.

...it’s the mistakes you remember most.

As discussed in the previous section on the employment system antecedents domain, Founder C had previous founding experiences that played a part in the organisation building process (Westhead et al., 2005). This potentially affects the employment system mental model by specifying areas of attention to the employment system. The lessons that Founder C learnt with regards to employment had a profound influence for building his next company as this directed attention to issues or problems encountered in the previous company. As discussed earlier, the influence of prior experiences has the ability to modify or change mental models (Alvarez & Busenitz, 2001). With regard to the employment system in Company C, Founder C used his experiences from managing people in his previous company to build an employment system that avoided those problems encountered. Founder C’s employment system mental model thus, reflects these experiences and embodies this into employment systems that reflect their management and founding experiences. This finding from Company C is important because it forms the basis for the development of the employment system in Founder C’s firm.

The issue of previous experience has been discussed in the previous case studies. However, Company C represents an important case in that it highlights the role of previous founding experience in the building of the employment system. While Company B had a founder with prior founding experience, the impact on the employment system was mediated by his co-founder. Company C is unique in that Founder C considers himself to be a “serial founder” and these prior experiences formed the basis for employment system building. The study of prior experience in the entrepreneurial process has been of significant interest to numerous researchers (MacMillan, Zemann, & SubbaNarasimha, 1987; McGrath & MacMillan, 2000; Reuber, Dyke, & Fischer, 1990; Reuber & Fischer, 1994, 1999; Ucbasaran, Lockett, Wright, & Westhead, 2003a; Ucbasaran et al., 2003b; Westhead et al., 2005). However, the majority of these studies relate the importance of prior business experience as a variable to determine the competence of entrepreneurs in establishing a business (Goslin & Barge, 1986;
MacMillan et al., 1985; MacMillan et al., 1987; Riquelme & Rickards, 1992; Roure & Keeley, 1990; Sandberg & Hofer, 1987). These economic analyses have sparked interest in how prior experiences distinguish the behaviours of novice and habitual entrepreneurs (McGrath & MacMillan, 2000; Ucbasaran et al., 2003b; Westhead et al., 2005). The differences in the different types of experience form important influences in entrepreneurial behaviours (Westhead et al., 2005). The findings from Company C show the importance of prior founding experience in building the employment system. Prior mistakes in hiring, as articulated by Founder C, forms the basis of learning about employment issues and a directed behaviour change in avoiding these mistakes. This forms an important elucidation for what Westhead et al (2005) describe as “learning about the ‘what’, ‘whether’ and ‘how’ serial and portfolio entrepreneurs learn from their previous independent business ownership experiences” (p. 92).

The impact of Founder C’s founding experiences bears some further analysis. In Founder C’s cause map, founding experiences was firstly informed by previous mistakes in Founder C’s previous company. This then focuses Founder C’s employment system mental model towards the strategy of the company (Figure 6.3).

**Founder C**

*The model I had in mind was based on the previous one and I corrected some of the things that I didn’t want to repeat in that company...it had to do with the hiring. It impacts on your strategy for the company and mostly you make your decisions based on what you already know from your experiences in managing people.*

This provides some fresh understanding for how founders utilise their experiences in building new firms. Ucbasaran et al (2003b) found that despite the fact that experienced entrepreneurs and habitual entrepreneurs were no different in their information search when recognising opportunities, habitual entrepreneurs were more likely to identify more opportunities and utilise a greater proportion of information sources than novice entrepreneurs.

Habitual entrepreneurs highlighted that opportunities often emerge in connection to problems. Also, they asserted that one opportunity often leads to another. Habitual entrepreneurs intimated that while ideas are important, obtaining the necessary resources and capital are crucial. We can infer here that opportunity
identification may follow a developmental process and opportunities emerge over time. (Ucbasaran et al., 2003b, p. 12).

The implications of this finding in Company C shows that experiences that form the basis for founders’ models of the employment system is steeped in the prior activities of the founder (Reuber & Fischer, 1999). Habitual entrepreneurs like Founder C recognise the importance of implementing strategies around the employment system of the firm including identifying the required resources and capital requirements for implementing said strategies. The implications from Founder C’s founding experiences show that understanding entrepreneurs in terms of their previous business experiences may explain the potential actions and behaviours that may impact on the potential success of their businesses. In fact, Wright (1997) suggests that habitual entrepreneurs may become fixated in repeating strategies that worked previously the first time around. In the case of Company C, strategies that failed were also a basis for action the second time around. While examining the impact of founding experiences on the employment system domain of Founder C’s mental model, the hiring and staffing of people were important aspects for Founder C and a focus for building the company.

Find the best was an oft-repeated maxim in the case studies explored so far and it is no exception here, with Founder C expressing the importance of finding the right type of people for the organisation. Find the best was a central concept in the founder’s mental model (having a total degree of nine). Company C was founded on Founder C’s IP, and he expressed definite requirements in how the IP and commercialisation process should work. Founder C expressed that finding the best for his organisation would require the best skills and knowledge, and a requirement to attract people to work for the organisation.

Founder C

Well, you identify a clutch of skills and void in company and very very clearly define the sort of individual you want...I’ll pick the best ones I think will fit into the company.

…it’s money, it’s our research...well, they enjoy the work that they do and...we have a very definite career paths and...they probably see that they can contribute to society...a lot of them have the opportunity to do something that’s going to contribute to their careers
With regards to finding the best, Founder C was similar to the other founders in expressing the need to build a credible employment system with the right kinds of human capital. In terms of recruitment for Company C, the methods were different for different levels within the organisation. In general, both the Research Manager and Team Leader agreed that whenever they could, finding the skills and expertise for the company within New Zealand was preferable. The Research Manager and Team Leader stated that specialised recruitment agencies were used for its clinical drug testing staff although this was done very rarely. Other formal recruitment practices were similar to Company A and B, including the use of advertising in newspapers, scientific journals, and through universities. The Research Manager cited that most of their scientific staff came from local universities while about 10-20 percent came from overseas or new residents within the country. However, as with the previous two case studies, the recruitment of talent into the company, Company C also utilised the social capital of Founder C in finding potential employees for the company. The Team Leader highlighted that they were proud of the fact that they were a New Zealand company that actively recruited within the university with most of their recent recruitment at the junior level focusing within the local university system. Informal discussion with the CFO seem to confirm the desire to recruit locally as this was financially more viable and also reflected the founder’s immense international standing and ability to develop the science in his own labs. Although Founder C emphasised finding the best in employees, the nature of this concept confined within the localised context of Company C as opposed to the international context of finding the best that the previous founders emphasised. On the subject of finding the right knowledge and talent, Founder C was dismissive of the fact that New Zealand found it hard to compete in terms of salaries for top scientists.

Founder C

_They can go do what they want, I can find the skills I need right here...I prefer to develop them myself. Makes for a better investment...I would much rather develop those people who want to be here than go overseas...we won’t get the wrong skills and they’ll be better for it._

The implications of this may be tied into the knowledge accumulation and dispersion of star scientists (Bozeman & Corley, 2004; Bozeman et al., 1999; Zucker et al., 2002a). Founder C believes that in developing the best employees they could find from his
laboratories may keep the valuable tacit knowledge and scientific and technical capital within the company.

Founder C

*I prefer to develop their knowledge and skills...and keep them here.*

The company maintains very close relationships with local universities in regards to recruitment as the Research Manager commented that those recruited from the universities were of high quality and also had the added advantage of knowledge about their work and personal background having worked with them in the past or known of their work in the academic setting. The accumulation and collaborations appear to be leveraged between star scientists and firms (Zucker et al., 2002a). Founder C recognises that the development of talent in the local context represents a resource to be utilised and built upon. The ability of Company C to focus on this also lies in Founder C’s considerable human and social capital (Bates, 1990; Cooper et al., 1994; Corolleur et al., 2004). Informal discussions with some of the junior scientists and students demonstrate the attraction to Founder C’s reputation and research. The use of Founder C’s social capital to build the employment system of the firm is crucial to knowledge firms and has been consistently seen in all three case studies. This impacts on the ways in which the staffing and recruitment of each firm is developed and maintained. The vision of founders and their management philosophy as reflected by the employment systems are inherently important impacts of founders’ mental models (Athanassiou, Crittenden, Kelley, & Marquez, 2002; Harris & Ogbonna, 1999; Levenhagen, Porac, & Thomas, 1993).

The Research Manager stressed that the company recognises that they already had the talent and sought to develop them as a preference for research and development. There were a number of junior scientists working in the company who were Founder C’s former PhD trained students. This was congruent to Founder C’s philosophy of utilising “homegrown talent”:

Founder C

*I prefer to find the talent here and train them up myself*
Scientists acquire and impart knowledge through formal education processes that forms significant human and scientific capital (Bozeman & Corley, 2004). These formal and informal network ties forms important avenues for the acquisition and transmission of scientific knowledge. Tacit knowledge often plays an important role in human capital (Balconi, 2002). Bozeman and Corley (2004) present some evidence for the finding that a mentor strategy in research collaborations are associated with a favourable orientation to industry work. Those tenured professors who have actually worked in industry at some point in their careers were more likely to have a mentor strategy for collaboration. The authors view the mentor strategy as particularly crucial to scientific and technical human capital accumulation and diffusion. In examining Founder C’s employment system mental model, the mentoring collaboration strategy may offer ways in which scientific and technical human capital can be shared and promulgated within a commercial environment where there are tight labour markets and limited access to sufficient human capital. However, the Research Manager pointed out that at the senior level they often also included international searches for expertise. This was a reflection that senior management and scientific commercial development expertise was not available in New Zealand. This was also an issue in which both Companies A and B faced. However, the ways in which each company coped with this resource issue appeared to be imbedded into their employment systems. For Company C, this limitation was seen as an opportunity to develop the talent within their local catchments.

While the ability to employ people from the founder’s network is important, Founder C also articulated the importance of getting the right knowledge and skills and attracting those people as key to finding the best people in the business.

Founder C

...you’ll find that you attract the right people when you pay them well...the people I get are the ones that are interested in working for me.

...we have a very early and different technology platform and we have a very early and good... pragmatic development in bio and so I think that we’ve got the staff to get to the development of this company.

Selection practices within the company consisted of semi-structured interviews over several hurdles. The research manager and team leader both confirmed that selection of people in the company was by structured interview and through their work experience or
track record. Founder C was crucial in any final decision about the scientific staff while most of the administrative staff were vetted by the people responsible. The concept bases of commitment, best knowledge and skills, and fit culture represent the areas of selection that were very important for the founder. In Company C, find the best is linked to people that fit into the culture of commitment and excellence in the commercial environment. Founder C was resolute that the search for scientific skills fit into the culture of excellence and high research output in his company. Following from finding the best and being able to attract them to work for his company, he was sure that they would be put to good use in creating an environment that would ensure good research productivity towards commercialisation.

Founder C

It’s hard to find people with the right skills...that’s in America...we’ve had a couple of individuals that had unrealistic expectations about what they need to do...I don’t like to downsize and so people are very important, we have to hire the right person...we have to find the right ones and that’s very hard and financing is hard...money and people issues are the main problems of commercialisation.

Founder C saw commitment as an important aspect of commercialising science. From the confines of a commercialised company, Founder C was of the opinion that the people he employed would be committed to getting science results before being chosen.

Founder C

Probably the people that I have picked would not only have the minimal skills required to do, but they have to be actively committed and not only committed but to be passionate about the research we do here. This is what sells me in terms of their desirability for this company...and we have been lucky. We find the talent ourselves and try and give them the support they need.

The ability to attract potential employees to the company was a combination of the salary and the work that was being done in the company. Compensation within the company is set by the local industry standards. In some cases depending on the expertise required, compensation can reflect international standards. This is more often the case in the clinical drug testing areas and the commercialisation management areas of expertise. However, this was very rare and consultants or associates were outsourced in this regard whenever possible. Founder C had considerable input into setting the compensation levels of key senior staff. The Research Manager revealed that much like Company A,
Founder C set the levels of compensation for some of the scientists in the company. The Team Leader and Research Manager stated that the compensation within the company was higher than in academic settings and this was a basic attraction for working in the company. However, for the majority of employees, standards reflected their experience or skills. Compensation is often based on knowledge and experience within the industry. Other benefit of employment that the Team Leader, CFO and Research Manager emphasised was the reputation of working for the company and the founder and developing an individual’s scientific career within the company. This is a considerable influence, which many of the scientists talked to, saw working in Company C as a stepping stone to developing a name and reputation for research and commercialisation. This has been highlighted in the previous case studies. However, in Company C, the reasons for attachment for employees appear to emphasise attachment for work and money. Many scientists remarked that the reason they worked there was to be part of Founder C’s breakthrough research. Mallon, Duberley and Cohen (2005) describe the career orientation of scientists as being categorised as: the impassioned scientist, the strategic opportunists, balance seekers, or organisational careerists. The impassioned scientist is characterised by science as a prime motivator for work, the strategic opportunists as characterised by conscious strategic career planning, balance seekers as balancing the demands for their careers with other aspects of life, and organisational careerists as defining their careers within the organisations. What the authors have argued is that scientists generally prescribed to these categories as defining their careers with research institutes. These categories are thus driven by individual, organisational and science factors that influence the ways in which scientists make sense of their careers.

While HR managers in science (and other organisations) quite rightly consider the nature of the career paths on offer and the various pay and performance systems that underpin them, it appears from these data that the most important career management action may be to seek to embed the notion that there is a variety of legitimate ways to run a career and thus a variety of ways to engage individuals (Mallon et al., 2005).

While, this suggests the importance of examining the context of attachment for scientists in biotechnology, it would seem that the meanings that scientists have for the changes in science careers may depend on the relationships between the form of employment system espoused by the founder as well as the individual career meanings brought into the relationship. Kinnie, Swart and Purcell (2005) theorised that knowledge intensive firms
that are able to deal with the tension between maximising the interests of knowledge workers and managing the commercialisation process would allow them to create a successful sustained competitive advantage. This organisation process advantage may include high levels of inter-personal and team collaboration, and building high levels of social capital and networks beyond the firm. Certainly, the strategic decisions made in all three case studies around the employment system demonstrated the importance of balancing the expectations of knowledge workers and the commercialisation processes. The employment systems of biotech companies and knowledge firms in general, may be dependent on influences that range not only from founders and the environments (as evidenced in the previous case studies) but also form expectations of employees and their professional identities (Bunderson, 2001; Fox & Stephan, 2001; Harrison & Rosenzweig, 1972). In Company A and C, both founders’ were able to utilise their role and position to develop strategies within the constraints of their industry. The choice of the HR system and their advantages are thus influenced by the constraints of the system and their organisational contexts. Founder C and the development of the employment system in Company developed their own strategies in coping with the environmental constraints by focusing on development of their own employees.

While the recruitment and selection practices and policies in Company C were akin to the first two case studies, Company C diverges from the way in which they emphasised aspects of the employment system. While Founder A in the first case study emphasised autonomy and indirect controls around the science of the business, Founder C and the employment system in Company C emphasises development and direct control over the science. While this has been discussed in some detail previously, a detailed examination of development in Company C is warranted. Archival evidence seems to indicate that the philosophy of the company was to recruit and develop the top talent from within NZ in the company. A number of newspaper articles described the developmental strategies of the company in relation to the company’s image. There was a preference for developing the talent required within the confines of the region. It would seem then that unlike the other founders, Founder C’s vision was to develop the top talent within the country and recruitment was focused on local recruitment rather than international searches.
Founder C
We try to find them everywhere but I prefer to try and find them in NZ, ... I prefer to find the talent here and train them up myself.

Research Manager
We try and get them before they go overseas, I mean, it makes sense to get them in here and develop them the way we want them. We already have the resources and are the best in what we do.

Media Article
The company has a deliberate philosophy of using NZ expertise in drug discovery and through its association with the (university), integrates academic student research into focused discovery programmes, leading to employment opportunities. This unique relationship sees the (university) as a share-holder in (Company C), providing access to University laboratories and infrastructure such as technical, security, physical plant, and administrative support.

This was an attitude shared by one of its venture capitalist,

Employees, not customers, come first. Select good people, train them well and they will fit into the organisation and subscribe to its values- then they’ll want to look after all stakeholders. There’s a set of behaviours that comes with satisfying quarterly earnings expectations. That often means companies don’t make capital and staff investments that equip them for the longer term.80

Founder C referred to development as an important factor in the employment system in company. An analysis for how the employment system of Company C came to adopt development as a key driver to their business capabilities can be seen in the resource constraints of the company. Founder C and the CFO of the company both iterated that it was difficult to find the skills required. However, this was seen as an opportunity and the ability to innovate in response to the constraints on Company C.

Founder C
..it’s hard but not a worry for me, it’s something that can be overcome, it’s good if we find our own people.

Informal discussions with the CFO showed that developing their own talent was one of the human resource “strategies” used. This can also be confirmed by archival evidence of Company C’s preference for recruiting and developing “homegrown” talent. The development of employees can be seen to be more productive to firms when individuals

80 Quotation from fieldnotes
in companies are exposed to challenging work environments in which their formal learning is extended (Marsick & Watkins, 1990). This “make dimension of competence” (Boxall & Purcell, 2003, pp.13) is seen as leveraging the local talent within its local context.

The opportunity to use training more powerfully really arises where firms have invested more comprehensively in recruitment, and thus built a labour pool with greater long-run potential (and consequently greater aspirations). Such firms would be unwise not to maximise the investment (Boxall & Purcell, 2003, p. 144).

Aside from the obvious benefits of “making” its own talent, Company C sees development as a way in which to retain much of its talent within the company. The opportunity to recruit selectively and develop its own talent serves several purposes in the context of Company C. With the mentoring strategy in place, Founder C sees the coordination and control of work as part of the development strategy.

**Direct control** of Founder C linked into development. This concept had a high centrality in Founder C’s cause map indicating it is a core concept (Total centrality is 7, after find the best and direct control). The ability to have direct control appears to also be further facilitated when the company hires and develops young scientists. In building the company, Founder C found that finding the talent and developing those talents was his preference for hiring in the company. The team leader and research manager both stressed the importance of staff training and development.

Founder C

*we seek to implement programs for development, we have full plans, we try and implement career paths, we have development programs that make them enjoy work and we have a strong culture of development here, we look at the person and best practice and we value the person…and acting as a team member…I think they appreciate it when they take into account what we think is best for them in terms of their careers and development.*

The most often cited case of training and development in Company C involved international conferences and seminars within the field. Training with particular experimental techniques and software was often also paid for by the company. Founder C’s employment system mental model points to a lot of direct control on the development within the company. However, what is interesting is the number of key concepts that lead
out of development. Founder C’s mental model shows linkages between the concept of
development and professionalism, regular control, excellence and working in teams.
Development thus was important in creating the culture within the company. The
development within Company C not only ties into the hiring and staffing strategies of the
company, but it is also tied into how employees are managed in the company. Company
C pays a number of PhD stipends for several of its projects as well as employing
governmental enterprise schemes to hire and train young scientific talent it finds from the
local universities.

Venture Capitalist

At (Company C) we’re supporting several doctorate and post-doctorate students
who are outstanding scientists. Some of these people have gone on to make
contributions to (omitted) research with this firm. But they are under no
compulsion to join our firm, simply because they received our scholarship.

Development was also highlighted by the Research Manager in that the budget for
training and development included sending their scientists to various conferences and
encouraging publications from their laboratories. The Team Leader also expressed the
importance of this expectation from their scientists. The Research Manager volunteered
the information that they had a proportionately higher amount of doctoral and post-
doctoral students in their company than other similar companies. It appears that the
founder’s vision of developing local talent was also reflected in the company in the form
of offering scholarships and developmental programmes for doctoral and post-doctoral
students. The unique relationship that Company C had with local universities also affords
a viable resource for the company to draw on in terms of its human resources. One
further analysis is possible with regards to the emphasis on development in Company C.
While the significance of founders’ human and social capital have been commented on in
the previous case studies, Company C provides further evidence for the utilisation of
founders’ endowments in building the employment system. Founder C was able to
leverage on the development of his employees primarily due to his association with the
university. Company C actively uses this resource in order to build the human capital of
the firm. Founder C still remains as a professor to many PhD students around his
research work. A number of students spoken to at one of the company social gathering\textsuperscript{81}
demonstrated the desirability of working for Founder C as opposed to Company C.

\textsuperscript{81} The researcher was invited to a cocktail party that Company C hosted.
Founder C’s employment system mental model also emphasised that control and the coordination of work in the company was achieved through direct supervision of the founder and his top management team. In this sense, the founder emphasised that understanding the work that needed to be done in the company was through the regular scientific meetings and meetings of the top management team. Founder C depended on the senior scientists to manage the scientific requirements of the company and indicated that where he could, he would observe as much direct control over the research done in the company. Peer control was very much an aspect of how senior scientists within the company ensured that the work was directed and productive.

Founder C
Surrounding yourself with the right people will mean that the right type of work is being done to get this science going in the right direction. I rely on the senior members of the company to ensure that we are headed the right way. I absolutely have to rely on senior managers that things are going right for the company and you have to rely on people for this to happen. I try and oversee the research done myself; I am involved in the planning, review and development as much as I can be.

As with the other case companies, planning was an important feature in the company. In terms of monthly performance reviews with the various scientific teams, planning was incorporated within these monthly meetings where a discussion of the research objectives and plans were drawn up. In essence, the science plans had a monthly review although planning was often looked at six-monthly to a year. Each research department utilised planning according to their objectives. As this company was very directed in its research needs, planning was often conducted in consultation with the founder and senior scientists. Most progress was often monitored by these senior staff although monthly meetings were at the level of the team leaders and supervisors. Planning was described as an essential activity of team leaders for their staff. The progress of which was measured and tied into performance management activities. Organisational goals were also often tied into these planning meetings. The practices around planning were similar to companies A and B. The role of the senior management is an important part of Company C’s employment system and reflects recent scholarship on the importance of the management team on the impact of firm performance in high-technology firms including the fields of biotechnology, semiconductors and software (Burton, Sorensen, & Beckman, 2003; Higgins & Gulati, 2003; Saxenian, 1994). The careers of the management team
have been found to impact on firm IPO performance (Higgins & Gulati, 2003). This may be due to the ability of the founder and her management teams’ ability to provide critical social capital which they leverage from the networks of former students and colleagues established throughout the course of their careers (Murray, 2004) or through the tacit knowledge generated by the firm’s star scientist (Zucker & Darby, 1996; Zucker, Darby, & Armstrong, 2001). However, this thesis provides evidence that the management team including the founder has significant impact on the control and direction of the research that forms the basis of the firm’s competitive advantage. It would seem that direct control is complementary to the development philosophy of Company C. While Company B emphasises direct control as part and parcel of using contingent staff, Founder C emphasised direct control in managing the development of staff.

Founder C

*You oversee the work done here because it helps inform you about how well the science is going...we have a lot of pragmatic development...it also helps you get to know how well your people are doing and the way they need to be developed.*

The Team Leader indicated that Founder C was very much a large influence in the day to day running of the science in the company. In spite of the large load of being the CEO and CSO of the company, the founder took the time to ensure that the science was running in the right direction not only in terms of quality commercialised research but in the planning and development of its staff.

Team Leader

*He knows that putting in the work into the research also adds to the financial side of things for the company...it’s crucial*\(^\text{82}\).

Observation of Founder C in the staff room also seems to reflect the great influence the founder had on the researchers in the company. During an informal discussion with Founder C, many of the scientists and especially the doctoral students from the company approach Founder C with questions about their own research. When asked about the founder’s role in the scientists’ work, one of the scientists replied that the founder was a mentor to many of the researchers.

\(^{82}\text{Quotation from fieldnotes.}\)
The standard term of senior management was Founder C’s view that the company needed to rely on the senior managers and scientists of the company in order to coordinate and control work done in the company.

Founder C

*We have systems in place for the management, I rely on the managers...I don’t oversee all of it, just some of the main bits.*

This concept was important in the development of the workforce in the company as well as in terms of their networks for finding scientists and in monitoring the research progress of the company. The Research Manager indicated the importance of the regular scientific meetings which was presided over by the founder and the senior scientists. Decisions were made by this level of management and evaluations were frequent both on a formal and informal basis. Scientific reviews were carried out monthly and twice monthly as needed by the scientific lab. The scientific advisory board consisting of the international board of experts within the field met annually to discuss the direction of the company’s R&D. Executive meetings were held weekly and involved the top management team and senior scientists. Individual performance reviews were held annually for each and everyone within the company. The performance reviews typically involved the supervisor or team leaders and were conducted using a 360 degree performance form. The HR manager was often involved with the process in an advisory role. Work was evaluated both in teams and individually. In this regard, the performance management and planning of work is quite similar to Company A. Founder C and the top management team were involved with all aspects of planning and development. While the performance management process was quite formal, the Research Manager and Team Leader did mention that it reflected a typical industry standard rather than an individualised company’s performance goals. The performance management process was tied in with compensation and development of its employees. However, the Team Leader stated that much of the performance management process was largely informal with meetings and individual coaching and mentoring carried out at the discretion of each individual supervisor or Team Leader.

The role of the top management team in building the employment system has not been explored thus far in the literature. However, the focus on the “upper echelons” (Hambrick & Mason, 1984), or “dominant coalitions” (Cyert & March, 1963) of firms
have been the basis of analysis for strategic management (Carpenter et al., 2004). This stream of research has invoked the importance of these groups of decision makers in the strategic choices and performance of firms (Carpenter et al., 2004). Research for example has shown that managerial characteristics are relevant to strategic outcomes (Hambrick, Finkelstein, & Mooney, 2004). Of particular interest in the building of the employment system is the study by Collins and Clark (2003). Collins and Clark (2003) set out to examine how human resource practices around the top management team affect the social networks the team is able to develop. They found that there were specific practices associated with the size, range and strength of external networks that were positively associated with firm sales growth and stock market returns. They suggest that one way HR practices lead to higher firm performance is through developing and reinforcing employee-based resources that are valuable in a particular competitive environment (Collins & Clark, 2003). Collins and Clark (2003) demonstrated that networks top managers have were only important when ties were close and trusting. The networks of these managers may provide access to novel information, and may allow for the understanding needed for effective transfer of information. Hence, the impact of senior managers’ networks both internally and externally provides different but complementary capabilities to the firm. The importance of building an employment system that manages and leverages the capabilities of managers is an important organisational capability in knowledge intensive or technology firms.

One other important study that details the role of founders on the top management team of the firm is Peterson, Smith, Martorana and Owens (2003). The study offers an intriguing account of the effect that CEO’s personality has on the group dynamics of the top management team. Individual differences such as conscientiousness, emotional instability, agreeableness, extraversion, and openness have distinct effects on the top management team group processes. They found a strong positive association between CEO effect and sales growth and returns on investment and assets which were mediated by top management team dynamics. The study is one of very few empirical studies that have examined a leader’s influence on the top management team and firm performance.

This suggests important implications for the practice of management-it points to the tremendous impact CEOs can have on the decision-making environment of the organization and relationships among senior managers (Peterson et al., 2003, p.803).
With regard to the founders of biotechnology firms who were leaders in their firms (all founders were either CEOs or CSOs), this research offers another way in which founders (or leaders in general) impact on the firms. Founders build employment systems that leverage their entrepreneurial capital by involving senior or top managers who are able to administer their vision. These senior managers are actively involved in the strategic decision making in the firm by controlling and directing work within the founders’ firms. The founders in this thesis all had significant influence on the management of work in their firms. The implications of previous study on the effects of leadership on group processes provide an avenue for which founders’ personality may impact on the senior management and this in turn influences the ways in which work is managed in the firm.

In summary, the building of the employment system in Company C represents a direct examination of the founder’s employment system mental model that was based on previous founding experience. This founding experience of Founder C allowed an examination of the significance of founding experiences on the models that founders bring to the firm in their organisation building efforts. Founder C’s mental model for Company C was based on “particular experience” that may be an asset or liability (Starr & Bygrave, 1992).

A complementary view of experience is analogous to an income statement: experience, or experiences, are things that happen, or events that occur, during a specific time period. It is these occurrences and their impact on the venture that are relevant, and collectively they affect the stock of experience, just as income ultimately affects a balance sheet (Reuber & Fischer, 1999, p. 31).

Reuber and Fischer (1999) suggests that the different ways in which to categorise experience may be important in understanding the cognitive decision making of founders. They cite a study by Chandler and Jansen (1994) who found that for previous experience was related to firm performance in founders of high-growth ventures. Firm performance in these firms were negatively related to the similarity of tasks performed in the previous and current firm indicating that founders who were able to adapt and change their activities in the new ventures were able to perform better. The results of this case study demonstrate that experience and the specifics of experience does matter (Reuber & Fischer, 1999). Incorporating the specific experiences of founders not only highlights the important essence of their mental models but also the mechanisms through which their
organisation building is instigated. With regard to the literature on the impact of experience on the firm, this thesis provides evidence for the analysis of founders’ experiences on the features of the venture. Founder C’s prior founding experience not only allowed conceptualisation of the employment system in his firm, but also the specifics of hiring and staffing in developing the employment system in Company C.

With respect to the features of the employment system as espoused by Founder C, the employment system in Company C reflected Founder C’s philosophy in development and reliance on the senior management of the company. Although many aspects of the company were similar to the previous case studies, Company C was unique in that it reflected Founder C’s emphasis on development. Founder C’s employment system mental model, although rich in terms of the variety of employment system practices, were centralised around development. The prominence of development resulted from adapting to the tight labour markets and limited resources of Company C. Development was seen as a way in which the company could attract, develop, manage and retain the human capital in its control. This provides further evidence that when founders build from their mental models of organisation building; they also, or subsequently, face constraints and moderating events, which shape the essence of their management or employment philosophies. Company C provides further evidence for the importance of understanding the local contexts of organisation building (Schoonhoven & Romanelli, 2001b), as well as the human and social capital elements that inform on the organisation building process (Murray, 2004). In particular, Company C highlights the nature and effects of the bio-entrepreneur’s human and social capital in the building of the employment system of their firms (Davidsson & Honig, 2003; Murray, 2004). This focus is likely to be particularly important for biotechnology companies who are highly dependent on their human resources for their success.

The last finding from Company C provides further evidence for the role of the founder in influencing and utilising the top management and senior managers of the firm in building and managing the science directions of the company (Carpenter et al., 2004; Hambrick & Mason, 1984). Much like Company A and B, Company C utilised a significant amount of direct controls and senior management help in administering to aspects of the company. In particular, the senior managers of the firm and the founder himself controlled the direction of the research and progress of the science. In particular, Company C
demonstrates the process by which the human and social capital of scientists are turned into viable endowments for the firm and its management of knowledge capital (Corolleur et al., 2004).

Organisational Culture

There were four standard concepts that can be categorised under the organisational culture domain. Founder C’s mental model also exhibited the causal linkages of the employment system to indicate a building of an organisational culture. The culture concepts were excellence, professionalism, working in teams, regular control and work itself. These concepts represent Founder C’s conceptualisation of the employment system as underlying concepts of culture and the working environment of the company. Figure 6.4 shows the organisational culture standard concepts domain map.

![Organisational Culture and Employment System Goals Domain Map of Founder C](image)

Figure 6.4. Organisational culture and employment system goals domain map of Founder C

Professionalism is associated with achieving science results. This is influenced by commitment, fit the culture, and development. Founder C expressed that professionalism is expected with regards to the work achieved in Company C. This was expected as a minimum standard for how scientists are trained and worked. Founder C, much like
Founder A, linked the selection of people in his company as having the minimum standards for entry into the company with their commitment, ability to work in the commercial sector as well as developing them into the professionalisation of commercial work as being important in the employment system mental model. The object of hiring committed people who fit into the culture was to create a professional setting aimed at excellence. Founder C spent most of the time describing the employment system within his company as an organisational culture of professionalism and excellence. Founder C thought that selecting people who were committed and fitted into the culture of the company would create or maintain a culture of high quality research. This is corroborated by the Research Manager who observed that the company had high expectations of their staff in terms of managing their own progress and results. The Team Leader also mentioned in passing that the commercialised environment is one in which scientists work to reach goals and the requirements for this is different from academia. The important factors for monitoring the progress of the research was the scientist’s burn rate, research skills and their professional demeanour.

Founder C
We monitor their burn rate; we try and keep it low. We have finite funding and resources so we expect that scientists here only use what is needed, we expect them to be professional about the services they offer and the work they do.

In discussing the controls of work in Company C, the Research Manager revealed that they only consider the scientists who had great professionalism and had a high standard of excellence in their fields. This was based on the scientist’s previous work experiences, publications and references. It was the same when selecting new entrants for development in the company.

Research Manager
We find out more about (doctoral or post-doctoral) students from their supervisors and we can be reasonably accurate about how they would work for our purposes. We think that we find out more about how they work and how much autonomy they need if we ask questions from their superiors or their colleagues...also these things give use a better picture.

Prior to this, the Team Leader and Research Manager both agreed that a significant amount of development was encouraged to develop their scientists into world class leaders not only in their fields but within the company as well. Practices that supported
this included research meetings monthly, generous training and development funds for employees and time off for personal development when feasible for the business, were offered to all employees. A look at the publication and seminar presentation records of the company’s scientists confirmed that research publications and attendance of public seminars and conferences were supported by the company. McMillan and Deeds (1998) suggests that this openness to publication and sharing of research information is a “signalling” device that aids in the reputation of companies to develop how prospective employees view them. In terms of McMillan and Deeds’ (1998) proposition that this provides a broad degree of visibility of the firm is supported and leveraged by Company C. In contrast to the other case studies, Company C resembled both Company A and B in their expectations for excellence and professionalism. This factor is seen in many studies of science firms (Latour & Woolgar, 1986; Mulkay, 1972; Zucker et al., 2002a). However, the ways in which each company incorporates the employment system into developing these into the structure and culture of the organisation is different.

**Working in teams** also made up most of the working units within the company with many of the scientists working within the company’s functional research units. The workforce within the company was divided into the three areas of research. Scientific teams are made up of scientists and team leaders. These team leaders then report to the senior management of the company. Founder C advocated the use of teams as the most efficient way of setting up the research laboratories. Teamwork was expressed as a most important attribute in the company. In that sense, the functioning of the company was arranged around teams including the top management team.

**Founder C**

*There’s no culture of individuality here really, but there is a culture of accountability...I can tell you...we totally structure in teams, that’s my own personal philosophy and I believe the best way for people to work.*

Founder C explained the general configuration of research in teams as a way of avoiding the general isolation of research itself. By structuring work around teams, there would be more innovation and greater satisfaction with the research process particularly with team based direction and goals. The team leader also addressed the issue of teams as an important way in which research could be directed towards the goal. He also expressed that working in teams also created a culture where sharing of information and problem
solving would be disclosed. As discussed in the previous case studies, working in teams is represented as an important way in which work is organised in biotechnology companies. This is akin to Founder A’s use of teams to build a social structure and culture within his firm. Founder C utilises the coordination of work in teams not only from a functional perspective but also as a method of social influence (Druskat & Pescosolido, 2002). The use of Hart’s (1992) framework of strategy making suggests that Founder C is aligned with the participative and symbolic strategy making in that the founder and top management team of Company C attempt to create a culture which serves as both coach and facilitator. The findings from this research suggest the importance of “how firms combine or blend more than one mode of strategy making and clarify how high strategy-making process capacity is actually embedded in organisations” (Hart, 1992, p. 347).

With regards to the importance of teams in organisations, Boxall and Purcell (2003) offer a framework in which teams form a fundamental building block of the organisation.

Teams can provide the means to coordinate work tasks between people, they can provide a means for learning and development, and become a social unit with a form of self, or more accurately, quasi-self-governance (Boxall & Purcell, 2003, p. 105).

They describe four necessary types of integration to occur for team working to be effective (Figure 6.5). The first type of integration is the need to integrate mental and manual work within work teams or among employees directly and forms the source for achieving horizontal coordination of tasks. The second form of integration comes from efficiency improvements associated with combining specialist work roles within operational teams. The third form of integration is the linking of supplier with the customer in an interactive way that will involve active information sharing and forming the intellectual block of the firm. The last integration lies in the attempt to integrate workers into the cultural or organisational fabric of the firm aimed at getting higher levels of employee commitment to the organisation. In some sense, the founder’s mental models provide some support for the role of these integrative elements of teams into the design and coordination of work. Founders in this research were found to have ideas around team working that not only involved the accumulation of work allocation units, intellectual and human capital formation but also as a means for building the social
capital of the firm. The design of teams in biotechnology not only serves as a basis for these four task integrations, they also serve as a method for leveraging founders’ concept of work and employment in the organisation.

![Figure 6.5. Task integration with team structures: Activity, example and process (Source: Boxall & Purcell, 2003)](image)

The team structure of the company also fed into Founder C’s concept of regular control for the company. Founder C expressed that in order to commercialise drugs for the market, regular controls over the research was important and feedback was an ongoing activity among all employees. The executive management team met weekly while scientific staff met monthly (although informal meetings were conducted every fortnightly or as required). The company conducted its own scientific forum twice a year which was attended by everyone in the company. These forums were for the company to be up to date with the performance of the company as well as to interact with difference members of the company. A newsletter was circulated as often as needed in order to update the employees with the research progress and news of the company. This was circulated via the email network. Regular control was maintained by the team leaders and Founder C. Founder C and the senior scientific staff were decision makers in the direction and review of the research. However, this was most often in consultation with the scientific staff. The final decision however, to proceed with research rested with Founder C. The Scientific Advisory Board met once a year. The science was often reviewed at these meetings and advisors on the board were there to provide expert advice
and consultations on the progress of the scientific research. Performance reviews were conducted with every staff member annually and this was the responsibility of the team leaders, senior management and the human resource manager. These performance reviews were often tied into the research and relationships within the firm. The team leader expressed that in spite of the slow ongoing nature of research itself, regular controls both informal and formal in the form of meetings was not only research directed but social as well.

In summary, the coordination and control mechanisms in the company were also attributable to cultural as well as professional outlooks. The Team Leader described control and coordination as being cultural as well as professional. Much of the scientific environment of the company came with the expectation that scientists would develop and keep track of their work via professionalism. A lot of the research while having measurable indicators as outputs for the research was based on the training and socialisation of scientific work. A scientist interviewed observed that their training and background were essential in providing a professional approach to working in the company. Scientists expected that to work and that the work they do would benefit not only the company but themselves as well. The cultural and peer aspects of the company also appeared to feature as a form of coordination and control. One of the junior scientists mentioned that the commercialised environment was different to the academic environment they came from, being directed towards a goal. However, she mentioned that there was a lot of support in achieving that goal from all levels of the company. Describing this company’s culture as a small and dynamic place to work because there was a lot of support and help reflects the nature of the company’s culture in keeping the employees on course and goal-oriented. Company C allows the close supervision of Founder C’s science through the use of mentoring (Dreher & Ash, 1990; Lyon, Farrington, & Westbrook, 2004), and direct control (Hoyt & Gerloff, 1999).

**Employment System Goals**

Science results and commercial products were expressed by the founder as being the goals for creating his employment system (Figure 6.4). Founder C attempted to create an employment system that was aimed at science results. Founder C believed that creating a
culture that emphasised **professionalism**, **excellence**, **working in teams**, and **regular control** would help achieve the science goals of the company.

In bringing people together as a biotech science company, Founder C expressed that a culture of **professionalism** and **excellence** would result in achieving science results.

*We’ve got the staff to get to the development of the company...but we’re pleased with the number of programmes we’ve done and really the results speak for itself, we’ve got the number of stages that we come and the results that have come out (in clinical trials)...and the performance of staff of taking it to clinical trials.*

The importance of science results was emphasised by the CFO in that he suggested that many of the important milestones in the company was related to the good results so far with the potential of the drugs in the phase I and II stages. The CFO emphasised that the culture and work practices of the company had to be linked to scientific results, and ultimately a commercialised product, in an effort to be a profitable company.

The founder was also able to articulate links with the goal of having scientific results with the ability to manage stock options in the company for its employees. While this was not a practice during the research, the research manager stated that they were looking into making stock options available to the employees in the future.

*Founder C*

*These drugs, if successful will not only benefit people in their everyday lives but also everyone in the company will know that they have been part of the process to achieve this. I believe that this early in the stage, everything is pointing towards us achieving our goals. We will become a successful company if we can commercialise the research and get all employees to work towards this goal.*

However, part of the coordination and control mechanisms in the company were also attributable to cultural as well as professional outlooks. The Team Leader described control and coordination as being cultural as well as professional. Much of the scientific environment of the company came with the expectation that scientists would develop and keep track of their work via professionalism. A lot of the research while having measurable indicators as outputs for the research was based on the training and socialisation of scientific work. A scientist interviewed observed that their training and
background were essential in providing a professional approach to working in the company. Scientists expected that to work and that the work they do would benefit not only the company but themselves as well. The cultural and peer aspects of the company also appeared to feature as a form of coordination and control. One of the junior scientists mentioned that the commercialised environment was different to the academic environment they came from, being directed towards a goal. However, she mentioned that there was a lot of support in achieving that goal from all levels of the company. Describing this company’s culture as a small and dynamic place to work because there was a lot of support and help reflects the nature of the company’s culture in keeping the employees on course and goal-oriented.

SUMMARY AND CONCLUSION

The results of the within-case analysis has identified that Founder C’s model of the employment system is influenced by sources that include organisational strategy, the founder’s background and other companies. These are concepts related far more to the founder’s personal and individual background rather than any external partners or environmental influences. These concepts influence the employment system features of the company in the organisation building process. This is an indication of the influence of the founder in terms of the subsequent evolution of the employment system. Founder C reflects an independent and confident founder of companies that built his company from his experiences in founding successful companies and the reputation of his expertise. Founder C is a serial founder with extensive founding experience. However, his employment system mental model is very different from Founder B1 in that there is a far more extensive blueprint for the employment system than Founder B1.

In general, Founder C’s employment systems of this company represent aspects of recruitment, control, planning and development being important features of the founder’s employment system. Finding the best talent and direct control of the company’s many practices and science appears to be the most important aspects of Company C’s employment system. Scientists, CFO, research manager and Founder C all expressed the attraction and motivation achieved with the research work and being at the forefront of research in their particular field. In fact, one scientist expressed the ability to work in the founder’s labs and the added benefits of that association for his career aspirations.
Training and development in the form of coaching and experience in the commercialised industry was also seen as a form of attachment for the employees as many were actively trained and developed into academics with encouragement and support from the senior managers of their junior staff. What was interesting but was not expressed in the interviews and the informal discussions were the collegial setting of the company. The researcher attended a social celebration for the company held at the company’s headquarters and was privy to the mentoring and coaching many of the founder and senior scientists to the junior scientists. The researchers observed the founder interacting with the junior scientists and observed the role of the founder as a mentor to the younger scientists. Some of the junior scientists expressed their contented state of working for the company in the form of personal relationships with the Founder and the senior scientists. The team leader expressed (and this was later verified by the Research Manager) that they take on the role of developing their scientists in terms of the research and personally.

The team leader expressed the company’s attitude towards hiring as being geared towards developing the IP their way and in recruiting for the long term. Both the research manager and CFO described the pragmatic approach the company took in investing and developing people locally while difficult areas to fill such as the legal and operational issues of clinical trials and the FDA process was outsourced when no such expertise was available. The role of the top management team in this process was crucial as many of the people and expertise sought came through the networks and contacts of the founder and the CFO. The reputation of the founder went in some ways in hiring for the company as the founder had previously founded a large and successful company in the USA prior to founding Company C. Identification and selection of potential employees also proceed from these networks. Most of the scientists within the area are known by the founder or members of the top management team. With regards to the selection criteria, candidates background and work history are important determinants of selection.

Perhaps what is interesting about this case study is the emphasis on development and the optimism for developing a biotechnology company in New Zealand for New Zealanders. In spite of the far-flung capital markets and biotechnology labour markets being overseas, Company C has approached the use of regional labour markets as a strength and highlight of the company’s employment system. Founder C had a very simple philosophy for the people in his firm,
...they enjoy the work that they do and...we have a very definite career paths and...they probably see that they can contribute to society...a lot of them have the opportunity to do something that's going to contribute to their careers...but we're very pleased with the number of programs we've done and really the results speak for itself, we've got the number of stages that we've come and the results that have come out (in clinical trials) ...and the performance of staff of taking it to clinical trials are amazing

The Research Manager described that the company was very supportive of having PhD and Masters Students work in their labs and in offering work to high performing and potential students. This is supported by the training and development policies of the company which fosters and collaborates with the university to provide high performing PhD/Masters students with a stipend to work in the company and various governmental scholarships to fund various research projects. The Research Manager also remarked that having these kinds of employees also allow the company to identify and select potential employees for the company. The advantage being that they already know or know of the candidates in the first place.

Company C is primarily a company that employs a lot of direct control by the founder and senior scientists in coordinating and controlling the research work of the company. The science is reviewed regularly at a minimum weekly and the reporting lines of the company are straight to the founder or the senior scientist in charge of the project areas. These levels of control are rather informal with many of the scientists reporting that many of the senior scientists and the founder were approachable at any time for discussion of problems or work issues. Executive meetings were held weekly as well in order to expedite management matters around the clinical work and financials of the business. Science was tightly controlled by the senior scientists and the founder with the founder being personally involved with the direction of the research and goals of the company. All levels of the company interviewed identified the founder as a leader in establishing the scientific and commercial directions of the company. Planning and performance reviews were held monthly or as often as needed and were conducted both formally and informally. Formal controls of these included reviews of the research the team does as well as examining each scientists work with regards to the process and goals achieved. Team leaders and senior managers with the help of the HR Manager were often involved with the performance review of the employees.
Chapter Seven
Cross-case analysis

INTRODUCTION

This chapter summarises the findings of the cross-case analysis. This chapter will illustrate the results and analysis from the CMAP2 software as well as compare the evidence collected of the employment systems of the companies founded. This cross-case analysis is important for a variety of reasons. The first is that the use of a between-case analytical design is appropriate for in the study of employment systems. A cross-case analysis captures the similarities and differences in founder’s employment system mental models, aiding theory development (from a cognitive perspective) on organisation building. In addition, the founders studied in this research belonged to a common professional group of scientists who had founded their own start-up organisations. This thesis provides a rich source of empirical data from which an assessment of the contribution made by founders’ cognitions to the organisations they have built can be derived. A cross-case analysis will highlight both the theoretical and practical applications of the research to this relatively homogenous group. The first section of this chapter describes the results of the comparative cause mapping. This is followed by a comparison of the employment systems of all cases and the evidence. Specifically, links will be made from the founder’s employment system mental models to the employment systems of the firms. The final third of this chapter examines the cross-case findings in relation to the SPEC studies presenting an important extension in both theory and practice. A summary of the analyses is presented at the conclusion of this chapter.

SIMILARITIES IN FOUNDERS’ EMPLOYMENT SYSTEM MENTAL MODELS

Comparative cause mapping and the software utilised for the method allows a database to be built across all founders’ employment system mental models. The standardised database contains all the SCUs used by the founders in the research. In addition, the database contains, in addition to incidence, data on the SNT’s links to other concepts (the indegree and outdegree) and core standard concepts and SCUs. The incidence also identifies which founder a term or causal assertion belongs to. This allows an
identification of the terms used by each founder as well as the causal links that appear for all founders. In addition, the CMAP2 software calculates a distance index for the database which measures the similarity between two causal map systems. It has values between 0.000 and 1.000 which denotes, respectively, either total similarity (0.000) or no shared elements (1.000).

Following the research design, this chapter will examine the founders’ causal thinking about the employment system and their organisation building efforts. The analysis will focus on the stable elements in each of the founders’ causal thinking as well as the idiosyncratic elements in their cause maps to draw a picture of the founders’ employment system mental models. The comparative cause mapping analysis will firstly pinpoint the central standard concepts used by the founders. Then, the employment system will be examined in detail using comparative cause mapping to illustrate the respondents’ thinking in their organisation building efforts. Finally some overall observations are drawn.

Table 7.1 displays the top 15 standard concepts of all the founders in order of their total centralness (Td). The standard concepts reflect the founders’ subjective belief system regarding the employment system within the organisations they have built. As shown, the founders’ concepts refer to the important aspects of the employment system, the general influences on the employment system, and its desired goals. In general, the concepts refer to employment system practices, the influences on these practices and the organisational culture. An analysis of the centrality of the concepts show that find the best (Td=33), science as a business (Td=27), and excellence (Td=21) have higher total degrees (that is, greater importance) than the other concepts in Table 7.1. However, find the best, and science as a business were the only concepts shared by all founders. In addition to the analyses of the centrality of concepts of all the founders, CMAP2 is able to isolate the SCU units shared by all founders. In the case of this thesis, all founders were seen to share SCUs between commercial background and science as a business.

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83 It should be reiterated that as with the other within-case study chapters, the standard concepts were method-generated as anchor topics in the interview although the majority were autonomous expressions of the subjects (Laukkanen, 2001)

84 This is done by filtering the SCU database to include SCUs shared by all Founders (n=4). CMAP2 analysis of the database shows that the commercial background → science as a business, and find the best → attract people SCUs are shared by all founders.
Find the best appears to be the top central concept as indicated by its total degree. All founders appear to emphasise the importance of this concept in building the employment system of their firms. Finding the best remains an important issue for the recruitment of scientists into their organisations. Recruitment practices among the three companies were similar and reflect industry standards. Much of the formal policy of each company was to utilise national newspapers and professional journals in recruitment, as well as the occasional use of specialised recruitment companies. What is similar among all three case studies is the use of the founders and the top management teams’ networks to establish a pool of available talent in seeking the required expertise for each company. These networks were established from the founders’ previous commercial and scientific backgrounds as well as through the use of scientific networking and conferences.
Founder B1

*If you find the best people and gather a good team, that’s all that they (the investors) care about... it’s about showing them that you’ve got the best team of people with proven results to take it as far as you can and make a lot of money in the process.*

Founder B2

*People only look at the science and the people you’ve got working for you.*

As demonstrated in the within-case analyses, the difficulty in finding talented scientists with commercial experience was an issue for the firms studied. The importance of building the human capital of the firm is repeatedly stressed in the literature (Alarson, 1999; Bates, 1990; Becker, 1962; Bozeman et al., 1999; Cooper et al., 1994; Corolleur et al., 2004; Dimov & Shepherd, 2005; Lepak & Snell, 1999). The founder must not only fulfil the roles of opportunity recognition but also interact with the environment to acquire and utilise resources (Chandler & Hanks, 1994; Erikson, 2002; Erikson & Nerdrum, 2001; Penrose, 1959). These key scientists provide biotechnology companies with the human and social capital that forms the basis of their innovations and performance (Becker, 1962; Higgins & Gulati, 2003). Each company in this research emphasised the importance of building a viable employment system that included the recruitment and hiring of talented scientists, a scarce and valuable resource.

The causal link between *find the best* and *attract people* was also shared by all founders. This indicates the importance of attracting people to their organisations as being an important causal link shared by all the founders. This demonstrates the imperative of *find the best* as a central concept for building the employment system of these firms. This can be related to the literature on environments and organisation building. All three companies stated that competitive salaries are important in attracting potential candidates to their firms. However, the ability to compete with overseas biotechnology companies places constraints on the ability of our case study companies to find the best. For Companies A, B and C, the search for talent is constrained within the geographical and regional markets in Australia and New Zealand. Tensions may exist between the founders’ models of organising and employment, and the institutional and environmental constraints within a localised region (Aldrich & Pfeffer, 1976; Aldrich & Fiol, 1994; Aldrich & Mueller, 1981; Baron et al., 1996; Boeker, 1988; Eisenhardt & Schoonhoven, 1990; Hannan et al., 1996; Romanelli, 1989; Romanelli & Schoonhoven, 2001). The
founders’ efforts are thus moderated by the localised context. However, what may appear to be a limitation in the labour markets in which these biotech companies compete, resulted in a different strategic direction by each company. The most distinctive recruitment practice can be attributed to Founder C’s propensity to actively recruit and develop talented young student/scientists. Founder C’s relationship with the university was thus a source for the company’s identification and development of potential employees. This reflects an academic model of training and development where potential candidates are identified for their long term potential and abilities. It also reflects the scientific “apprenticeship” model that dominates the large-scale academic laboratory.

Company A continues to try and attract top talent in the field by concentrating their efforts on developing a business model and culture based on a collegial atmosphere and family-like company. Starting with an initial core of experienced scientists, they recruited internationally within the regional and financial constraints referenced above. Company B on the other hand, views this expertise as an expense that can be bought (contracted in) for a limited term. Core employees are encouraged to absorb and learn some of these key areas, knowledge or skills. One important implication for the identification and problem solving of founders around the employment system lies in its potential impact on firm viability and performance. Brown and Kirchhoff (1997) found that perceptions of resource availability by founders, such as the capacity to recognise markets and identify unexploited resources, contribute to firm performance. This finding has led Erikson (2001) to suggest that the ability of founders to influence the performance of firms may in fact lie in their social networks where forms of asymmetric information are obtained and shared about resource opportunities. He further suggests that venture capitalists utilise evidence of networking experience, past innovation, deal-making capabilities and outcomes of previous resource allocations as very important indicators of “entrepreneurial drive”, a factor that combines with an entrepreneur’s ability to recognise opportunities and exploit resources to implement strategies (Erikson & Nerdrum, 2001).

The empirical findings from this research give credence to the contribution of the founders, and their networks, to the employment system of the firm. The ability of founders to mobilise resources through these networks in implementing strategies and exploiting opportunities is significant.

Science as a business represents the second most central concept for all founders. This reflects the commercialisation strategy of the founders toward their IP. Strategy is an
important aspect of the employment system model (Burton, 2001). The employment systems of the firm may be dependent on the strategic direction of the companies (Boxall & Steeneveld, 1999; Burton, 2001); the implications from the empirical data collected in this research suggest that where matters of employment are concerned, founders are able to express and link the strategy for their organisation building with the required employment system requirements. Founder A, B1, B2 and C all expressed the unique requirements of commercialising science that emphasise the employment system imperative. In particular, pursuit of focused or differentiated drug development strategies determines the organisation of work and human capital requirements. This is important for two reasons. Firstly, the ability of founders to link the strategic direction of their organisation and the employment system begins to illuminate our understanding of the strategic management of human resources (Boxall & Purcell, 2003; Child, 1997; Eisenhardt & Zbaracki, 1992; Mintzberg, 1978). The nature of how strategy influences the employment system can be traced to the developments of managerial and administrative policies and practices (Child, 1972, 1997; Child & McGrath, 2001). Burton (2001) suggests that firms pursuing different strategies may be likely to deviate from dominant industry models. This thesis provides the drivers behind these strategic decisions. Company A pursues a diversification strategy in discovery and therefore employs a mixture of employment systems that emphasise a combination of attachment for its staff as well as a style of control and coordination that is predicated on the expectation of professionalism. Company B and C both have a focused pipeline in commercialising IP, although they both give emphasis to different aspects of employment in their firms (for example, Company B “buys” contractors; Company C adopts a “make” or development model). This reinforces the linkage between firm strategy and the strategy of human resources. The second reason that strategy is important to employment systems lies in its practical implications. Strategic management of these biotech companies and the ongoing process of managing valuable human resources is a highly complex affair. Founders for example, who have limited understanding of the employment system, may be detrimental to the building of the employment system if their knowledge about the employment system is incomplete or they do not give enough attention to HR strategy (for example, Founder B1 is a good example of limited

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85 For example, Founder A described science as a business as directing the focus of the employment system to find the best. Founders B1, B2 and C similarly conceptualise their diverse IP as specific pipelines in the way it is to be developed.
knowledge of or attention to the employment system although this limit was balanced by a reliance on his co-founder). The key essential action then is to recognise the importance of entrepreneur-related expertise and partner with people who have the required expertise (such as the case of Company B). Alternatively, founders could develop their understanding of the employment system (Nohria, 1992).

In examining the shared concept of science as a business, all founders also shared the same causal linkages between their commercial experience and science as a business. This is an increasingly important point in biotechnology as all founders gained experience from their commercial work experiences that allowed them to understand how to commercialise their IP. In terms of the formation of the employment system mental model, these experiences allowed founders to understand the business requirements for founding a biotechnology company. Founders are both exposed to “organisational models” as well as strategic know-how of the firms they work in (Burton, 2001). With regards to its impact on strategy, commercial experience largely carries knowledge and experience of the correct ways to organise the human resources for the firm. This is argued by Cooper (1979) that the strategic decisions of founders are influenced by their background and the commercial experiences of the founder, particularly the experiences of working in their last organisation. This thesis provides empirical evidence to the influence of these commercial experiences on the strategy of the firm. With regards to organisational strategies, this thesis provides an insight into the origins of the organisational and subsequent human resource strategy. Key strategic decisions around employment systems are influenced by the backgrounds of founders particularly from their professional working and commercial experiences.

Shane and Khurana (2003) highlighted the importance of taking into account founder’s career as an important explanatory mechanism for organisational founding. Their results suggest that prior experiences affect a potential entrepreneur’s own and other constituents’ expectations of liabilities of newness in founding a new firm. These liabilities of newness (Stinchcombe, 1965) are particularly limiting for inexperienced founders as they do not have a set of stable ties to resource holders, who are often relied upon to provide founding requirements of an organisation. Potential entrepreneurs with greater firm-founding experience should be familiar with the roles and skills necessary to establish a new organisation and should not expect to incur as high a cost of adapting to
their new role and acquiring new skills as novice entrepreneurs. Individual’s variance in career experience impacts their own and others’ expectations of their ability to organise successfully a new firm in response to the discovery of an entrepreneurial opportunity (Shane & Khurana, 2003). Perhaps one of the most relevant findings from this study was the understanding of how potential founders who have achieved high status in their careers are able to possess the necessary legitimacy to convince others to allocate resources to the new venture. Potential entrepreneurs’ career experiences influence external constituents’ evaluations of their ability to overcome the liability of newness by providing them with evidence that entrepreneurs have adapted to the role of organisational founder and developed the skills necessary to found an organisation. High status in careers (in this case as senior scientists) generates the necessary legitimacy to motivate potential investors, employees and other stakeholders to reallocate resources to the new activity.

By showing that career experiences affect firm foundings, even after attributes of industry and technological opportunities are controlled, our research shows that firm foundings are not determined solely by the characteristics of opportunities themselves but by the confluences of enterprising individuals and valuable opportunities. This result supports the argument that accounting for the role of individuals in the firm founding process is critical for advancing theory (Shane & Khurana, 2003, p. 540).

This also suggests that the organisation building process is influenced largely by the career experiences of founders. The role of the individual is important in theories of organisation building and firm founding. Founder A, B1, B2 and C all demonstrated the enduring influence of their technical, commercial and university experiences in helping them build their companies. The particular experiences of each founder forms the basis for strategic decision making around the employment system and have been shown to influence the direction of the employment systems in this thesis.

**DIFFERENCES IN FOUNDERS’ EMPLOYMENT SYSTEM MENTAL MODELS**

An important analysis that CMAP2 performs includes the distance index which is a measure of similarity between two causal map systems. As described earlier, these distance indices provide a quantitative description of the similarity or idiosyncrasies of the domain maps based on the SCU database (A value of 0.00 indicates total similarity,
while a value of 1.00 indicates no shared elements). Table 7.2 describes the overall gross distance index for all founders’ domain maps of the employment system.

Table 7.2. Gross Distance Index of all Founders

<table>
<thead>
<tr>
<th>Founders</th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0</td>
<td>0.6172</td>
<td>0.4676</td>
<td>0.409</td>
</tr>
<tr>
<td>B1</td>
<td>0.6172</td>
<td>0</td>
<td>0.3989</td>
<td>0.585</td>
</tr>
<tr>
<td>B2</td>
<td>0.4676</td>
<td>0.3989</td>
<td>0</td>
<td>0.3386</td>
</tr>
<tr>
<td>C</td>
<td>0.409</td>
<td>0.585</td>
<td>0.3386</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 7.2 shows the gross distance index for the overall domain map of the employment system, Founders B2 and C have the most similar maps (value = 0.3989) while Founders A and B1 have the most dissimilar maps (value = 0.6172). These differences can be compared with the characteristics of the founders. Founder A and B1 were the most business oriented founders, with Founder B1 having a business commercialisation background while Founder A perceived his company as a business first and research company second (including leaving his professorial position at the university). However, Founder A was a scientist who founded his company outside its institutional origins while Founder B1 was a business founder within the university system. Founder B2 and C, on the other hand, were scientists who still maintained their positions and links within the university.

The differences and similarities of their cause maps are discussed at the level of the domains of the maps. A breakdown of the domain maps according to the employment system mental model is also available with CMAP2. In this case, distance indices were calculated around domain maps of theoretical importance: employment system antecedents, employment system, organisational culture, and employment system goals. Table 7.3 summarises the distance index of the focal maps.
Table 7.3 indicates the distance of the domain maps of all founders. In terms of employment system antecedents, Founders B1, B2 and C appear to have similar maps (0.2627 and 0.3902 respectively) while Founder A appears to be distant to the other founders (0.7554). Founder A has more employment system antecedents in his mental model of the employment system as he had no previous founding experience and relied on external advisors to help build the employment system of his firm. Haunschild (1994) asserts that inter-organisational relationships are important determinants of organisational characteristics as firms scan their environments and adopt organisational features of other firms. DiMaggio and Powell (1983) suggest that this process of organisational imitation may be accelerated with increasing network ties among firms. Nohria (1992) builds on the notion that start up firms rely heavily on external partners because they lack legitimacy and have a need for resources. In the absence of founding experience, this reliance may be exacerbated by the influence of others on the firm’s employment system such as these venture capitalists and lawyers (Suchman et al., 2001).

Burton (2001) found little influence of external partners, such as venture capitalists and lawyers, on the employment systems in the SPEC sample. She attributes this to the
variability of the industries and strategies of the firms studied or to the indirect effects that these external partners may have on the firm that could not be assessed through her research design. However, she did advance the notion that external partnerships may be most important when founders lack experience or legitimacy. From the perspective of this thesis, the lack of founding experience did have an effect on the number of external influences in building the employment system. This can be seen when Company A is contrasted with Company B, where the lack of founding experience of one of the founders was bolstered by having a co-founder who had founding experience. While Founder B2 was also a first time founder, he relied heavily on Founder B1 to help build the employment system of Company B. This reflected a lesser reliance on external advisors to build the company.

In the domain map of employment systems, all founders share average values for their distance (range 0.4782-0.5883). This shows that all four founders have very similar employment system mental models. However, indices in the organisational culture and goals domain maps show a dramatic difference between founders. The distance index of Founder B1 was totally dissimilar to the other founders (1.00 distance to Founders A, B2 and C). This is because Founder A, B2 and C are scientists that have specific ideas about how to manage the employment system in their laboratories and the organisational culture that was required to commercialise the science. Founder B1 managed the financial side of the organisation building process and did not participate in the employment system building of Company B. Aside from recognising the core requirements of the employment system (finding the best), Founder B1 was not involved in the employment system building of the company and left it to Founder B2 to create the employment system and organisational culture of the company in line with scientific assumptions and mores. Beyond this gross level of analysis, the CMAP2 process allows me to “drill down” into specific differences in the founder’s mental models. The next sections outline similarities and differences in how founders’ modelled and developed the employment system of their firms.
Employment System Antecedents

With regard to the employment system mental model, antecedents were a key feature of all founders’ mental model. The founders’ individual background or demographic characteristics are a highly salient variable in founder’s employment system mental model. Technical, commercial and university background are highly related to the way in which strategy is formed and understood in building their employment systems. The particular role of commercial experience and science as a business has been discussed previously. Founder’s background as represented by their experiences in the technical, commercial and university work remains a large influence in their understanding of the employment system. The interesting differences in the founders’ employment system mental model lie in the founding experience and its interaction with the employment system. For example, the networks and advisors of the founders influenced subsequent models of employment.

Rousseau (2001) provides an interesting line of research that may account for the differences among founders in their employment system mental model. She provides two sources in accounting for differences in psychological contract schemas. The first of this are professional norms and ideologies (Bunderson, 2001) and the second, through legalisms associated with societal beliefs regarding the law and its practices (Stolle & Slain, 1997). These influences affect schemas that people have for the psychological contract. However, integrating this idea from psychological contract research, it can be understood that professional norms and ideologies (Bunderson, 2001) are important in the shaping of the mental model about the employment relationship. The results of this thesis demonstrate that mental models of the employment system are a direct consequence of the professional norms and ideologies that a founder adopts. In all of the case studies, the scientist-founders’ philosophy for employment is carried over to the employment system of their firms. While speculative at this stage, society-based schemas may also suggest the means to which founders reinforce stable and enduring models for organising (Stolle & Slain, 1997).

Previous founding experience plays an important part in the organisation building of the firm. It would seem that founding experience helps founders build their employment systems by either founders learning from their previous mistakes or by allowing them to
tap into organisational designs that would be effective for their commercialisation efforts. Two founders (Founder B1 and Founder C) in the case studies had previous founding experience.

Founder B1
...I suppose having founded other companies helps you know what you have to do to make it succeed.

Founder C
Well, it was one of the companies I founded before and the model was based on that and it was an improvement on the previous one and I corrected some of the things that I didn’t want to repeat in that company.

Founder C is unusual in the sense that he had very little external advisors influence on his mental model and subsequently, the firm that he built. Founder C had very firm ideas about his firm is structured, having built a successful biotech company before embarking on Company C. In contrast to this, Founder B1 had founded companies before, although not in the same industry, and thus had virtually no impact on the resultant employment system of Company B. Those with founding experience are able to either have a firm employment system model to guide their organisation building behaviour or help their co-founders build their organisations and employment system. There is some evidence in this study that career experience affect the perceived legitimacy of founders’ organisation building (Shane & Khurana, 2003). As our case studies show, all founders had high status career experience that put them in a position of high legitimacy, influencing their interactions with employees, investors and stakeholders. In the face of not having founding experience, founders used a variety of methods to finesse the legitimacy issues. Founder A and B2, for example, depended highly on their status within the scientific community to leverage their legitimacy whilst Founder B2 also depended on a collaborative founder, Founder B1 (with extensive commercial experience) to help with the organisation building process. The high status legitimacies of our sample in were used as leverage in order to attract funds, capital and people into their organisations. With regard to building the essential and important employment systems of these biotechnology companies, having high status within their professional arenas enabled the attraction and hiring of key staff to their organisations. In employment systems building at least, founders’ reputations are a resource for exploitation. This provides a useful direction for future research in examining the effects of founding and career experience
on the impact of organisation building and legitimacy. This study provides some preliminary evidence that these experiences are important in the building of the employment system.

Aside from Founder C, the external partners represent an important influence to employment system mental model development. Venture capitalists in this sample appear to influence either directly (on the employment system) or indirectly the makeup or organisational design of the company (through the employment system mental model). The impact of these various stakeholders highlight the influence that these stakeholders have on the employment system mental models of founders as well as the employment systems they’ve built. This spectrum of influences include venture capitalists, legal advisors, and/or mentors that have a significant impact indirectly through advice and expertise, to those who have a direct influence in the setting up of aspects of the employment system. For example, Company A reported influences on the employment system from a number of sources, including the legal advisor (who developed employment contracts and set up stock options for Company A) and the introduction of the HR Manager to the company (resulting in HR formalisation). In spite of having previous founding experience, Founder B1 also cited several key influences from external partners (for example, these key influences include the angel investor who provided advice on founding the company as well as leading Founder B1 to other venture capitalists). The idea that stakeholders have a significant effect on the subsequent employment systems of firms has been explored in the literature (Boxall & Purcell, 2003; Donaldson & Preston, 1995; Kochan & Dyer, 1993). Boxall and Purcell (2003), for example, has highlighted the importance of understanding stakeholders needs in the HR planning process. However, there is little evidence of the way in which stakeholders impact the employment system. This study provides some evidence for the impact that stakeholders may have on founders’ mental models of the employment system. It would seem in the light of these findings, the commitment and help that various stakeholders, such as venture capitalists or angel investors, provide may very well shape aspects of the founder’s employment system mental model and the employment system that emerges.

Because firms are networks of stakeholder groups, we must expect that any major initiative involves political management, particularly where investors must be persuaded to support the initiative or where employee groups are being asked to make changes that threaten their interests…In a nutshell, firms are beholden to
stockholders (who supply financial capital) but they are also dependent on any stakeholder group (such as suppliers and key customers) that contributes resources that are valuable to the firm (Boxall & Purcell, 2003, p. 39).

In this thesis, the role of stakeholders is notable, particularly as represented in the mental models of the founders. Other important influences in the founders’ employment system mental models include an awareness of other biotechnology companies within the industry competing within the same labour markets. Other companies remain an important influence to the founders in terms of competing for the human capital and maintaining market pay rates. Founders consistently address the need to maintain vigilance with companies in the industry in order to evaluate the market value of potential employees. Furthermore, founders understand the competition for the limited pool of expertise available to the case study companies. This has a significant impact on how founders find and attract talent into their companies, as they are always attentive to the ebbs and flow of the labour pool.

Founder A

...and I think you have to do it its...interesting that since 1994, from about 1994-1998 we had no problems finding people, we’d advertise internationally, select good people bring them over...its very hard at the moment because you advertise for scientists and I don’t know where they all are...but its like the pool has dried up. And so, its I think harder and harder to find scientists with the sets of skills that you actually want to grow...I think it’s a small market so you have to be opportunistic...a number of times, good people have come through and we’ve simply made decisions on the spot. This is an A-class athlete and we’ve got to have them, we don’t have a job for them but somewhere it will grow and it does most of the time...so we’ve tended to do that a bit and recognising that...at some point you would have a need so it’s a range of things....at the moment its tough, I think that we’re probably at the point as a nation where we would need to look carefully at the skills that we want to import and bring in and be far more selective about doing it.

Founder C

... its hard to find people with the right skills...that’s in America...we’ve had the couple of individuals that had unrealistic expectations about what they need to do...I don’t like to downsize and so people are very important, we have to hire the right person...we have to find the right ones...that’s very hard and financing is hard....money and people issues.

With respect to the competitive environment of these case studies, founders expressed the impact rival biotechnology companies have on the employment system mental model that they had. This is seen to have both a direct and indirect effects on aspects of the
employment system in the mental model. Other companies in the form of rival biotechnology companies represented a competitor in terms of both the labour markets as well as in the progression of research in similar areas. The analysis of competition and cognition is in its own right a considerable area of interest to many scholars of strategy (Grant, 1998; Greenley, 1989; Hitt, Hoskisson, Johnson, & Moesel, 1996; Johnson & Scholes, 1999). Of relevance to this research is the literature on how strategic decision makers come to develop knowledge of their competitive worlds and represent this knowledge (Hodgkinson & Sparrow, 2002; Porac & Thomas, 1990). The work in this area has focused on exploring the structure and content of actors’ mental representations of competition. Over the past twenty decades or so, the empirical literature in this area has demonstrated the limits of strategist’s categorisation of their competitors. The research evidence has shown that strategic decision makers attend only to a limited subset of the many available competitors within their industry (Eisenhardt & Schoonhoven, 1990; Feeser & Willard, 1990; Sandberg & Hofer, 1987; Stout, Cannon-Bowers, Salas, & Milanovich, 1999; Wijbenga et al., 2003). With regard to the building of the employment system, founders look to other biotechnology companies as a source of reference or model for building their own employment systems (DiMaggio & Powell, 1983; Haunschild, 1994), or as a rival in resource markets (Clark & Montgomery, 1999; Gaglio & Katz, 2001; Gripsrud & Gronhaug, 1985; Hodgkinson & Johnson, 1994; Johnson et al., 1998).

Companies within founders’ ideas of competitive firms are often limited to a narrow competitive group (Porac et al., 1989). The firms found to have a direct impact on the employment system are firms that either share similarity to the founders’ firms, or overseas firms that are considered rivals. Founders’ consistently identified overseas companies that were similar as major rival companies for the labour markets in which they competed. Interestingly, the companies studied did not consider one other as competitors, as their technologies differed even though they shared a geographical location. However, the mobility of executives among the case study companies was notable, with management talent from one case study company having had worked in the other case company. The mobility of key executives to move within the regional sector among companies is relatively straightforward. Founder A, for example, was proud that his executives and top scientists were head-hunted by other companies. One possible explanation for this is that the size of the industry fosters a more collaborative attitude.
based on the relationships of the people within the industry in order to maintain viability as an industry. Responses from executives and the founders themselves view their firms in contrast to the other companies within the sector as “unique” compared to the other companies. In the absence of a perceived similarity among the firms, the perceived competition for key talent is diminished. This is interesting as all cases seem to indicate the lack of talent available for their companies as a key problem for their employment system.

**Employment System**

In general, as the distance index of the employment system domain reflects, the standard concepts around the employment system are remarkably similar among the founders. However, aside from the shared conceptualisation of find the best as imperative for their employment systems, all founders have differing causal thinking around the employment system. While the founders share several of the standard concepts (such as attract people, best knowledge and skills, competitive salary) around the employment system (see also Appendix E), founders’ causal thinking around these concepts are more idiosyncratic than similar. Founder A for example, emphasised a commitment model of employment system, demanding excellence around the company’s employment system practices and policies. Founder B1, had fewer concepts and causal links among the employment system while Founder B2 emphasised a “buy” employment system preferring to buy the required expertise for the required knowledge and skills. Founder C, in contrast, emphasised direct control and development in the employment system. These employment systems demonstrate the “make” versus “buy” approach of both companies. The ongoing pressures of market forces, globalisation, and technological change allowed a transformation to the principles of work organisation and worker expectation that is reflected in the many organisations today (Osterman, 1994). As can be seen in the high-technology industry and descriptions of the knowledge economy, work organisation in firms with high knowledge capital requires a flexible structure that emphasises teamwork and greater employee discretion (Proctor & Mueller, 2000). These historical antecedents to the broader employment economy came to be seen as the development of the evolution of work expectations and understandings in the formation of the employment or work system. Perhaps in this sense, the mental models that founders have of the employment
system within their firms are a reflection of these pressures and experiences in the formation of work and employee expectations.

A view on the employment system of scientific organisations perhaps may reveal much about the nature and process of scientific work and innovation (Burns & Stalker, 1961; Dosi & Lovallo, 1997; Grabowsky & Vernon, 1994; Lundvall, 1992; Marsh, 2000; McKelvey, 1994, 1996; Mulkay, 1972; Murray, 2002).

Organizational attachment of research scientists supports a viewpoint of the scientific community as constructed around research institutes with stable cores of employees. This perspective is based on the findings that positive work settings encourage organizational bonding; scientists who find themselves in work climates conducive to both personal and professional objectives are ready to reciprocate with fidelity to their employers. From this standpoint, scientific activities may be seen as primarily developing out of an exchange between a local distribution of rewards and resources and a scientist’s commitments to the organization...Harmoniously, recognition from the scientific community can strengthen rather than weaken commitments to an employing organization. The receipt of high status from colleagues may in itself be due to an established position in a recognized institute; the researcher obtains standing as a representative of a prominent institute, one which may assist the development of contacts with colleagues by providing facilitating conditions. Concurrently, evaluation systems at top research institutes may be linked to recognition in the scientific community and fidelity often further guaranteed by granting greater rewards to those who bring credit to the institute (Goldberg & Kirschenbaum, 1988, p. 215).

The different emphasis within the employment systems of Companies A, B and C can be seen by the centralness of each standard concept (this reflects the relative importance of each concept in the cause map) as emphasised by each founder’s cause map. Table 7.4 summarises the central concepts of each founders’ employment system mental models. The results suggest that founders in this sample have already predefined ideas of how to organise work and the management practices required to implement these assumptions.
<table>
<thead>
<tr>
<th>Standard Concept</th>
<th>Td</th>
<th>Standard Concept</th>
<th>Td</th>
<th>Standard Concept</th>
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<th>Standard Concept</th>
<th>Td</th>
</tr>
</thead>
<tbody>
<tr>
<td>Find the best</td>
<td>10</td>
<td>Co-Founder</td>
<td>7</td>
<td>Co-Founder</td>
<td>7</td>
<td>Find the best</td>
<td>9</td>
</tr>
<tr>
<td>Excellence</td>
<td>8</td>
<td>Science as a business</td>
<td>7</td>
<td>Science Results</td>
<td>7</td>
<td>Direct Control</td>
<td>8</td>
</tr>
<tr>
<td>Legal Advisor</td>
<td>4</td>
<td>Find the best</td>
<td>7</td>
<td>Attract People</td>
<td>7</td>
<td>Development</td>
<td>7</td>
</tr>
<tr>
<td>Science as a business</td>
<td>4</td>
<td>Viable Company</td>
<td>6</td>
<td>Fit Culture</td>
<td>6</td>
<td>Science as a business</td>
<td>6</td>
</tr>
<tr>
<td>Control Core</td>
<td>4</td>
<td>Attract People</td>
<td>4</td>
<td>Best Knowledge and Skills</td>
<td>4</td>
<td>Planning</td>
<td>6</td>
</tr>
<tr>
<td>Information</td>
<td>4</td>
<td>Shareholder Value</td>
<td>4</td>
<td>Excellence</td>
<td>4</td>
<td>Excellence</td>
<td>6</td>
</tr>
<tr>
<td>Attract People</td>
<td>4</td>
<td>Angel Investor</td>
<td>3</td>
<td>Angel Investor</td>
<td>3</td>
<td>Regular Control</td>
<td>6</td>
</tr>
<tr>
<td>Commitment</td>
<td>4</td>
<td>Venture Capitalists</td>
<td>3</td>
<td>Focused Pipeline</td>
<td>3</td>
<td>Science Results</td>
<td>6</td>
</tr>
<tr>
<td>Fit Culture</td>
<td>4</td>
<td>Focused Pipeline</td>
<td>3</td>
<td>Other Companies</td>
<td>3</td>
<td>Professional</td>
<td>5</td>
</tr>
<tr>
<td>Professional</td>
<td>4</td>
<td>Senior Management</td>
<td>3</td>
<td>Direct Control</td>
<td>3</td>
<td>Attract People</td>
<td>4</td>
</tr>
<tr>
<td>Evaluation</td>
<td>4</td>
<td>Venture Capitalists</td>
<td>4</td>
<td>Focused Pipeline</td>
<td>4</td>
<td>Senior Management</td>
<td>3</td>
</tr>
<tr>
<td>Venture Capitalists</td>
<td>4</td>
<td>Focused Pipeline</td>
<td>3</td>
<td>Other Companies</td>
<td>3</td>
<td>Professional</td>
<td>5</td>
</tr>
</tbody>
</table>

Td= Total degree, employment system domain concepts in italics

Examining Table 7.4, we find that all founders share the concept of attract people as a concept in their employment system mental model. The similarity of the founders sharing this standard concept as an important part of their employment system mental model is reflective of the difficulty in finding talented scientists for their firms. The need to attract people to work in their firms thus represents an important imperative for all founders within their competitive environments. This finding is congruent with the global scarcity for talented scientists (Larbey, 2002).

In examining the most important concepts in the employment system domain, we find that there are far more differences to what founders consider important in their employment system mental models. The first interesting finding is that Founder B1 had the least number of employment system concepts he considered important. Founder B1 thought find the best, attract people and senior managers to be important features of his employment system mental model. This fits into earlier within-case analysis of Company B. Founder B2 was the business co-founder in Company B and did not have much involvement with the everyday running of the company aside from its finances. An analysis of these concepts also appear to confirm his ideas (and our within-case analysis of Company B) about the requirements for finding talent for his firm as well as his dependence on the senior management team to run the company and its research.
When we compare the important employment system concepts across the scientist-founders, we find that the founders all emphasised different aspects of the employment system. However, there were a few similarities across the founders as well. For example, Founder A and Founder C shared find the best as the most central (and thus most important) concepts for the employment system mental model. This matches each founder’s philosophy that to finding the best talent was an important imperative for the employment system of their firms. Founder A also shared fit culture with Founder B2. This reflects the important idea of selecting the right scientists based on their ability to work within the commercial setting. Founder A and B2 both emphasised in the within-case analysis of their companies the importance of adapting to the commercial setting of biotechnology that differed to other research institutions. Founder B2 and Founder C shared direct control as important concepts for their employment system mental models. This is congruent with Founder B2’s ideas about utilising contractual staff and the need to control and coordinate the research work himself. Founder C also maintains direct controls over his science by overseeing the control and coordination of work in his firm. This shared importance in concepts is suggestive that the importance of some employment system concepts may be shared within an industry given the shared environments of the firm (Suchman et al., 2001). However, given the different emphasis on these concepts in the founders’ employment system mental models, the findings are only suggestive of such shared thinking at this stage.

The more interesting finding of the employment system domain across the founders are the differences between what founders considered important for the employment system. Looking at Founder A, we can see that aside from attract people, find the best and fit culture which has been discussed earlier, Founder A also emphasised commitment, and professional evaluation as important employment system concepts. Founder B2, on the other hand, emphasised best knowledge and skills, and direct control (aside from fit culture and attract people). Founder C had the most employment system concepts in his employment system mental model with development and planning (in addition to find the best, direct control and attract people). These differences are important because they can be related to our understanding of the emergence of the employment system in their firms. If we were to contrast the importance of each founder’s employment system domain concepts with the employment system in their firms, we can see the significant relationship between the employment system mental model and the employment systems
that the founders build. By looking at the idiosyncratic importance of concepts of each founder, a few interesting findings can be gleaned.

Founder A’s employment system mental model for example, highlight the importance of commitment and professional evaluation. When contrasted to the employment system of his company, we can see that aspects of this model is realised. The use of a commitment model in Company A required an emphasis on finding and selecting the right kinds of people (by selecting not only on the best skills and knowledge, but also the fit into the commercial setting of the firm) and building a collegial and family oriented culture. Founder A’s emphasis on professional evaluation was also realised in the company by formalised professional evaluations of the science by peers and senior managers. This not only included informal and formal science meetings with teams and departments but also participation in company-wide “democratic forums”. The implementation of the founder’s mental model is perhaps not surprising given the involvement of the founder in selecting and controlling the science of the work. In contrast to the emphasis on commitment and evaluative employment system mental model of Founder A, Founder B2 emphasised best knowledge and skills and direct control in his mental model. Founder B2’s idiosyncratic concepts around the employment system domain is important because it demonstrates the ability of Founder B2 to employ the “buy” form of employment system in his company. Aside from finding people to fit into the culture of the commercial setting, Founder B2 is able to utilise contractual arrangements with the scientists in his company by determining the requisite knowledge and skills required for commercialisation. The within-case analysis of Company B showed the reliance of contractual staff and the fluidity of the scientists between Company B and the research institute Company B was embedded in. This reliance on contracts and periphery staff require careful controls of the direction of research and development by the founder. This necessitated an emphasis on direct control by the founder. Founder C’s employment system domain emphasised development and planning as central concepts. This is congruent to Company C’s emphasis on developing or utilising a “make” form of employment system. Company C utilises their relationship with the university to recruit and mentor potential student/scientists. The preference for developing their own talent requires practices that focus on the control and coordination of work. These practices include a focus on providing regular planning and direct control by the founder and senior
managers of Company C. The emphasise of Founder C’s employment system mental model were thus confirmed in the employment system of his firm.

By contrasting the cross-case analysis results with the case study evidence, a number of interesting findings emerge that confirms the initial analyses of each case study. With regards to the employment system domain, founders’ emphases on particular practices were found to be directly related to elements of the employment system in their firm. This not only confirms our initial within-case analyses of the case studies but also provides further evidence for the impact of founders’ employment system mental models on the employment systems of their firms. Employment system mental models contain elements that are shared and idiosyncratic (Crocker, Fiske, & Taylor, 1984; Lord & Foti, 1986; Rousseau, 2001; Stein, 1992). The cross-case analysis highlights concepts that are shared by all founders within their industries. Concepts that are idiosyncratic reflect elements that are employed by the founders’ particular experiences or backgrounds, and their conceptualisations of how to organise work in their firms. This highlights the distinct reality that individuals can have differences in their basic cognitive structures, including concepts in the employment system domain. This in effect may produce sources of heterogeneity that are postulated in studies of employment systems (Baron et al., 1996; Fligstein & Byrkjeflot, 1996; Marsden, 1999). The findings are also suggestive that founders of firms have models of “synergistic” systems of practice (Barney & Wright, 1998). While speculative at this stage, the different emphasis that founders place on employment system concepts highlight the idea that founders are aware of the complementary practices required to sustain a particular type of employment model.

Organisational Culture and Goals

In articulating the impact of employment system policies and practices on the organisational culture of the firm and the goals of each company, Founder B1 was found to have no standard concepts or shared SCUs in the organisational culture domain. This resulted in Founder B1 having total dissimilarity to the other founders within this domain (see Table 7.4). This is hardly surprising considering the role that Founder B1 plays in the building of the employment system of Company B. Founder B1 is the founder in charge of fund-raising and the financial management of the firm. His employment system mental model expresses the employment system in very generic terms with linkages to
the organisational goals rather than the building of a comprehensive management system and culture. Aside from highlighting the importance of finding the best and attracting talent, Founder B1 conveys a reliance on Founder B2 and the senior management of the company to take care of other aspects of the business including its human resources and the particular practices of the employment system. This is an increasingly important point as founder’s roles in the company may also mediate the interaction of the founding team and the contribution of individuals when building the employment system of the firm (Finkelstein & Hambrick, 1996; Fligstein, 1987). Burton (2001) found that founding teams with more senior management experience and more non-technical experience are most likely to deviate from the dominant industry models. She found that experienced executives that are part of a functionally well rounded founding team are the most likely to adopt an employment model that is different from either the dominant industry model or any other well understood cultural archetype. She attributes this to functionally heterogeneous teams being more complex and diverse in their operations and requiring more divergent models to meet these complex interactions. Burton (2001) also speculates that the presence of heterogeneous teams such as having non technical founders or industry outsiders may have an impact on the models built. While Burton’s (2001) interpretations was speculative based on normative data, this case study research finds that where founders are concerned, the effects of functional background and their role in the founding team has significant impact on the models of the employment system. In Company B, for example, Founder B2 had a significant impact on the employment system as he was the scientist overseeing the employment system issues of the firm, and enacted a traditional scientific model, discrepant from his co-founders business-oriented mental model.

The idea that work structures particularly the employment systems have an effect on the management of scientists has long been explored by various researchers (Hagstrom, 1965; Kornhauser, 1963; Sklair, 1973). The demands of academic versus commercial areas for research and development have different implications for the organisation of scientists (Goldberg & Kirschenbaum, 1988; Hirsch, Milwitt, & Oaks, 1958; Jacobs, 1981; Tingey & Inskeep, 1974). This contrast means that further investigation into the employment systems of commercial settings are crucial in understanding the innovative and commercialisation aspects of R&D (Macmillan, Klavans, & Hamilton, 1995). The case studies demonstrate that founders have an understanding of the difference for the
requirements in research and commercialisation. This cognitive validation highlights the signalling and balance that are required in the commercial environment. The organisational framework thus reflects the different forms of research efforts (Mulkay, 1972). This is perhaps one aspect of the employment system that is imperative in the biotechnology sector, the requirements are thus able to be leveraged through a variety of practices that are seen in this research as well as others (Chatman & Cha, 2003).

An important area of cross case analysis is the domain of organisational culture\(^{86}\). Table 7.5 shows the key concepts around the organisational culture domain for all scientist-founders. Aside from Founder A, who had 2 additional standard concepts (communication and deal with failure), all scientist-founders had the same concepts around the organisational culture domain. These standard concepts were excellence, professionalism, teams, and regular control.

**Table 7.5. Standard Concepts in Scientist-Founders’ Organisational Culture Domain**

<table>
<thead>
<tr>
<th>Founder A</th>
<th>Founder B2</th>
<th>Founder C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellence</td>
<td>Excellence</td>
<td>Excellence</td>
</tr>
<tr>
<td>Professionalism</td>
<td>Professionalism</td>
<td>Professionalism</td>
</tr>
<tr>
<td>Teams</td>
<td>Teams</td>
<td>Teams</td>
</tr>
<tr>
<td>Regular Control</td>
<td>Regular Control</td>
<td>Regular Control</td>
</tr>
<tr>
<td>Communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deal with failure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The fact that scientist-founder share all of the concepts around the organisational culture can be attributed to the cultural norms and expectations for work within science firms. It is not surprising to learn that organisational culture have an important part to play within employment systems and organisations. The psychological basis of culture lies in its construction of the norms of legitimate social standards for behaviours to be evaluated within a firm (Birenbaum & Sagarin, 1976). Norms are the regular stable behavioural patterns that are expected by group members and influence the interaction, processing and problem solving of people within the firm (Bettenhausen & Murnighan, 1991). Studies

\(^{86}\) As stated, organisational culture in itself is a wide ranging topic that will not be comprehensively covered here. It is recommended that interested readers refer to the work of culture theorists (Martin, 1992; O'Reilly, 1991; Schein, 1990). However, we will focus our discussion of organisational culture with the relevant works, most notably in the creation of culture in start-up companies and the role of founders (Schein, 1983, 1991, 1992).
have found that organisational culture and expectations of group norms have a profound effect on job behaviours and work environments (Bettenhausen & Murnighan, 1991; Collins & Porras, 1994; Johnson & McIntye, 1998; Sheridan, 1992). Thus, the implications for building a strong organisational culture are immense. Strong organisational cultures are reflective of the ability to achieve bottom-line performance and ongoing success in executing strategies (Chatman & Cha, 2003; Collins & Porras, 1994; O'Reilly, 1991). The importance of building an organisational culture is backed by evidence already discussed earlier in the thesis that the form of organisational culture and employment practices may be of crucial importance in the early days of the firm (Baron et al., 2001; Hannan et al., 1996).

Chatman and Cha (2003) discuss how leadership can enhance and influence the organisation by leveraging employment practices and philosophies. They identify three sets of managerial practices that allow CEOs and leaders to influence and manage innovation within organisations. These include recruiting and selecting employees for culture fit, intensive socialisation and training and the use of formal and informal rewards to leverage culture for success. This thesis provides evidence that founders are able to leverage the kinds of culture they build by focusing on aspects of employment practice that are relevant.

Organizational culture can be a powerful force that clarifies what’s important and coordinates members’ efforts without the costs and inefficiencies of close supervision. Culture also identifies an organization’s distinctive competence to external constituencies. Managing culture requires creating a context in which people are encouraged and empowered to express creative ideas and do their very best. Selection, socialization and rewards should be used as opportunities to convey what’s important to organizational members (Chatman & Cha, 2003, p. 31).

This study provides evidence that founders, in creating their firms, build employment systems that reflect the founders’ assumptions of work and expectations (Schein, 1983). The meaning that people draw on the organisation of work and what employees come to expect from the workplace is in part culturally determined as well as individually.

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87 For a review of the debate about the extent of founders’ influences on organisational culture, (see Martin et al., 1985; Pettigrew, 1979; Rowlinson & Proctor, 199; Schein, 1983, 1991). However, recent research suggests that the debate may be shifting towards a recognition that the founder’s influence is substantial (Ogbonna & Harris, 2001).
constructed (Bowles, 1989; Casey, 1995; Erez & Earley, 1993; Pauchant, 1995; Peters & Waterman, 1982; Sievers, 1994). The work in organisational culture draws on how people find meaning in their lives with work organisations as the basis for providing them with a sense of meaning and shaping the meaning of their lives (Peters & Waterman, 1982; Watson, 1994). It is suggested that, in a like manner, people who build organisations have a cognitive model or idea about the ways in which work should be organised and give meaning to employees. This point is an interesting one in that exploring the meanings that arise out of accepting or rejecting the organisational ideology and member roles that it prescribes can be a crucial difference for why and how people should be managed (Kunda, 1992). This research provides some preliminary evidence that the elusive nature of shared meaning (Weick, 1995), may be centred in the ability to share cognitively the held beliefs of employers and employees. Scientist-founders in this thesis were able to link the building of employment system policies and practices with organisational culture concepts. This is an important extension for how founders are able to influence the organisational culture of the firm. Scientist-founders are aware of the cultural implications of employment systems. The importance of employment system mental models offers a cognitive substantiation of founders’ vision, philosophy and thinking about the employment system and culture.

Scientist-founders in this study all demonstrate the expectations that they have for the employment system and their employees. A look at the case studies show that founders adopt these varieties of management practice in addition to others to build the culture in their organisations. Company A and C recruit and select on the basis of their founders’ ideas for obtaining, managing and retaining key employees while Company B reflects the founders’ philosophy of “buying” the right kinds of talent. In addition, the case studies reflect each company’s idiosyncratic display of management practice that is intended to impact on employee’s behaviours and actions within the firm. An examination of Table 7.4 shows the key central concepts (and importance) of the organisational culture domain. For Founder A, excellence, was highly important to the founder’s employment system mental model. Founder B2 and C also emphasised excellence as an important concept. However, this was not as high in importance in their employment system mental models compared to Founder A (in Founder B2 and C it comes sixth). The shared importance of excellence as an organisational culture concept reflects the idea that professional norms and expectations of scientists play an important part in the employment system mental
models of founders. This highlights the differences that founders have on the employment system and the emphasis that they give towards different employment system practices in creating their organisational cultures. This provides an indirect confirmation that cultural expectations within professional groups may account for an influence on the founder’s employment system mental model. The expectation of excellence by the scientist-founders may reflect norms around the professionalism of scientists and norms of research (Gilbert & Mulkay, 1984; Latour & Woolgar, 1986; Levin & Stephan, 1991). Employment system building is not just relegated to the realm of practice; it appears to be an ongoing exercise in influence and control.

The similarity of concepts in the organisational culture domain (Table 7.4) provides evidence for the norms of work around science and research companies. These can be contrasted with the case study evidence. All companies in our sample organise work in teams, have high expectations for the quality of their employees’ work and professionalism, and a regular control or monitoring system. However, Founder A does stress two additional concepts that include communication and dealing with failure. Company A implements these by regular mentoring, formalised performance management and regular forums at all levels. Although, the key organisational culture concepts for the scientist-founders are realised within each case company (for example, in all companies, scientists work in teams, have high expectations of work and professionalism, and regular monitoring by the founders and senior managers), the different choices of employment systems and the resulting organisational culture that arose were different. The differences can be linked to the employment system mental models of the founders especially around the employment system domain. Company A, whose founder stressed find the best, attract people, commitment, fit culture, and professional evaluation (important employment system domain practices) and excellence, professionalism, communication, teams, regular control, and dealing with failure (important organisational culture concepts), has built a company culture that fosters a collaborative/collegial culture evidenced by its pastoral care of its employees and professional evaluation policies designed to encourage professionalism, commitment and communication. Founder B2 specifics attract people, fit culture, best knowledge and skills, and direct control as important employment system policies and practices that highlights an expectation for employing particular expertise on contractual arrangements. Company B’s employment system features a more transactional employment system that focuses on the work or research (Company B’s employees work in separate departments
or project teams that have little association with one another, with many of its employees specifying work as their reason for being at Company B) in a diffused research setting (based on its embeddedness with its institutional origins)\textsuperscript{88}. Founder C specifies, find the best, attract people, direct control, development, and planning (employment system concepts) while also highlighting excellence, regular control, and professionalism as important organisational culture concepts. The employment system and culture that emerged in Company C was one based on a collegial laboratory-based apprenticeship, where there was great support for training and development and several programmes designed to mentor and develop scientists. The point that can be made about the analysis of the organisational culture domain is that founders have very specific ideas about employment system policies and practices that are designed to build the organisational culture of the firm. The analyses of the founders’ mental models around the employment system and organisational culture domains highlight the influence that founder have not only on the employment system but also the culture of the firm. This provides evidence for the way in which founders contribute to the building the organisational culture in the firm. This finding extends our understanding of the founder’s legacy in organisational culture (Chatman & Cha, 2003; Harris & Ogbonna, 1999). While the founders role in organisational culture is profound, employment systems are also designed to achieve other goals specific to the organisation.

The ultimate goal of each founder’s conceptualisations of the employment system is to achieve science results, and ultimately commercial products. These standard concepts refer to the end product of the companies’ research and science. These concepts appear at the end of the cause map and appear to be predetermined goals of the employment system. All founders expected that their organisations (and the employment system) were designed to achieve science results and ultimately a commercial product. The goal was thus to create an organisational entity directed at commercialising the research of the founders.

Founder A

...our business is science, so we have to do good science. And our product begins with science results...so you have to have sound science results, so you can’t avoid that.

\textsuperscript{88} A scientist remarked “what organisational culture?” when asked about the culture of Company B. The Science Manager even stated, “We have a very work-oriented culture”.
Founder B1
Results are hugely important!

Founder B2
You need results to develop a product.

Founder C
I think that we have a very early and different technology platform and we have a very early and good (results)...and with this setup, we might get to where we want to go.

The significance of these key concepts is that they are articulated when discussing aspects of the employment system. While much of the literature on organisation building (for example, Burton, 2001) and the emergence of employment systems (Baker & Aldrich, 2000; Boxall & Purcell, 2003) suggest that the modes of organising for founders are emergent in nature, this thesis provides evidence that founder recognise the impact that employment systems have for their organisations, particularly through the mechanisms of talent management (recruiting and retention) and fostering an appropriate organisational culture.

The findings from the organisational culture domain analyses provide further evidence for the influence of founders’ mental models on the employment system of their firm. These findings do not only suggest the shared expectations and norms of the professional group and industry that the founders belong to, they also link the policies and practices of employment systems with the organisational culture of the firm.

**Employment System Evidence**

The final cross-case analysis to be made is to contrast the case studies employment system evidence. This is an important section as it highlights the differences in employment systems among the firms studied. Table 7.6 displays the main employment system practices of the case study companies.
### Table 7.6. Employment system policies and practices across companies

<table>
<thead>
<tr>
<th>Employment System /Company</th>
<th>Company A</th>
<th>Company B</th>
<th>Company C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recruitment</td>
<td>Recruitment utilising professional periodicals, journals and international and national newspapers, occasional use of specialist recruiters. Utilisation of founder’s networks.</td>
<td>Recruitment utilising periodicals, journals and international and national newspapers. Utilisation of founder’s networks and close links to research institute.</td>
<td>Recruitment utilising periodicals, journals and international and national newspapers. Utilisation of founder networks and university.</td>
</tr>
<tr>
<td>Selection</td>
<td>Formalised multiple hurdles, semi-structured behavioural interviews, use of panel interviews with hiring managers and HR manager. Founder involvement.</td>
<td>Interviews multiple hurdles, occasional use of panel interviews with hiring manager and business development manager. Founder B2 involvement only on senior scientific roles.</td>
<td>Semi-structured interviews with hiring managers and founder. Founder involvement.</td>
</tr>
<tr>
<td>Training and Development</td>
<td>Training and development funds available to all employees. Active encouragement of seminar and conferences. Tied into performance management reviews.</td>
<td>Training and development funds available only to core employees. Funds for other employees available but only on a high priority basis.</td>
<td>Large training and development funds available to all employees.</td>
</tr>
<tr>
<td>Other</td>
<td>Formalised HR department and documentation.</td>
<td>Flexible hours. Low formalisation. Liberal use of outsourcing and contracts.</td>
<td>Some outsourcing of independent clinical research.</td>
</tr>
</tbody>
</table>
Recruitment practices among the three companies were similar and reflected industry standards. Much of the formal policy of each company was to utilise national newspapers and professional journals in recruitment as well as the occasional use of specialised recruitment companies. What is similar among all three case studies is the use of the founders and the top management teams’ networks to establish a pool of available labour talent in seeking the required expertise for each company. These networks are established from the founders’ previous commercial and scientific backgrounds as well as through the use of scientific networking and conferences. The most distinct recruitment practice for recruitment can be attributed to Company B and C. Company B’s recruitment largely lies with the utilisation of contractual agreements utilising the relationship with its institutional origins. Company C actively recruits talented young scientists for development from university. Founder C’s relationship with the University was thus a source of labour pool for the company’s identification and development of potential employees.

Selection practices among the three firms were similar particularly on its use of interviews as the main form of selection. Company A and C used semi-structured interviews over multiple hurdles in selecting potential candidates, while Company B was less formal with its less structured interview approach. Interviews were often conducted in panels by the hiring manager, a senior member and HR staff in all companies. The main differences among the three companies with regards to selection appeared to be the criteria that each emphasised for selecting people in their company. At the fundamental level, potential candidates were assessed on their ability to do the job and bring in the required skills and knowledge. However, beyond that level, Company A emphasised a fit in the culture of the company, Company C emphasised the development potential, while Company B did not emphasise anything beyond the required expertise hired for. One of the differences in selection for each company was the involvement of the scientist-founders in the selection process. In Company A and C, Founders A and C were involved at all levels of the organisation, while in Company B, Founder B2 was only involved in selection at the senior scientific roles.

While the performance management systems in each company was at varying stages with Company A being the most formalised and developed, Company B and Company C had distinctive and formalised performance management systems within their firms. To an
extent, performance management in each of the firms reflected industry expectations and acceptance. Formalised practices include an annual review process for individuals (in all companies), fortnightly or monthly scientific meetings (in Company A and C) and shared forums for dissemination of knowledge and information (Company A). However, informal practices still abound in terms of how staff were managed in each company. Company A had the most sophisticated articulation of their performance management system with many of the goals linked to the strategy of the organisation and tied into development of its employees (made explicit with their performance management manual). Company B, on the other hand, was relatively informal regarding their performance management with much of the practices carried out on an informal basis with consultation with the top management team throughout the year. Company C was unique in the sense that the company ran the performance management system as part of its scientific evaluation process. The links between different management policies and practices were much more developed in terms of the links between the project areas of the company. Due to its technology and reliance on Founder C, company C had informal supervision by senior members of the company as well as the founder himself.

Training and Development among the three companies reflected an acceptance of industry and professional norms. In Company A and C, funds were allocated for employees to undertake their own training in terms of ongoing conference presentations, publications and specialised training modules. With regards to the availability of training and development, Company A and C had formal policies and funds available to all of its employees. However, Company B only reserved its training and development funds for its core employees. Although some funds were available to other scientists and contract staff, these were on an as needed basis. This typically included funding for conference trips, publications and research. Employees in Company B were encouraged to develop their own skills and research publications wherever possible. Company C is perhaps unique among the three case studies in that it actively seeks out potential for development and conducts much of the development and training in its own laboratories. Company C provides its employees with a generous stipend for training and development for its employees and has an active informal programme of mentoring and coaching for its staff. Moreover, a number of grants and scholarships were available for PhD and postdoctoral students.
With regards to compensation and benefits, all three companies reflect higher than average salaries and compensation within the local and national standards for compensation. Company A reflects compensation practices that are discretionary to the founder. As CEO and founder of the firm, Founder A had control over what is offered to key employees of the firm. This is directly opposite to Company B which relied on industry norms and compensatory norms to guide its compensation levels including the CFO to set the levels of compensation. Company C relied on these norms as well as Founder C’s discretion in determining compensatory levels for its employees. Other financial benefits were offered by Company A and B. Company A, for example, offered a comprehensive insurance plan and stock options, while Company B offered bonuses tied into performance.

A final analysis can be made around the meanings behind each company’s employment system. Burton (2001) found that medical research and research and development companies appear to highlight ‘star’ models of employment systems. As discussed earlier, the employment system mental models extended the findings from the SPEC research. In the same way, the employment systems also demonstrate further extension of the SPEC models. In terms of attachment in the companies, Company A, for example, emphasises love, work and money in terms of its attachment. Company B highlights work as its main source of attachment in the company while Company C emphasises work and money. The companies in this sample all emphasise work as part of the main attachment. While Company A appear to make a distinct effort to highlight other forms of attachment, Company B works in the opposite way, building on its reputation in their area of expertise as main components for attracting and building its attachment of employees. Company A manages other forms of attachment by leveraging on its established name in building a culture of family and trust. Company C in contrast also maintains an effort to distinguish both the research and the higher end commercial pay as its main attachment.

With regards to the selection of employees in the case studies, companies appeared to reflect a difference in selecting employees. All companies agreed on selecting for the knowledge and skills required for their firms. However, each company appeared to emphasise additional criteria for the selection of employees. The main selection criteria for Company A appeared to reflect a selection of employees primarily based on their
skills and fit within the culture. In contrast, Company B reflects selection based on skill rather than potential and fit. As mentioned earlier, Company B has a “buy” strategy, attempting to buy the required expertise or skills needed along the commercialisation pathway. Despite this, core members of the company utilise this strategy in selection to bolster the core skills and knowledge by outsourcing most of their activities and needs and learning the missing or deficient skills and knowledge. The focus on keeping core discovery functions within the company is seen as a strategic way of keeping costs down and bolstering its limited resources around the human capital of the firm. Company C is focused on the potential of candidates to contribute to the company in the long-run. Company C’s long term strategy is to identify the requisite skill and knowledge as well as the long-term potential of possible recruits. It bolsters and recruits among the national labour markets and identifies its key strengths as the utilisation of these markets in order to sustain the knowledge capital of the firm.

The mode of coordination and control in each company employed the use of industry established work around the project teams of disciplinary areas. Work is defined and coordinated by the senior management team along with feedback from founders. It would seem that in terms of the science and the direction of the research, the founders remain influential. All three case studies reported the traditional setup of laboratories accepted in the industry (Gilbert & Mulkay, 1984; Latour & Woolgar, 1986). Planning and evaluation are staple activities of each project teams and research area. It is done meticulously by each and every company with a regular review process. Founder A remained influential as the CEO of the company, while Founder B2 is the Chief Scientific Consultant for Company B. Founder C remains the CSO, as well as the interim CEO of the company, and this has implications for how science is run and managed in the company. Professional socialisation of the scientists was seen as strong influences on the companies’ method of coordination and control. The case study companies relied heavily on the knowledge and high standards of research quality. In addition, employees in the companies were expected to work in teams and share information. This was achieved to variable extents by each company. Company A for example, extolled a culture of sharing and working in teams, teams were formed on the basis of contribution and merit, while in Company C attempts to achieve the sharing of information and teamwork was done through the building of a team collegial culture similar to Company A. Company B, on the other hand had expectations for teams within project areas to work together.
However, due to the sometimes distinctive geographical locations and set up of the companies outsourcing research contracts, this to some extent was not a highly cohesive company. The theoretical implications of the employment system mental model and the employment system in this study’s case companies will be discussed in the next section.

**EMPLOYMENT SYSTEM MENTAL MODELS AND THE SPEC PROJECT**

A cross-case analysis of the case studies would not be complete without examining the case studies in context to the SPEC project. The organisation samples in the SPEC project that relate to this research include the medical related and the research industry (the number of medical related organisations in the SPEC sample was 22, while the research industry was 4). The results from Burton’s (2001) study demonstrate the star model of employment systems as being the dominant design for medical-related and research companies in her Silicon Valley sample. These models are characterised by attachment based on work, selection on potential, and control and coordination of work through the use of professionalisation. While this is a good way in which to examine and characterise the employment systems in a given industrial or regional area, it misses the subtlety of employee relations and the real dynamics of employment systems within individual organisations. From an organisational theorist point of view, taxonomies of employment systems are indeed useful in determining the forms of organisations in industry; however, the focus of this research is to examine the substantiation of mental models of employment systems and to determine its effects on the organisation. This theoretical perspective diverges at the levels of analysis and thus, direct comparison of Burton’s (2001) sample may be inapt. Moreover, the representative samples of the industries (medical related and research) in the SPEC project make up 15 percent (n=26) of the firms compared to the overall sample of the SPEC project (n=173) and comparisons to the study will be limited. However, one way in which the results of this research can extend the work of Burton (2001) and the SPEC project is to build up to the body of work in which we can view the building of the employment system in nascent industries and the cognitive processes involved. Results from this research show that employment systems can extend beyond Burton’s (2001) dimensions. The findings from this research suggest that forms of attachment, selection and the coordination and control of work are limited and basic indicators of an overall employment system model. Nonetheless, delving deeper into the forms of employment system models in this study
revealed that employment system models are far more complex and diverse in practice than typologies of employment systems expressed in the SPEC project. For example, founders in this study utilise several forms of attachment for their employees which encompass love, work and money, not just love, work or money. Some companies highlight one dimension over the other; other companies highlight one or more of the dimensions. As a descriptive research of employment systems in a relatively new industry and region, employment systems in this study go beyond the boundaries of attachment as characterised in the SPEC project. The richness of recognising the variety of attachments within an organisation allows a recognition of the meanings and factors that establishes the form of employment relationship within the firm. This is an important point as there is some evidence for the difference in recruitment of labour markets utilised by different scientific companies (Beeson & Montgomery, 1993; Beltramo, Paul, & Perret, 2001; Wolff, 1993). Specifically, Beltramo, Paul and Perret (2001) show that there are some differences to the organisation of R&D in companies and the recruiting practices of these companies. They found that laboratories where the recruitment of PhD graduates is limited are characterised by traditional hierarchies; whilst laboratories that work in close liaison with university research and have a large proportion of PhD graduates are typically more conducive to doctoral recruitment. This study confirms those findings and extends explanation as to why the employment systems of firms are related to their institutional environments. Company C, for example, is embedded in the university and utilises the internal pool of doctoral students for the company’s needs as well as an emphasis on developing these talent. This “make” form of employment system is consistent with institutional ideas of resource munificence (Baum & Oliver, 1992), and human resource advantage theories (Collins & Clark, 2003). Perhaps what is more cogent for attachment for employees appears to be an interactive effect between the company’s culture and employees’ needs which appear to change at different stages of the organisation. Company A utilises several modes of attachment for its employees. The company attempts to pay competitive rates for salaries, institutionalises a “family” atmosphere, and encourages communication amongst the different levels of the company. Company B, on the other hand, is highly dependent on contingent labour and bases its attachment on a select few of the top management team including monetary incentives. Company C attaches employees by focusing on their development that also becomes enables the company to retain their employees. These forms of employment systems have a role to play in the management of scientists and the companies in our sample.
display a profound strategy around signalling their preferences for employees. Certainly in terms of recruitment, a variety of practices appear to signal a preference that highly qualified employees in high-technologies might prefer (Jones, 1992; Macmillan et al., 1995). Macmillan and Deeds (1998) found that while publication support by companies matter, the quality of research staff, working conditions and salary appear to be cogent conditions for prospective PhD qualified individuals. Employment systems are thus a signalling device for prospective employees and form the basis of cultural dynamics within the firm (Goldberg & Kirschenbaum, 1988; Jones, 1992; Macmillan & Deeds, 1998). The role of founders and the top management team in employing these practices contribute subtle meanings to the attachment of employees to the organisation and can be a strong indicator for organisational commitment and potential productivity (Goldberg & Kirschenbaum, 1988).

The findings from the case studies also suggest that while founders are important influences on the development of these models, the form and function of employment systems are moderated by several variables on the course of the organisation’s development. This draws a more dynamic and evolving view of the emergence of the firm’s employment system. This research bridges the gap between the role of individual action and organisational action that is driven by environmental, competitive, and institutional forces. Studies of the SPEC project all point to the enduring effects of founders’ models (Baron & Hannan, 2002; Baron et al., 2001; Baron et al., 2002; Burton et al., 2003; Hannan et al., 1996). These studies show that founders’ mental models affect outcomes for the organisation such as employee turnover, bottom-line financial performance, and even survival. For example, Baron, et al (2001) suggested a process through which founders’ mental models may impact organisational performance by effecting turnover. Changes to the employment models or blueprints of founders over the course of the organisation’s life cycle were shown to increase turnover, which in turn adversely affects subsequent organisational performance. Turnover was associated with the destabilisation of organisational change and concentrated among the most senior employees, which the authors suggested as “old guard disenchantment” (p. 960) as the primary cause.

Turnover seems an especially appropriate indicator of the disruptive effects of organizational change within the setting we examined- high technology
companies in Silicon Valley—because retaining the key human assets in young technology firms is often viewed by senior management, investors, and other informed parties as a crucial requirement for organizational survival and success…our results support the claim by neoinstitutionalists and organizational ecologists (following Stinchcombe 1965) that cultural blueprints are superimposed by founders on nascent organizations, as well as ecologists’ claim that altering such blueprints is disruptive and destabilizing (Baron et al., 2001, p. 1009).

Baron et al (2001) further suggest that future research could devote attention to conceptualising and measuring how these blueprints are selected and imprinted on organisations during their infancy. This study has fulfilled this call by examining the rationales behind these models for organising. In this study, the founders in this sample were intricately linked to various employment system practices. For example, all scientists-founders in the study were involved in the recruitment and selection of employees within the firms. This suggests that, particularly with key senior staff within their firms, the staffing and retention of employees were often related to the founders themselves. Key management positions were often fulfilled by the founder’s professional colleagues or cohorts. Company B was a good example of this as many of its employees were hired through Founder B2’s relationships and networks. Founder A, as well had a hand in the employment practices of the firm by virtue of setting the financial compensatory levels for some key scientists. A practice that was also found associated with Founder C. Thus, with links between the founders and employment practices, the findings from the case studies provide some answers to this perplexing problem of how and why changes to founders’ organisational models may be destabilising and disruptive to the firm. Founder’s employment system mental models form the basis for management practice that become utilised within employment systems of their firms. Founders’ employment system mental models guide the design of these employment systems. However, these mental models are also sustained and modified through interactions between the environment and various stakeholders. For example, Company A’s employment system was influenced by important stakeholders, while Company B’s form of employment system relied on specific key senior employees. Mental models not only guide the organisation building of the firm, these models are also prone to adaptation and modification over time. The difficulties of changes to the founders’ organisational models are reflected by its effects on many aspects of the firm, not only on the practices
and organisational routines of the firm but also on the culture and expectations of key employees.

The case studies demonstrate a strong inference that founders’ models of the employment system can be attributed to influences on the stakeholders, competitive environment, key employment policies and practices, organisational culture and the directed goals of the employment system. One further implication from Baron et al’s (2001) study that impinges on the results of this research concerns the use of the star models of employment systems. The authors found that star and commitment models of employment system were more affected by changes to the founder’s employment system model. They postulate that this may be the result of the greater potential of returns of these “riskier” models of employment systems (these models are thought to be riskier or novel as they invest in practices associated with greater autonomy and professional control as in the star model, or the reliance on emotional attachments as in the commitment model). However, the results from this study shows that the star models of employment systems in the case studies reflect very determined patterns of professional norms and expectations. The findings suggest the reasons why it would be difficult to change these star models into more bureaucratic or autocratic forms of employment models. Changes from a star model of employment system is disrupting because it means changes not only to the organisation’s practices and routines (as well as to relationships with the founders), but also to the professional norms and expectations of employees.

The case studies all reflect employment systems that reflect the dependence on the founders including the benefits of working within the founder’s laboratories. The considerable resources that the founder brings to the company are embedded within the founders’ substantial human and social capital. For example, this can be seen in the way that which the companies recruit and select people, most often relying on the founders’ networks. This is highlighted by a comment from the HR Manager of Company A and intimated by many others in Companies B and C,

HR Manager (Company A)
*I bring some formalisation to the company…but (Founder A) really has set up the business his way and a lot of it is just making sure that it’s fair and professional.*
Changes to the employment system policies and practices would be disrupting to the organisation and its employees as the forms of attachments and underlying expectations of ingrained practices and resources utilised by the firm will also change. These ingrained practices and attachments for employees also include the attachments to the founder who is often the face of the firm. Moreover, all companies in the case studies also depend on senior or top management to coordinate and control the science of the companies. Changes to the employment system may impact not only on senior management turnover, as evidenced by Baron et al (2001), but also the way in which the organisation is run, not only the control and coordination of the research work, but the valuable mentorship and knowledge sharing features of the organisation. Many of the scientists in Company C have stated that the attachment to Company C was not only through the important work they were doing but also from the legitimacy they have when attached to the work of Founder C. In Company A, employees spoke of doing “important work” and seeing Founder A as the leader of their research. In Company B, we are presented with a core group of employees that are invested in Founder B2’s company. This not only represents significant implications for the reasons behind why the “old guard” may be disenchanted but the work of employees within the firms, particularly for the scientists, are bonded with the upper echelons of the organisation (Barley & Kunda, 1992; Carpenter et al., 2004).

Congruent with the organisational literature on effects of influential intermediaries such as lawyers and venture capitalists (Powell, 1990; Saxenian, 1994; Suchman et al., 2001), the analysis of the case studies provide some evidence for the effects of these stakeholders on the employment system of the firm; however, only under certain conditions. Baron et al (1999a) found that external stakeholders (in addition to organisational scale, growth, and aging) tend to shape the amount and rate of formalisation and senior management title proliferation (evidence for bureaucratisation) while founders’ models of the employment system had significant and enduring effects on managerial intensity (characterised by managerial-administrative intensity).

Apparently, founders’ premises regarding employment relations and organizational concerns have only limited enduring impact on the more superficial facets of bureaucracy that have preoccupied neo-institutionalists, such as adoption of standard HR policies and creation of managerial job titles...This suggests to us that the neo-institutionalists have it right when they suggest that
many of the surface trappings of modern bureaucracies are adopted to satisfy external constituents (such as venture capitalists and the constituencies of public corporations), reflecting a loose coupling between those features and the organizational “core”...but what the neo-institutional accounts miss is the fact that founders’ models also serve to institutionalize an abiding orientation toward coordination and control, reflected in the propensity to rely on self management versus specialized overhead personnel as organizations become larger, older, and more complex (Baron et al., 1999a, p. 31).

The findings from the case studies show that while Company A and B both show dependence on certain stakeholders within their companies, Founder C showed a lack of stakeholder influence in his mental model. Lerner (1999) in commenting on the findings from Baron et al (1999a), raised an important question as to why high technology firms would cling to their founders’ original structures when firms in competitive environments are under enormous pressure to revise and continuously refine their business models (Bhide, 1999). This led him to suggest that “while the article’s interpretation may be the correct one, it is important to also examine alternative explanations that are easier to reconcile with profit-maximising behaviour” (p. 45). Lerner (1999) postulated that this could be the case of omitted variables in the research design of Baron et al (1999a). However, the findings from these case studies provide a solution that reconciles the puzzling dichotomy of this finding. Founders of firms may come to rely on stakeholders when they lack previous founding experience or knowledge about the specific industry or technology. By examining the role and influence of stakeholder influence on the employment system mental model, we can theorise the conditions under which stakeholders become involved in the building of the firm. Founders A, B1 and B2, have stakeholders as influences in their employment system mental models. Founder C, on the other hand, showed very limited influence of stakeholders in his employment system mental model. In Founder A, the influence of stakeholders are in an advising capacity suggesting ways and forms of organising Founder A’s new venture. The lack of prior founding experience necessitated a reliance on these stakeholders. While Founder B2 also showed a lack of founding experience, Founder B1, who had prior founding experience, was on hand to help guide Founder B2. However, Founder B1’s employment system mental model also had a number of stakeholder influence. The presence of stakeholder influence on Founder B1’s employment system mental model can be explained as Founder B1 lacked of specific knowledge and experience in the particular industry and technology of Company B. So although Founder B2 relied on Founder B1
to help build Company B, the influence of stakeholders is also a key feature of their mental models. This can be contrasted to Founder C’s mental model. Founder C did not have any stakeholder influence on his mental model because he had specific prior experience of building a company within that particular industry and using the same technology. These differences are critical to explanations of how and when stakeholders such as venture capitalists may become involved with the building of the new firm. The research literature on venture capitalists, for example, suggests that venture capitalists adjust to the circumstances of their portfolio firms (Gompers & Lerner, 1999). Lerner (1999) suggests that venture groups provide entrepreneurs with considerable slack on the makeup of the firm until their firms encounter difficulty, whereupon the venture capitalists become more involved in the firm. Company C demonstrates that conversely, founders tend not to rely on stakeholder when they have specific and considerable resources for building the employment of their firms. Where there is no founding experience (such as Founder A and B2), or where the industry is outside of the founder’s technical and commercial experiences (as in Founder B1), the influence of stakeholders are more salient. The findings from this research provide an important illumination for how to consider the mechanisms for organisational inertia and path dependence in firms. The case studies also provide some evidence for the effect that various stakeholders have on the mental models of founders when launching their firms. This provides insight into the conditions for when founders’ models of employment become ingrained into the employment system of the firm.

In discussing the impact of founders’ models and the conditions in which they become ingrained into the employment system of their firms, it is essential to understand where founding models come from (Baron et al., 1999a). Specifically, Baron et al (1999a) note that understanding the origins of these models may highlight the ways in which prior work experiences, connections to labour market institutions, and social networks affect the amount of bureaucratisation in firm. From the evidence of the case studies, Companies A, B and C all rely on the founders’ technical, university and commercial backgrounds to shape the employment system in their firms. Founders in this research sample all bring their prior knowledge and experiences into the building of the employment system. This provides evidence for the importance of founders’ human and social capital in the evolution of the employment system (Davidsson & Honig, 2003). Founders’ individual social capital interacts with key stakeholders which culminate in
varying influences to the employment system. This is an important finding as it provide
evidence for Baron et al’s (1999a) proposition that,

A second set of influences likely to shape founders’ models are the positions of
founders in social networks, particularly ties to key gatekeepers capable of
shaping or dictating organizational structure. In a sense, these social positions
simply represent another form of social capital that entrepreneurs have at their
disposal (p. 32).

The results from our case studies provide compelling evidence that founders’ experiences
particularly their founding and technical experiences may be important to how external
stakeholders influence the employment systems of their firms. However, although
founders’ individual background and the interaction with key stakeholders and the
environment are significant, the effects on the employment system also owe much of its
influence on the contextual variables that impact on the firm. Recall that founders in this
research sample point to other companies as influences on the employment system of
their firms. The influence of other companies on the employment system have been
commented on, however, this finding in the context of the SPEC project provides some
interesting implications for the role of the founders’ competitive environment on the
employment system mental model and subsequently the employment model of the firm.
Baron et al (1996) suggest that founders’ models have strong complementarities and a
tendency towards internal consistency on human resource management dimensions. The
results from the case studies suggest that the models founders have not only come from
their own professional and working experiences, but also from the competitive
environment. The fact that all companies in this research identified other companies as
having an impact on remuneration practices implies the influence of competitive forces
on certain aspects of the employment system. One inference from the results is that
competitive forces and institutional understandings such as professional norms are
enacted in the mental models of organisation creators and builders. These competitive
forces including founder’s understandings of the employment system become the
template or blueprint that founders utilise to drive their organisation building behaviours.
Thus, the employment system mental model should also incorporate the notion that
competitive and institutional forces may play a role in founders’ models. This is an
extension of the work around understanding founders’ models of employment.
One final analysis regarding the cross case analysis concerns the idea of “institutional embeddedness” of the companies in our sample (DiMaggio & Powell, 1983; Fombrun, 1988)\(^8\). By comparing the institutional contexts in the case studies, a number of fascinating insights can be generated regarding the emergence and evolution of the employment system in the companies studied. Examining how each company is embedded into the institutional context of their environment offers some explanation to the heterogeneity of processes in the employment system as well as the influence that these contexts may have on the employment system of the firm. The case study companies were all university spin-offs. If we were to examine the links with the institutional origins of each firm, some interesting findings begin to emerge about the relationship between the emergence of the employment system and the institutional settings of each firm. Company A is a spin-off from university that saw itself established itself completely out of the university setting. Company B, on the other hand, is a spin-off from university that was established within the confines of the university, while Company C was also established within the university. However, the employment systems that emerge in each company are all different and draw on their links to the institutional environment in different ways. Company B was located within the boundaries of the research institutions which Founder B2 established while maintaining a fluid relationship between the two organisations in terms of the employment mobility of its scientists. This creates a blurred distinction between Company B and its institutional origins. Company C, although similar to Company B in establishing its base within the confines of the university maintains a “hands-off”\(^9\) policy by the university. This finding contributes to the knowledge on how the institutional environment influences the employment system of firms. The institutional literature argues that the norms and social expectations of the institutional environment improves an organisation’s survival chances significantly (Meyer & Rowan, 1977; Scott & Meyer, 1983). Hannan and his colleagues (Hannan & Carroll, 1992; Hannan & Freeman, 1987, 1989) postulate that organisational forms are a response to perceptions of legitimacy by relevant actors within an

\(^8\) My usage of the term “institutional embeddedness” while invoking institutional theories of the environment (Aldrich & Fiol, 1994; Baum & Oliver, 1992) differs from this conceptualisation by its focus on the institutional origins of these case studies (such as the universities or research institutes that these firms have “spun out” of). While this conceptualisation has properties of institutional theory (such as resource allocations and legitimacy), it is restricted only to the embeddedness that these companies have with their institutional origins rather than the institutional environment as a whole (as conceptualised by institutional theory (Berger & Luckman, 1966)).

\(^9\) “Hands off” was used to describe the relationship between Company C and the university by Founder C and the Research Manager.
environment. Organisations that establish ties to institutions signal their adherence to appropriate organisation form and obtain recognition and rewards that enhance their ability to survive. These signals include greater perceptions of legitimacy and status, including access to resources (Aiken & Hage, 1968; Aldrich & Auster, 1986; Galaskiewicz, 1985; Scott & Meyer, 1983; Singh, Tucker, & House, 1986). Wiewel and Hunter (1985) for example, suggest that the endorsement of an organisation’s business practices by a community or institution increases their legitimacy and enhances the organisation’s ability to attract clients and resources. In addition to this, research shows that institutional relationships act as buffers that protect organisations from environmental uncertainty and threats to its survival (Baum & Oliver, 1991, 1992; Singh et al., 1986). These institutional relationships are thus, seen to improve legitimacy for the organisation and allow them to mobilise resources for viability (Hannan & Carroll, 1992).

Institutional connections are the building blocks of ecological communities- they embed populations within higher-order collectivities in the broader organizational field...Therefore, the development of relations between population members and the institutional environment influences population dynamics (Baum & Oliver, 1992, p. 541).

Institutional theorists have examined the influence of these institutional relationships on the impact of organisational survival and found that empirical evidence for the role that institutional embeddedness offers nascent organisations in terms of legitimacy and resources (Baum & Oliver, 1992; DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Scott & Meyer, 1983). This has important implications for the role of the institutional environment on the employment system. As Hannan and Freeman (1989) have argued, important stakeholders and actors within an organisation’s environment will only perceive the organisation as legitimate once the organisation has established the routines, control systems and institutionalised roles that are accountable and reliable. Furthermore, employees’ perception of the legitimacy of the organisation is also important as it establishes a rationale for investment in learning organisation specific skills when the organisation has proved its viability and stability (Hager, Galaskiewicz, & Larson, 2004). By establishing its locations within the research institutes, Company B and Company C leverage its relationships with the institutes they were embedded in. Archival evidence for both companies show that Founder B2 and C were often linked with the research
institutes they were employed in\textsuperscript{91}. This study has found observable relationship between the institutional embeddedness of organisations and the employment system of the firm. Company A for example, represented a true university spin-off or “spin-out”\textsuperscript{92}. Company A was the only case study in our firm that established its base of operations away from its institutional context. Furthermore, Founder A relinquished his position as a university professor to lead the company full-time. In addition, members of the organisation quit their positions with the university to undertake employment in the company full-time. Company A can be regarded as an organisation that managed its operations and emergence separate from the university. Company B, on the other hand, was located within the institutional setting in which one of the founders remained the director of. The setting of Company B shared much of its laboratory space within the institutional setting including utilising and sharing scientists from the institutional setting of the company. Scientists from Company B had previously worked in the research institute and many of the scientists are contracted from the research institute the founder was a director of. Company C, much like Company B, maintained its relationship with the university by locating itself within the institutional setting. Founder C also remained employed by the university although there is a separation of employment between the company and the university. Although there is some contractual staff from the university, the majority of its scientists are employed in the company full-time. In addition, Company C has created a mentoring relationship with the university. The variety and depth of institutional embeddedness of each company can be seen to influence the employment system of each company.

As discussed earlier, neo-institutional theory posits that links with institutional settings may impact on the organisation’s legitimacy and ability to mobilise resources. Certainly, for Companies B and C, locating themselves within their institutional settings allowed them to legitimise their activities within the confines of the institutional environment. Company B and C both utilised the labour pool that were at their disposal through the founders’ relationship with the institutional settings. Founder B2, for example, was also a research director for the research institute, while Founder C was a professor at a university. The social networks of these founders were enhanced by their positions

\textsuperscript{91} From newspaper and magazine articles
\textsuperscript{92} “Spin-out” was a description supplied by Founder B2, “(Company A) went out all the way out, it was the university’s first “spin-out”
within the institutional settings and thus the founders were able to access resources from these institutional settings (Bourdieu, 1985; Burt, 2000; Lin, 2002; Putnam, 1995). These two case studies provide evidence for the notion that social network within institutional settings may provide an organisation with favours, access to other people and references for other resources (Galaskiewicz, 1985; Hager et al., 2004). On the other hand, Company A having located and separated itself from its institutional origins, relied on a more independent business model which also saw it formalising its employment system faster than the other two case study companies. The impact on the form of employment system of these institutional forces may then be mediated by each founder’s employment system mental model and their understanding of the right ways to organise within the context of their institutional environments. Company B differs from Company C in its utilisation of resources available to them. Company B relied on contractual staff from its institutional setting while Company C relied on developing employees from the readily available pool of potential scientists in its research setting. The institutional setting of Company B and the effects of various organisational and institutional forces influenced the employment system to adopt a buy approach to their employment system, while Founder C believed that the best way to staff his firm was through development of employees. Founder A utilised his own social networks in finding staff for his company, which featured a mixture of methods for recruiting and selecting. This research provides evidence that institutional factors impact the emergence of the employment system through an interaction with founders’ mental models as well as directly through the networks and processes of the organisation and institutional linkages (Baum & Oliver, 1992; Granovetter, 1985; Hager et al., 2004). The institutional contexts are actively exploited by these organisations to derive the greatest value for the organisation (Robertson & Swan, 2003). The differences in institutional embeddedness of each case study provide a process through which institutional forces influence the employment system of each company.

93 The distinction between “spin-outs” versus “spin-offs” can also be seen by the presentation of the companies’ settings. Company A’s premises reflected a more corporate business model, particularly with the reception area and the design of the office area. The laboratories were located across the road in another building or behind the main reception areas away from public view. The first impression of any visitor was that this was a corporate environment. Companies B and C, on the other hand, being located within the confines of research institutes had more of a laboratory design, with the location of its reception and offices being primarily in laboratories.
One other finding that offers an insight into the issue of institutional embeddedness of companies is the impact on the legitimacy of a company (Aiken & Hage, 1968; Aldrich & Auster, 1986; Galaskiewicz, 1985; Hannan & Carroll, 1992; Scott & Meyer, 1983; Singh et al., 1986). Company B and C, as discussed earlier were embedded in their institutional origins and enjoyed advantages to its legitimacy and the resources available to them. Company A, in order to maintain and create a venture outside the influence and confines of its institutional origins required Founder A to quit his job at the university to found the company. This reflects on how institutional forces may impinge on the individual and enhance the understanding of how employment systems emerge from actor’s perceptions and behaviours. Founder A believed that in order to found his company, there needed to be separation of the company from the university. Founder A saw this as an issue of socio-political legitimacy (Baum & Powell, 1995). A company which had a fulltime invested founder and leader would signal its legitimacy as a serious prospect as the founder would be able to devote his time and resources to keeping the company viable and legitimising the activities of the company. This relates well to the understanding that employees (and in Company A, many of the employees left their stable jobs to join the founder) become important perceivers of the organisation’s legitimacy and thus become an important stakeholder to the company’s survival. In order to found his company, Founder needed to prove the stability and viability of the new venture to the employees that were leaving their stable jobs within the research institutes. This suggests that employees’ perception of the legitimacy of the organisation was first and foremost an important factor in the employment system mental model of Founder A. Company A provides some insight into the process of legitimising the organisation when separated from its institutional context. Company A not only had to rely on various stakeholders in implementing its employment system but also had to rely on formalising the relationship and practices within its company. However, separation from its institutional contexts also affords certain legitimacy to the business of Founder A. The separation of the company from its institutional roots not only influences important key stakeholders such as employees but also signals the legitimacy of the company as a business to others such as venture capitalists and investors of the seriousness and viability of the founder’s company. This finding is important because it highlights the choices and perceptions of actors in the institutional environment that is not often acknowledged by institutional theory (Robertson & O'Malley Hammersley, 2000).
Taken together, the findings from this research build on and extend the findings from the SPEC studies. The cross case analysis suggest some important findings that impact our understanding of the individual mental models of founders, the organisations they build, and the impacts of their environments. Biotechnology firms are an important setting for research into the emergence of the employment system since their competitive capabilities are knowledge-based. The employment system mental models described in this study represent the process and mechanisms through which organisational and institutional forces may enact through. The biotechnology firms studied in this research do show that founders and their organisations present an emergent engine for the knowledge economy. The findings from the cross case analysis not only provides evidence for the origins of employment system but also highlights the unique influence that these forces have on the models of founders.

SUMMARY AND CONCLUSION

The empirical data collected of founders’ employment system mental models suggest that founders have a definite organisational blueprint of the employment system of their firms. Founders’ employment system mental models show varying levels of sophistication for the conceptualisation of the employment system. Founders’ employment system emphasised clear and distinct practices for the employment system. Founders were able to link their preferences for the way in which they wanted to manage employees through practices that have profound effects on the attachment of employees, coordination of work and evaluation of work and the performance of their employees. In addition, all founders emphasised the need to find and locate key talent and employees as crucial to the development of their firm and commercialisation of their IP.

The first section of the chapter presented the CMAP2 analysis of the causal thinking of all the founders to identify shared commonalities in their causal thinking. Analyses of the central concepts shared were also presented along with the analyses of the distance index which is an indication of the similarity of founders cause maps. In addition to this, the employment systems of all case studies were contrasted around aspects of the employment system including the forms of attachment, selection and coordination and control of work in the companies. This formed the basis of the cross-case analysis. The cross-case analyses for similarities between founders in our research showed that all
founders agreed that find the best was a central concept for the employment system. In the case studies, all founders were able to make the connection for the need to attract people as being a crucial activity for finding the best. This is an important finding as it highlights that founders are aware of the implications for recruiting and building a capable workforce in their knowledge-intensive companies. This also signals the human resource imperatives for attracting not only the best kinds of people but also the idea that employment systems should also incorporate ways for the companies to attract the best employees for their firms. The case studies in this research demonstrate a variety of ways in which they enact on finding the best employees in their firms. This constitutes activities such as highlighting the work of the founders, promoting the available resources and facilities of the companies as well as financial incentives for attracting workers.

In addition to the important human resource imperatives of finding the best for their firms for these biotechnology companies, the organisational strategy of the firm was also an important shared concept among the founders. The implications for recognising the organisational strategy of the company as being important to the building of the employment system not only provide evidence for the link between organisational strategy and human resource strategy, but it also provides an insight into the rationale behind the organisation building activities of the founders. One interesting finding from the similarities of founders’ thinking was that commercial experience of the founders influenced their thinking around the strategy of the business. This is an important point as it highlights the founders’ exposure from these commercial experiences of the sort of prior knowledge and experiences that are important for the commercialisation process. Firstly it allows an understanding for founder’s strategy making processes. These prior experiences not only allowed the founders to be exposed to the different models for commercialisation and the inherent employment implications, but it also allowed founders to understand the feasibility of their business ideas including the reduction of risk for their new ventures. This aspect is particularly important in knowing how founders’ prior experiences are enacted in the entrepreneurial process.

While the similarities of founders’ thinking about the employment system mental model were important, the differences in founders’ employment system mental models were greater. The analysis of the differences between founders’ employment system mental models was facilitated by CMAP2’s distance index calculations. This allowed comparisons to be made in terms of the number of concepts and linkages that founders
shared or did not share. While most of the founders share aspects of the employment system antecedents, employment system and the organisational culture and goals that are shared by the founders in this industry, Founder B1 did not share organisational culture concepts or linkages. Aside from the similarities around these aspects of the employment system mental models, the differences in causal thinking and key concepts used were also examined in order to explicate the differences between founders’ mental models.

The differences between the founders’ thinking around the employment system antecedents were interesting as it highlighted the influence of stakeholders on the founders’ mental models. Founder A, B1 and B2 all had stakeholders as important influences on the employment system mental model. Founder C was found not to have any stakeholder influence on his employment system mental model. The implications of these influences allowed observations to be made regarding the influence for external stakeholders on the employment system of the firm. Where founders lack experience or legitimacy (as in Founders A, B1 and B2), the role of external stakeholders become important to the building of the employment system. Company A, for example, had input from Founder A’s legal advisor on the corporate governance of the company. Founder C on the other hand, had very specific design for this company and required no help from external stakeholders in building the employment system of his firm. The interaction of this with prior founding experience in this study provides important evidence and implications for the role of stakeholders in the organisation building process.

In addition to the influence of stakeholders on the employment system of the firm, other companies within the case studies’ competitive environment were also important in the founder’s employment system mental model. These rival companies impact on the employment system mental model by specifying the direct (for example, how other companies may set the standards of salaries among scientists) and indirect impacts (through emulation or differentiation on practices) on the employment system. This is an important point in the research as founders often point to international biotechnology companies overseas as competitive groups while not acknowledging each other as potential rivals (they formed part of a small group of human pharmaceutical companies in one regional area). This finding demonstrates the limits of founder’s thinking on the competitive environment on their company as the mobility of scientists within the region was fluid. This highlight the possible dangers that could limit founder’s and key decision
makers understanding of the competitive environment in which they worked in and the impact on the employment system.

With regards to the employment system domain, the founders in this research sample had similar concepts although differing emphasis on these concepts and causal linkages between them. The three case study companies begin to reflect their founder’s employment system mental model in terms of the founder’s management philosophy. Company A for example, reflected Founder A’s emphasis on a commitment model, while Company B emphasises a “buy” model of employment. Company C on the other hand, attempts to “make” their own brand of employment system by developing and mentoring their employees. The centralness of the founder’s concepts in the employment system mental model provide an insight into how these models are enacted in the building of the employment system. While the emergence of these employment systems are based in the founder’s mental models as well as moderating variables that affect the evolution of employment systems in their firms, these models evolve around central concepts and philosophies based on the founder’s values for these practices and policies. The cross-case analysis of the employment system domain provides evidence for the fact that founder’s mental models are important but dynamic. These models respond to the context of their firms and may be explain the basis for heterogeneity within a given organisational population.

A further finding on the differences in founders’ employment system mental models can be considered around the organisation culture and employment system goals domain of the founders’ mental models. This domain highlights a significant difference of Founder B1’s mental model from the other scientist-founders. Due to his role and function within Company B, Founder B1 had no concepts within the organisational culture domain. This had significant implications for the role of founders in the organisation building process. Founders who played a large part in the ongoing running of the employment side of the business such as Founder B2 had a larger impact on the employment system than his co-founder who was the financial founder and manager. The role of the organisation culture was also considered to be an important part of the employment system mental model to the other scientist-founders. Scientist-founders in our sample were able to link the requirements of the employment system with building the organisational culture and to achieve the goals of the company. The scientist-founders in this study were cognisant
and knowledgeable about the links between employment policies and practices and the professional and commercial culture in order to commercialise their research. This demonstrates an important finding as it specifies an important role for knowledge-intensive companies as well as extends ideas about the complexity of employment system mental model.

The results of the cross case analysis provided some insight into the combination of forces that act on each founder’s mental models as well as provide a fuller picture of the way in which employment system emerge in a given sector. Comparison with the SPEC studies highlights the theoretical contributions of this research especially with regards to how founders’ models of the employment system impact on the employment system they build. The findings extend the research of the SPEC studies by specifically demonstrating the complexity of these models, the origins of these models, including the moderating variables that impact on the ability of these models to guide the behaviours of founders. In addition, the findings from the case study analysis provide some insight into the “institutional embeddedness” of each case study and the impact of institutional forces on the founders’ models and employment system.
Chapter Eight  
Conclusion and Implications

To exploit an opportunity for which she has gathered resources, an entrepreneur must engage in organising. Organising is the process of creating the routines and structures that will support the goal-directed, boundary-maintaining system of collective activities that recombine resources according to the entrepreneur’s conjectures (Shane, 2003, p.247).

INTRODUCTION

This chapter revisits the initial propositions of the research and places the analysis of the case studies in theoretical context. The findings of these case studies yield a number of interesting and important contributions to our understanding of the founder’s mental model of the employment system from both a theoretical and practical perspective. At the fundamental level, the elucidation of founders’ mental models of the employment system provides evidence of the thinking process that founders have about the employment system in their firms. This provides a useful lens for understanding the approaches that founders take in organisation building and the organisation and management of members in their organisations.

In the previous chapters, each founders’ employment system mental model was elicited to provide an understanding of each founder’s rationalisation and models for organising the employment system. The within case analysis of the founders from the case studies provide an overall picture of the way in which founders engaged in organisation building behaviours, including the idiosyncratic ways that the employment system of their companies emerged. As the above quote by Shane (2003) demonstrates, the importance of focusing on entrepreneur’s efforts in organisation building is an important entrepreneurial activity contributes to our understanding of the entrepreneurial process. However, this research has extended the extant literature and provided a significant framework in which we can understand the nexus of individual, organisational, and environmental variables that influence the design and creation of employment systems in organisations. This chapter will explore the main research contributions as they relate to the specific aims of the study including the broader implications of the findings and suggestions for future research.
THEORETICAL AND PRACTICAL CONTRIBUTIONS

This thesis sought to examine the relationship between founder’s mental models of the employment system and the employment system of the organisations they build. The case studies show that within the local contexts of biotechnology firms, founder’s mental models have a strong influence on the shape and nature of the employment system they build. The impact of these mental models appears to be moderated by contextual variables such as the experiences of the founders, and “midwives” to the organisational founding such as key advisors in the organisational start-up. However, each case study in this research contributes to the investigation by highlighting the complex and dynamic nature of founders’ employment system mental model on the employment system of the firm. The in-depth look at how the employment system emerged within the particular contexts in each case study provided insight into the use of these models, the origins of these models, as well as the subsequent effects of these models. These findings will be discussed in relation to the theoretical and practical contributions of the wider research area.

Biotechnology founders have distinct employment system mental models. These founders’ employment system mental models play an important part in the organisation building process. They provide the means by which founders coordinate their organisation building activities, including the rationales and justifications behind implementation of policies and practices around the employment system. These mental models form the basis of their management philosophy and guide their decision making around the employment system. Mental models in the cognitive literature (Beck, 1967; Stein, 1992) refer to a cognitive blueprint or model of conceptually related elements that are developed from past experience and subsequently guides the way in which new information is organised. This current research has provided additional evidence that these mental models arise from individual’s prior knowledge and experiences. In terms of the employment system, these mental models emphasise elements that organise knowledge of employment and give direction to the building of the employment system. The mental models that founders espouse in this study are cogent and powerful frameworks for building the employment system. The elements of these mental models contain domains of influence in building the employment system, the founder’s management philosophy including elements of policy and practice, features of
organisational culture and employment system goals. This study provides empirical
evidence of founders’ complex mental models of the employment system; these go
beyond relatively limited analyses of attachment, selection, and coordination and control
(Burton, 2001). By conceptualising the mental model as causal linkages between key
concepts, the analyses of the founders’ mental models in this thesis elucidates the
rationales and influences that guide founders’ organisation building activities. The
method of elicitation of mental models in this study is of theoretical importance because it
highlights founder’s natural understanding and thinking around the employment system.
As Cardon and Stevens (2004) stated earlier, “founders do not talk about HR, but rather
as a flow of interrelated activities that they deal with concerning their employees,
activities that fluctuate over time” (p.318). In contrast to previous studies that have
looked at the mental models of the employment system (Baron et al., 1996; Burton,
2001), this study provides a deeper and holistic conceptual framework for understanding
the employment system mental model. Previous research have utilised the mental model
concept as a metaphor for cognition (Burton, 2001; Fligstein, 1990; Guillen, 1994).
However, employment system mental models in this study were found to be far more
complex in conceptualisation and design. Founders in this study articulated not only
policies and practices in the employment system, but also influences on these features.
These influences include elements such as stakeholders who are important to the firm,
organisational strategy, and other companies in their competitive environments.
Furthermore, founders’ employment system mental models also articulate the building of
the organisational culture and the employment system goals of the firm, which are
connected to their understanding of employment policies and practices. Such
understanding highlights the dynamic nature of founders’ mental models. It not only
specifies the types of employment system policies and practices that founders a cognisant
of, but also places them in the context of the firm and its goals. This extends the work of
the SPEC project by articulating an empirically rigorous concept that may help explain
the rationales behind founders’ decisions around the employment system.

The contribution of findings from the case studies is not only in advancing the conceptual
rigour of the mental models concept in organisation building, but also in establishing a
link between founders’ employment system mental models and the employment system
they build. The analyses of the case studies in this research provides evidence for the
influence that these model have on the subsequent employment system that emerges in
the founder’s new venture. Founder A, B1, B2, and C all had models of the employment system and were able to articulate links between key employment system concepts and their consequences. In each of the case studies, the mental models of the scientist-founders are closely aligned with the employment systems of their firms. This is perhaps more urgent in start-up companies than those in the establishment phase. Further, the findings of this research linked the structure of mental models with the process of organisation building. This is an advancement on previous research that have examined these employment models from an organisation or industrial level of analysis (Aldrich & Von Glinow, 1992; Baron et al., 1996, 1999a; Baron et al., 1999b, 2001; Burton, 2001; Fligstein, 1990; Hannan et al., 1996). The case studies demonstrate that employment system mental models are held not only in the founders but become shared by employees, management and the organisational culture of the firm. By comparing each founders’ mental models with the employment system of their firms, each of the case studies demonstrated that founder’s employment system mental models were strongly reflected not only in the use of practices but also by the management and employees of the firm. The link between founders’ mental models and the employment system are suggestive of the mechanisms for organisational imprinting and inertia (Boeker, 1988; Hannan et al., 1996; Romanelli, 1993). The links of the founders with their employment systems (such as their networks for recruiting and their participation in vetting the work of employees) demonstrate the potential for destabilisation when changes are made to the employment system (Baron et al., 1999a). While founders bring their experience of employment into these mental models, the models are by no means rigid in their implementation. A variety of factors influence the employment system in their firms. The choice of employment systems develops from the dependence on the environmental resources of the firms and the labour that is available to it. This is an important theoretical contribution as it highlights the dynamic processes on the founders’ contribution to the building of the employment system.

Previous research has lamented the lack of understanding of the ways in which employees in entrepreneurial ventures are managed (Cardon & Stevens, 2004). The mental models elicited in this research and the process of enactment by the founders allows us to advance theory on how the employment system emerges within a new venture. This provides a growing understanding of the importance of people issues in the entrepreneurial process (Baron, 2003; Katz et al., 2000), and growing consensus and
evidence that the importance of HRM issues for founders become imperative in the early stages of an organisation’s life cycle (Baron, 2003). The case studies in this research have demonstrated that employment systems emerge from nascent firms through an interaction of the founders’ employment system mental models, and organisational and environmental variables. The analysis of Company A, for example, highlights that Founder A’s employment system mental model was the basis for the employment system in his company. The emergence of the employment system was a combination of the founder’s ideas, moderated by help from stakeholders (such as venture capitalists), and the management team (including the HR manager). This was also found in the analysis of Company B, where the interaction and role of founders in that company allowed one dominant model to guide the features of the employment system. Founder B2’s employment system mental model was the basis for the organisation of the employment system in Company B. However, this was also mitigated by factors in the organisation and the competitive environment such as the requirements for the organisation to stay “lean” because of the limited funding for the company and its relationship with the research institute. Company C was distinctive for the central role of Founder C’s employment system mental model in building the employment system of the firm. Founder C had a specific design for the employment system of his firm and proceeded to implement policies and practices around his vision for the company. All these case studies demonstrated that the emergence of the employment system in firms is a result of variables at many levels moderating the enactment of cognition of the organisation builder: the founder’s employment system mental model. This provides a powerful theoretical and practical framework in which to understand the emergence of the employment system in firms.

In examining the antecedents of the employment system mental model, this research also makes a contribution by articulating the origins of founder’s mental models. Founders rely on their technical, commercial and university background to guide their building of the employment system. Every founder in this study highlighted the knowledge and experiences that influenced their ideas of the employment system. Their prior professional and managerial experiences were critical to the mental models of the founders.
The mental models of the founders show that the founder’s past training, work, and commercial experiences have significant impact on the resulting employment system of their firms. The literature has generally taken for granted that experiences form part of the knowledge endowments of entrepreneurs (Erikson, 2003; Reuber & Fischer, 1994; Ucbasaran et al., 2003b). However, this current research places the context of these experiences with the building of the employment system. Entrepreneur’s pre-founding experiences not only provide founders with knowledge of the different organisational forms and employment practices, but also form the basis for their social capital and networks (an important asset for the employment system of their firms). Not only do the employment system mental models of the founders in our study demonstrate the origins of their ideas about the employment systems, but they also specify the conditions under which they guide organisation building. Founders A and B2 relied on the external stakeholders or co-founder in building the employment system of their firms. Although Founder B1 had founding experience, he was operating in a new industry in case company B. His mental model demonstrates that incomplete knowledge or experience about organisational forms and the employment relationship may reduce the impact on the enactment of these models. The resulting relationship with Founder B2 enabled Founder B1 to look after the business side of the company while leaving his co-founder, the scientist-founder, with the responsibility of building the employment system of the firm. This suggests the central role for founding experience in mitigating the external influences on the employment system as well as conditions in which the dynamics of these experiences may impact on the development of these models. It also shows that when founders’ roles are encapsulated within specific functional areas of organisation building (as in Founder B1), their influence on the employment system of their firm is limited. This research highlights and extends the role of prior experiences (including the business/scientific roles of the founders) in the organisation building process. Decisions regarding the employment system come from founders’ understanding of effective practice and their environments. In cases where experiences and knowledge are insufficient, additional advisors become important to the development of both mental models and the resultant organisational systems. The implications are that the heterogeneity of employment system choices may be explained by founders’ previous experiences only within their area of competence; beyond that, interactions with important stakeholders (venture capitalists, co-founders, etc) become important.
The origins of employment system mental models also highlight the influences of external stakeholders on the employment system of the firm. Founder A for example, relied on advice and help from his venture capitalists and legal advisor in setting up aspects of the employment system, while Founder B relied on advice from his co-founder and angel investor. Founder C, on the other hand, experienced little influence from these stakeholders on his employment system mental model. These findings highlight the context in which external stakeholders may play a more central role on a firm’s formation. With regards to Company A, the influence of external stakeholders such as legal advisor played a direct role in setting up stock options in Company A. Informants in Company B related the influence of stakeholders through the organisational strategy around the employment system. This finding extends the knowledge of the role that stakeholders play in the organisational strategy and employment system of the firm consistent with the theoretical literature (Boxall & Purcell, 2003).

That stakeholders impact on organisational strategy demonstrates the important role of organisational strategy on the employment system of the firm. For each and every one of the founders in this study, organisational strategy was an important influence on the direction of the employment system. This demonstrates the importance of organisational strategy on the human resource strategy of the firm and confirms findings that deliberate choices on employment systems reflect strategic choices by founders (Burton, 2001). However, although founders are able to draw links between the firm’s strategies and the employment system, the ways in which they are enacted diverge. Company A, for example, pursues a diversification strategy and pursues an employment system that reflects the founder’s management philosophy of finding the best and creating a family and collegial culture that is based on a variety of attachments and inducements. Company B, on the other hand, pursues a focused pipeline that is based on one of the founders’ relationship with the institutional environment and the requirements to minimise costs in the early stages of R&D. The pursuit of this strategy is predicated on a “buy” mode of employment system that focuses on a core cadre of key management employees. The final company, Company C enacts their organisational strategy in a different manner to Company B, despite being similar to Company B in that the focus of the company’s strategy was on a single pipeline of the founder’s IP and similar embeddedness in their university origins. Through a “laboratory” model of employment with a classical science PhD or postdoctoral researcher programme, a “make” model of employment can be
detected. These findings suggest that the myriad of ways in which founders are able to influence the employment system and find competitive advantage for their firms. The intrinsic value of the founders’ human and social capital allows organisational activities that transform the endowments of organisations into a focus for commercialisation. This thesis provides empirical evidence for the theoretical conjecture that competitive differentiation through human resources exist in professional knowledge firms (Boxall, 2003). The results of this thesis show that for the biotechnology firms in this study, organisational strategy offers a way in which to think about the organisation of people particularly when the investment in people is high and the competitive environment tight. It supports the view that founders have a vital role to play in decisions about the direction and targets of their human resource strategies (Deshpande & Golhar, 1994; Hornsby & Kuratko, 1990, July) as well as to highlight the role of key employees and senior managers in the coordination and control of work (Cardon & Stevens, 2004; Katz et al., 2000). The case studies also highlight how founders not only guide their organisation building with their mental models but also share them with senior managers and the top management team in order to realise their models for organising. This is facilitated by bringing scientists from their prior laboratories into the firm as well as by having the final say in the selection of key employees.

Taken together, these findings demonstrate not only of the value of this research for how managerial practices evolve within the firm, but extend our knowledge about the strategic underpinnings of emerging employment systems (Boxall, 1998; Feeser & Willard, 1990; Harris & Ogbonna, 1999; Hendry, Arthur, & Jones, 1995; Purcell, 1996). Despite the absence of trained HR personnel or expertise in attracting and selecting candidates for their firms (Arthur, 1995), the case studies demonstrate that founders of biotechnology firms are able to utilise their significant resource networks strategically. Despite the fact that very little of the activities of the firm are formalised in its early conception, the notion of strategic planning and strategic choices are important; the founders are cognisant of human resource strategies for their firms. The employment system mental models of the founders in this study offer some insight into this awareness. It traces the rationales behind staffing and organising the firm. However, comparisons of the ways in which these strategies are enacted in the case studies suggest that seeing the opportunities for employment systems are not always the same as achieving the result (Boxall, 2003). For Company B, the employment system that emerged not only came from Founder B2’s
model but was also the result of environmental (constrained cash flow) and institutional forces (tight and loose coupling to the host university) on the employment system. The resource constraints around the funding of the firm, and the unique relationship of Founder B2 with its institutional origins, helped and facilitated the “buy” form of employment system. Company B’s HR strategy (as well as the other case studies) and its decisions around the employment system provided an insight into how biotechnology firms are able to secure and maintain human resources that are necessary for the firm’s viability. These decisions are historically important to the evolution of the firm and its subsequent competitive advantage (Boeker, 1989; Boxall & Purcell, 2003; Eisenhardt & Schoonhoven, 1990). This thesis thus provides a theoretical contribution to the role of founders in appropriating the necessary human resources (Bates, 1990; Boxall & Purcell, 2003), the ability to form a “stable and committed labour force” (Alpander, Carter, & Forsgren, 1990; Rubery, 1994), and the processes to achieve managerial and process forms of competitive advantage (Boxall, 1998; Hendry et al., 1995).

One other important finding from this study relates to how the competitive environment influences some of the features of the employment system. In recent years, it has been recognised that it is the actor’s perceptions of competitive positioning and their interactions with existing mental models that form the basis for strategic decision making and formulation (Calori, Johnson, & Sarnin, 1992; Porac & Thomas, 1990; Porac et al., 1987; Stubbart, 1989). The findings from this thesis highlight the features of the competitive environment of companies that become salient to the founders. It not only suggests competing for resources (such as human and social capital embodied by people) but also forms the basis for emulation or differentiation. Competitive environments are an important feature for the development of the employment system. They not only specify the resource constraints that competitive groups have on each other but also highlight competitive practices and structures for emulation. Other companies are an important feature of the founders’ employment system mental model. The analyses of these competitive groups in founders’ mental models are interesting because it points to their ideas about the HR strategies for their firms. The influence of other companies on the founders’ mental model impacted their labour market strategies. Founders consideration of other companies informed and influenced the choice of employment systems, and the practices and policies founders employed (Boeker, 1989; Boeker, 1988; Hannan et al., 1996; Hannan & Carroll, 1992; Hannan & Freeman, 1989). This provides
further empirical support for the links between competitive dynamics and HR strategy (Barney & Wright, 1998; Boxall & Purcell, 2003). One practical contribution with regards to the perception of competitive/comparative groups is in understanding narrow cognitive corridors and blindspots of founders when building their organisations (Kahneman, Slovic, & Tversky, 1982; Porac et al., 1987; Tversky & Kahneman, 1982). Despite the fact that founders acknowledged each others’ companies, and there was ample evidence of employee movement between firms, founders did not think of each other as competitors. They often related their competition to companies outside their regions or overseas. The mental models that founders in this study espoused not only demonstrated the group of companies that founders’ believed to compete with their firms, but also point to the features of the environment that moderate the impact of their employment system mental models. This finding is important because it points to the features that founders attend to when building the employment system of their firms and identifies the limits (of understanding) of their competitive environment. Much research has shown that mental models utilised in strategic decision making are prone to mistakes and limits that inhibit the optimal use of information and quality decision making (Ensley & Pearce, 2001; Lyles & Mitroff, 1980; Porac et al., 1989). The results of this research suggest that where matters of employment are concerned, decisions around the employment system need to take into account details of the organisation, all of its competitors, and what it takes to succeed in their particular industries and national contexts. Furthermore, with regard to their particular methods for managing employees, founders would do well to give sufficient attention to the ways in which their models can be shared to establish and implement a common strategy. The importance in giving founders’ mental models of the organisation sufficient attention is imperative as founders in industry groups may compete with one another and exchange opinions, ideas and norms through professional and social interactions within the industry (Porac et al., 1989). Competitive advantage thus becomes tied to founders’ ability to quickly adapt and build value around their human resources and employment systems.

A practical contribution of these findings lies in highlighting the challenges that firms face in establishing viability through human resources. Biotechnology firms are guided by the organisation building of their founders as well as increasing recognition of the impact of local contexts (Schoonhoven & Romanelli, 2001a). Employment system mental models highlight the requirements for founders in building the employment
system of the organisation. These mental models both indicate the direction of the future organisation as well as the means through which to achieve it. They are, however, an important mechanism. Founders of emerging firms need to take into account the limitations of these models in the local environments of their firms. Founder of emerging firms may do well to consider the limits of their mental models and their influences when making strategic decisions, including those of employment. As discussed earlier, many founders of new ventures are not HR or employment experts (some even believe that advice or important decisions on HR matters can be easily bought if required, or is unimportant). As such, their mental models may limit their vision of the employment system as well as their technical choices. When founders of new ventures are creating the employment systems of their organisations, it may be useful for founders as well as their top management team to find ways in which to improve their strategic decision making as well as resource choices. This is important as there is considerable evidence that such decision making may have an impact on the performance of these firms (Boxall & Steeneveld, 1999). While this study has found that founders are aware of the important links between their organisational strategy and the human resource implications (despite the potential blindspots), it is reasonable to suggest that they also give full attention to the impact of local competition and importance of HR issues for the firm.

The analysis of the case studies in this study demonstrate that employment systems in the biotechnology industry in New Zealand are similar to the star models of the SPEC project (Baron et al., 1996; Burton, 2001). As the most complex and important research to date about the employment system, Burton’s (2001) work and the SPEC project contributed to understanding the employment system and founder’s role in this aspect of organisation building. The SPEC project has advanced the understanding of employment system mental models by differentiating them on three dimensions: attachment, selection and coordination and control of work. This study has provided an extension of the SPEC project by including the antecedents, concomitant organisational culture and consequences of the employment system with the mental model. This extends our understanding of employment system mental models beyond the SPEC studies. This finding is important not only for our understanding of founders’ models of organising as discussed, but also because it extends our understanding of the autonomy versus control dilemma in knowledge intensive firms (Lowendahl, 1997; Scarbrough, 1999; Starbuck, 1992). In general, knowledge firms have often been characterised as requiring the
development of a culture that fosters autonomy (Friedman, 1977; Grant, 1996; Lowendahl, 1997; Maister, 1993; Robertson & Swan, 2003) while maintaining control through social and professional norms (Lowendahl, 1997; Robertson & Swan, 2003). However, the recent empirical literature on has found that the interplay of identity regulation (Alvesson, 2001; Robertson & Swan, 2003) and technocratic or bureaucratic control (Alvesson & Karreman, 2001; Karreman & Alvesson, 2004) is at the centre of managing these tensions and involving the employees within such firms. The “loosened behavioural grip” of bureaucratic forms of control in the knowledge firm is balanced by the increase in socio-cognitive forms of control that involves an employee’s perception and identification with the work and company (Karreman & Alvesson, 2004, p. 172).

The findings from the case studies contribute to this argument by introducing another variable into the emergence and origins of managing these tensions. Founder’s employment system mental models contribute to the development of these forms of control by specifying the founder’s philosophy for the company including the underlying culture of the firm. While bureaucratic forms of control, which include the employment system policies and practices of the firm, appear to be important in building an employment system that manages employees, founder’s cultural ideas about the firm also extends their forms of control through professional norms and cultural and social means. Founders’ employment system mental models provide evidence that organisation builders not only understand management practice, but also the social and cultural means to establish and maintain control. Thus, this interplay of different methods of control can be attributed to the founders’ backgrounds and individual management philosophy.

Company A, B and C all demonstrate different cultural forms of control, including different emphasis on employment system policies and practices that not only arise from founder’s mental models but also from the interaction of organisational and institutional factors. Karreman and Alvesson (2004) alluded to the “mental cage of subjectivity” (p. 171) that employees may employ in understanding the forms of control in the company they work for. However, this research has provided a means to which organisational forms of control, particularly in knowledge-intensive firms may come to be embodied in organisation builders and decision makers.

I have already noted the role of moderating variables in the building of the employment system. This is an important finding for theory development as it forms the basis for employment system emergence from founder’s mental models. The findings from each
of the case studies relate the importance of the contextual influence on the emergence and development of the employment system in the firms of the founders. Company A, for example, owed much of the development of the employment system not only to the founder’s model but also to key important stakeholders such as the legal advisor and HR manager of the firm. Company B’s employment system emerged not only as a consequence of Founder B2’s mental model but also through the organisational constraints on the availability of funds for developing the employment system. Company C utilised Founder C’s relationship with the university to leverage his vision for the employment system of the firm. Each of these case studies demonstrates the importance of each founder’s employment system mental model as well as the local contextual forces that act on the firm’s development (Schoonhoven & Romanelli, 2001b). This research has provided a means by which ideas about the emergence and evolution of the employment system can be understood through the cognitive construction of the organisation builders. The key contribution of this research thus is that it not only offers a way in which we can understand the role of founders in the building of the employment system but it also provides an insight into the depth and impact of organisational and institutional factors. This study has shown the ways in which macro perspectives can be represented at the individual level. It also provides the mechanisms through which macro and organisational factors such as interaction of key stakeholders, management teams, organisational imperatives, and resource constraints may work: through the mental models of founders and their organisation building activities. Burton (2001) found that entrepreneurs are not overly concerned with cultural pressures as represented by institutional theory or resource dependency. Rather, the located heterogeneity or homogeneity of employment systems may be due to interpretation of the environment as well as cognitive factors reflecting the cultural and work experiences of the founders. These cognitions work in tandem to produce organisational and industry demands for legitimacy. The role of the founder becomes an important fundamental variable in organisation building and our understanding of employment systems.

One final contribution that this research provides is the exploration of institutional embeddedness of each of the case companies and the impact of this embeddedness on the employment system of the firms. As discussed in the cross case analysis, this study provides empirical support for the idea that relationships with institutional contexts may grant new ventures resources and legitimacy (Aiken & Hage, 1968; Bourdieu, 1985).
However, this study not only provides an insight into the sources of legitimacy and resource for the employment system of firms, but it also extends understanding of the institutional embeddedness of firms by examining what happens when companies form outside of the influence of their institutional setting as in Company A. While neo-institutional theories focus on the disadvantages of this (Baum & Oliver, 1992), this thesis demonstrates that ventures that go it alone may develop their own brand of legitimacy and resources. This is not well understood in current explorations of institutional relationships and provides a fascinating insight into the contexts and conditions in which companies may prefer to “spin-out” of their institutional settings. In addition to this, this research has provided evidence for the impact of the institutional setting on the emergence and evolution of the employment system in new ventures. The degree of embeddedness of these organisations in their institutional origins has a significant impact on the shape and form of the organisational structure in their firms. The findings from this thesis not only demonstrate how the institutional embeddedness of these organisations impacts the employment system of these firms but also provide an insight into the mechanisms involved. In Company B and C, the relationships between the companies and the research institutes to which they were linked allowed the exchange of resources. These institutional links not only provided a resource for the development of the employment systems, but also influenced the type of employment relationship and culture that emerged (recall that in Company B, the utilisation of limited term contracts and absorption of scientists from the company into the research institute allowed a “buy” form of employment to emerge, while in Company C, Founder C was able to develop his own talent through his relationship with the university). These case studies provide an insight into the ways in which resources are obtained for the employment system. However, it also focuses attention on the importance of founders’ human and social capital in this dynamic. Founders not only bring their considerable human and social capital advantages to bear on the endowments of their companies but the links between their institutional positions also provide significant endowments for the building of the employment system. This has implications to high technology companies that are formed within institutional settings such as universities, incubators and research institutes. The impact of being institutionally embedded in the university settings may offer different kinds of resources and legitimacy to the new venture.
Despite the resource limitations faced by the case studies in our firms, there were a number of strategies available to alleviate the worst of these constraints. Biotechnology firms, particularly in the human pharmaceutical sector, face significant hurdles in commercialising their science (Gaisford, Hobbs, Kerr, Perdikis, & Plunkett, 2001). These hurdles combined with contextual constraints in the biotechnology firm’s environment places further pressure on the ability of these firms to maintain viability in the long run. Understanding the role of human resource strategies or obtaining such expertise may form viable ways in which to manage the constraints placed on the firm. There is evidence to suggest that greater and consistent investment in human resources and work practices may yield benefits in the ability of firms to adapt and increase their productivity (Ichniowski, Shaw, & Prennushi, 1997; MacDuffie, 1995). The argument can be made that within a professional knowledge based industry, the fit between competitive strategy and HR strategy may be more crucial because of the high investment in human resources and capital (Boxall, 2003). Certainly, one of the key issues facing many biotechnology firms is the lack of human capital available to exploit such opportunities in the biotechnology area (Larbey, 2002). A focused attention to human resource issues at the emergence of the firm may improve the ability of firms to cope with the demands of viability and sustained competitive advantage.

Summarising the theoretical and practical contributions of this current study, I make a number of significant contribution to the understanding of mental models and employment systems, but also provide some important practical implications as to how the mental models of founders in the biotechnology arena can be used to improve the organisation building activities of founders. Understanding the choices that founders make, including the perceptions they have of the employment system is essential in building a picture for how these initial models affect the evolution of practices within firms. Founders’ organisational models and the decisions they make regarding the employment system early on in the firm also highlights the reasons why these choices become ingrained and explain the organisational inertia or imprinting of these firms. These theoretical and practical contributions not only offer some answers around founders’ activities, but also contributes to our understanding of organisational building at the individual, organisational and industry levels of analysis. However, the contribution of this thesis not only applies to the theoretical and practical areas but also in its methodological applications. The methodological design of this current thesis allowed
for a deeper understanding of mental models and enabled the study of founder cognition at an integrated individual and organisational level. A case study design, utilising multi-methods, allowed a deeper understanding of how these mental models are used in the organisation building process.

**METHODOLOGICAL CONTRIBUTIONS**

The research design in this thesis contributes to a deeper understanding of what mental models are and how they are used in the organisation building process. By developing the concept and methodological rigour of the mental model concept, this research has built on existing ideas from organisational theory about the mental model and developed this into a comprehensive framework for understanding founder’s cognitions. Mental models were conceptualised as cause maps for the purposes of this study. By theoretically developing this concept, a range of methodological techniques were able to be utilised. Utilising and building on a framework for eliciting cause maps (for example, Jenkins, 1998), this current study has contributed to the mental model and cognitive mapping literature by developing a framework for eliciting and comparing the mental maps of founders. In addition, the use of multiple-case study methodology allowed for theory – generalisability and construct confirmation without compromising the complexity and richness of the founder’s experiences (Eisenhardt, 1989). The use of case studies not only allowed us to view the contexts of founder’s mental models but also provided a rich range of resources for uncovering how these models were utilised and perceived by members of the organisation. The use of case study methodology allowed a deeper understanding of the causal themes within and across participant cases. The design merged the best of qualitative and quantitative techniques in an effort to bridge a number of methodological issues from the literature. By specifying a method for studying mental models and merging this with the case study, a range of questions around founder’s mental models could be explored.

While cause mapping of the founder’s mental models was a theoretically and methodologically useful way of understanding founder’s shared and idiosyncratic thinking, data collection within the framework of a case study design also allowed an understanding of the ways in which mental models are formed, evolved, and are enacted. The two main methodological contributions of this thesis is in the use of a case study
design and secondly, in the discussion of the appropriate comparative cognitive mapping approach for the study of cognition. In the first instance, the case study methodology allowed a deeper understanding of the role that founders and their mental models of employment play in the organisation building process. Cognitive mapping and its ability to highlight individual cognitions allowed a structured approach to elicit and compare cognitions.

Studies of organisation building, particularly the SPEC project, approach the issue of organisation building of founders through a positivist design. The methodological design of this research attempts to combine analyses of the founder and organisations they build into a comprehensive framework. This approach combines individual analysis (through the use of cause maps of founders) and organisational analysis (through several case study methods including interviews, documentation and observation) in order to explicate the relationship of mental models with the organisations that founders build. Hindle (2004), in developing an argument for more qualitative methods to be used to examine entrepreneurial cognition, argued that the dearth in qualitative methods to examine entrepreneurship inquiries limits the depth of the discipline,

In my view, unless entrepreneurship generally and entrepreneurial cognition particularly begin to embrace higher volumes of higher calibre qualitative research, the relevance and potency of the entrepreneurial canon will be severely compromise by a lack of the methodological variety that is so strongly displayed in other social sciences (p.577).

The problem with the limited use of qualitative methodologies in the field of entrepreneurship stem from three logical problems associated with the field. From its historical development, entrepreneurial cognition research runs into the “introspection issue” by virtue of its unit of analysis and subject of investigation (Hindle, 2004) that is, critics suggest that introspective data about cognitions are inaccurate and misleading (Nisbett & Wilson, 1977). However, despite this, the logics through which introspection can be a powerful and useful methodology to give valid and useful data is often tied into the contexts for eliciting these cognitions and the processes that is being investigated (Ericsson & Simon, 1993; Eysenck & Keane, 1995). For example, Ericsson and Simon (1993) suggest that introspective data is appropriate when matched to activities or used to examine cognitive processes that participants are able to fully attend to. This current
research provides further methodological advancement for the issue of introspective data by providing a way in which the cognitions of founders (based on introspective data) can be validated. Through the use of our methodological design, this research has bridged the reliability and validity of the founder’s cognitions by combining elicitations of the mental model with other qualitative research methods such as interviews with other members of the organisation as well as documentation and archival evidence. This multi-method design gives credence to the cognitions (in this case, mental model) of founders by explicating the antecedents and outcomes of these cognitions and examining the shared elements with other rigorous methodological analysis. This research builds validity of introspective data in a similar way to methodological techniques such as life history and testimonio as advocated by Hindle (2004). The use of elicited cause mapping and corroborating case study evidence allows for the reliability and validity of the data to be ensured. This study has shown that mental models of founders can be embodied in the organisations they have built including the multiple perspectives of employees and workers within those organisations.

A second limit to the use of qualitative methods that Hindle (2004) discussed was the issue of holism. The argument about holism centres on the ability to examine the cognitive processes as a unit of analysis when entrepreneurs and entrepreneurship is considered to be part of complex systems. Commentators on research methodologies assume that it would be difficult to study entrepreneurs (and their cognitions) apart from their natural contexts (Bygrave, 1989; Hanson, 1995). However, calls for a more balanced view of holism suggest that essential variables be considered (rather than the whole system (Rebernik & Mulej, 2000)) as a more methodologically sound approach to studying cognitive phenomena. Hindle (2004) argues that the need to “record the concept of requisite holism, resident in entrepreneurship literature, permits researchers to exercise considered judgement concerning multiple aspects of the environment and system of which the individual entrepreneur forms a part of” (p. 585). While this is an argument that is supported by this research, the methodological advancement on this theme can be seen by specifying the conditions under which requisite holism in research studies can be used. This current study specified the requirements for examining mental models of founders and related this to the organisation being studied. This current study’s design provides evidence that the balance between examining a specific unit of analysis (such as entrepreneurial cognition) and locating them within their complex systems (the
organisational and institutional contexts) can be achieved. The methodological strength of this approach lies in the use of theoretically sound building of the contextual elements and conceptualisation of the unit of analysis under investigation. This was achieved by careful consideration of the extant literature and allowing the concepts to emerge from the data capture and generation techniques employed in this study. The process and outcomes of this study supports the power of combining methods to overcome the limits of holism.

The last challenge to qualitative methods is temporality (Hindle, 2004) highlighting that thinking processes change over time. There is general agreement that this may distort the perspectives of entrepreneurs, change the influences of environment and variables, and undermine the degree of validity of the mental phenomena under investigation (Forbes, 1999; Hindle, 2004; Mitchell et al., 2002). However, this is considered to be surmountable if only by elucidating the temporal contexts of the investigation (Hindle, 2004). This study however, is able to justify the temporal boundaries by providing justification for the use of retrospective data on the study of entrepreneurial cognition. This study examines the building of the employment system from the organisation’s conception and examines how founder’s models relate to the emergence and evolution of the employment system. By utilising a multi-method approach, the problems of temporality (and retrospective data which is discussed later in this chapter) is eased. The focus of the study was on the founder’s mental models and the employment system of the firm. The utility of triangulating several sources of data provided some conceptual and temporal validity for the mental models that founders use. By focusing the study on the employment system concept through the founder’s perspective and comparing this to several other perspectives of the organisation I demonstrate that cognitions that founders have and develop may be linked to the retrospective or historical processes of the organisation. This methodological design shows that the elusive nature of cognitions may be studied utilising the individuals involved and by studying the way in which these become embodied and embedded into organisations. In this thesis, the voices of the founders, in particular their representations of reality, become the main focus of analysis. The combination of comparative cause mapping and case study analysis allowed an integration of methods and analysis that embed the rationalities of the founder with that of the organisations they have built over time.
Researching three different sites in a niche industry allowed an in-depth study of the founders’ mental models and comparisons to be made on the similarity and differences of these cognitions and each founder’s organisation building activities. The mixed-method design also allowed a number of complementary and mutually supportive data analyses to be made. This study highlights the mental models of the founders and contrasts these with other evidence of the founder’s thinking and actions. This study also generated data on the employment system of the organisation. By contrasting these two methods of data collection and generation, the methodological validity and reliability are enhanced. This supported the trustworthiness of the results and allowed a detailed and rich analysis to be made of the founder’s organisation building activities. It is by triangulating the results of the different methods that theme convergence and consistency emerges. The combination of cause map and case study approaches the problem of studying cognitions from two ways. The focal point of the comparative cause mapping approach used allowed the cognitions to emerge that are meaningful and relevant to the participant founders (Fodor, 1980). In addition to this, the best way in which to understand the role and place of these cognitions within the organisation is to use a holistic approach to case study data collection. The combination of comparative cause mapping and qualitative case study data collection avoided the limitations in previous studies of the enduring effects of founders’ models of employment systems.

This thesis makes a specific methodological contribution to the research of cognitions by integrating the cognitive mapping literature into a cohesive framework for studying mental models and cognitions of founders. The current study integrates the philosophical and theoretical basis of cognitive mapping with the advantages and disadvantages of various methods utilised to study cognition, by building on other frameworks (Bood, 1998; Eden & Ackermann, 1998; Huff, 1990; Jenkins, 1998). In the methodological chapter, the problem of matching research techniques on cognitive mapping to the research question was explored. This was achieved by examining the comparison of cognitive mapping methods that updating and integrating the choices of cognitive mapping in the literature. The result for this research was the use of comparative cause mapping approach within a case study design to assess our understanding of employment system mental models. Employment system mental models provide a means for individuals and organisations to create and share understandings (Lyles & Mitroff, 1980; McCaskey, 1982; Morgan, 1980). As a mechanism for sensegiving, mental models create
and reflect the underlying values, shared interests and common understandings that are important (Kiesler & Sproull, 1982). This research used a comparative cause mapping approach to examine founders’ beliefs and thinking about the employment system. Theoretically, comparative cause mapping allowed us to examine the elements and linkages of founders’ thinking around employment systems. This allowed us to examine the nature and process of founders’ employment system building processes. The benefits of using the comparative cause mapping approach to study founder employment mental models allowed an objective quantitative data analysis that combined easily with the qualitative case study data collection. Comparative cause mapping combines the science of empiricism with the art of human interpretation. It allowed an ordered and organised approach to analysing the elements and linkages of founders’ mental models of the employment system. This helps ensure the accuracy of researcher analysis. While the comparative cause mapping approach and its advantages has been highlighted, it is the multi-method approach that deepens our understanding of the impact of individual cognition on the organisation. The emergence and evolution of the employment system does not only rely on founders’ mental models, it is only by considering the perspectives of others and through different analysis of other sources of evidence that the strength and validity of these conceptions can be tested and understood. Founders’ conceptualisations of employment systems were the subject of this research and it is the strength of this research methodology that allowed this conceptualisation to emerge. Whilst the results show that founders have many shared elements when it comes to building the employment system, the linkages or shared causal thinking around each element is more idiosyncratic. This highlights the role that experience and shared elements of knowledge may play in the organisation building process. Although this study has only considered the shared thinking and ideas of the employment system from the founders studied, founders’ cognitions may have shared elements that are informed by industry and cultural norms while the causal linkages show founders’ ways of interpreting these elements. This may form a basis for future research.

The design of the thesis research also makes a contribution by highlighting the building of the employment system from multiple perspectives. Previous research in organisation building has focused on the views of both the top management team and founder (Hannan et al., 1996). However, this research has incorporated the views of the employees as well as gathered significant evidence in the form of archival evidence and company
documents. This multi-method approach is an advancement of other studies of organisation building and addresses some of the limitations in this thesis.

STRENGTHS AND LIMITATIONS

A key strength of this research is that it provides evidence of founder’s emergent knowledge structures of the employment system, answering calls for a multi-methodological and multi-theoretical approach to studying complex phenomena (Aldrich, 1992; Hindle, 2004). This thesis has contributed to theoretical and methodological development by integrating disparate literatures from human resource management, sociology, cognitive psychology and management to extend our understanding of founders and their contribution to the employment systems of their firms. Not only are the findings from this research important for our understanding of employment systems of organisations and the contexts, but it also provides insight into entrepreneurs and the entrepreneurial process. This contributes substantially to our understanding of the process through which entrepreneurs recognise and develop opportunities in their employment systems. Moreover, at a general level, this study enhances awareness that the organisation building process is very complex and is influenced by a multitude of variables operating at distinct levels such as the individual (in the mental models of founders), the organisation (through institutional embeddedness) and at the societal level (through regional and environmental constraints and munificence). This study’s strength lies in its ability to effectively study and theorise this process of complexity including providing the conceptual tools to highlight important phenomena and processes.

One other strength of this thesis is in its illustration of scientist organisations and the employment issues in the biotechnology industry. While much has been made of the role and impact that the biotechnology sector will have in everyday life, our understanding of this industry, particularly the mechanisms and processes for building organisations and management, is still in its infancy. The introduction of this research began by noting the multitudes of activities that the bio-entrepreneur engages in. Aside from raising finance, building the research synergies among its various stakeholders and managing the demands and challenges from a variety of sources, the bio-entrepreneur must play multiple roles in starting and building the venture. Biotechnology companies are knowledge companies. The importance of studying biotechnology companies and the
ways in which they structure their employment has implications for the management of knowledge and how knowledge is translated into economic success. Knowledge management and the knowledge creation process become increasingly important to our understanding of knowledge based firms. This thesis has illustrated the specific ways in which founders of biotechnology firms build their organisations, including the ways in which their scientific and entrepreneurial capital contribute to the governance and structure of their organisations. The contribution of these bio-entrepreneurs not only provides knowledge, expertise, and technological resources as suggested by Shane (2002), they also provide models of “organisation” (Baron & Hannan, 2002; Boeker, 1988; Burton, 2001; Busenitz & Lau, 1996) that can be shared and implemented by others in their firms in order to commercialise their intellectual property. This research provides specific mechanisms and processes through which bio-entrepreneurs contributes to the employment systems of their firms.

While there are strengths to this thesis, there were also limitations that are needed to be considered is the context of this research. Methodological issues are normal in any thesis. While some studies advocate the use of many case studies to increase empirical validity and robust theory generation (for example, Eisenhardt, 1989), the research question and the epistemological and ontological approach of this research required the use of in depth case studies, limiting the number that can practically be studied. The object of this thesis research is to understand not only the founders’ mental models but to also provide a rich description of the social context to which the organisation building of founders occurs. This approach clearly supports the use of exemplar case studies as a robust research methodology for theory building and empirical evidence especially within an interpretivist paradigm (Dyer & Wilkins, 1991). The point of case study research thus may not only be used to provide a rich description of the social scene, to describe the context in which events occur as Dyer and Wilkins (1991) propose, but also to reveal the deep structures of social behaviour (Light, 1979). Theory arising from deeper insights is thus more accurate and appropriate as they reveal the intricacies of each particular context (van Maanen, 1979). Understanding these particular contexts and the deeper dynamics of how founders utilise their mental models generates a fuller understanding under which these mental models are utilised and influenced. As Dyer and Wilkins (1991) stated,

94 I should also note that Eisenhardt’s (1989) suggestion of a minimum eight cases for theory development exceed the population in this research.
The emphasis of the classic case study approach is to highlight a construct by showing its operation in an ongoing social context. The result is that the classic case study becomes a more coherent, credible, and memorable story. (p. 616).

As such, the three cases in our study is not only appropriate but also fulfils the necessary criteria for demonstrating not only our study of the key concepts as well as the context and dynamics for under which they occur. This examination of the contexts of the mental models and the role of mental models in the organisations of the founders provides us with a window into the deeper social structures of the mental models. Using three cases thus is appropriate for the interpretivist approach where the founders’ world and their interpretation of this world including their problems are highlighted and understood. The three cases provided us with an accurate understanding of the mental models and how they are used in organisation building. As the results of our study has shown, mental models that founder hold of the employment system are not static and rigid in their implementation, rather, these models are susceptible to influence by many variables in the founder’s context. The importance of the founder’s unique perspective and the wider context affords a more thorough and dynamic view of mental models and locates its utility within the founder’s reality. The use of three in-depth case studies also allowed us to examine the validity of the mental model construct not only from the founder’s perspective but also from the multiple perspectives such as from the perspective of employees, managers and key advisors. In addition, the in-depth examination of our case studies contributed to the validity of the construct and the findings by anchoring these perspectives and constructs in artefacts such as written documentation and archival evidence. Thus, the use of three in-depth case studies was robust in examining and exploring the often difficult and complex entrepreneurial cognitions of founders.

Another source of potential limitation is the issue of retrospectivity (Wolfe & Jackson, 1987). It may be argued that a longitudinal design would have been an ideal design to examine the founder’s organisation building activities. This is congruent with arguments in the entrepreneurial cognition literature that advocates studying cognitions contemporaneously rather than retrospectively (Crutcher, 1994; Ericsson & Simon, 1993). As Hindle (2004) has noted, certain types of cognitive processes, particularly those dependent on implicit learning and memory processes (such as learning the rules of grammar, or classical conditioning), would be difficult to study using retrospective (and introspective) data. This is a valid argument against the use of retrospective data.
However, this argument is not applicable due to the theoretical underpinnings of this research. Mental models are organisational models that founders have of the right and appropriate ways in which to organise the employment system. Thus, the constructs and data collected represented long-term and relatively enduring conceptions that founders have of the employment system; their validity rests in the utility they have for the founders. This conceptualisation of the mental model is compatible with the interpretivist perspective of this study. Mental models are important knowledge structures that founders use to understand and perceive the world. These knowledge structures are also cumulative and forms the basis for founder learning and thinking.

In addition, this study explores the mental models of founders and how these are related to the employment system of their firms. The exploration of how founders built the employment system in their new ventures required an examination of their past organisation building activities including the formalisation of these practices at the organisation level. This requires that the data collection utilised in this study focus on the past activities of the founder as well as the historical development of the organisation. While the reliability and validity of retrospective data could have been a potential problem, careful consideration of the case study methods alleviated the limits of retrospective data by including several data collection methods. The data collection employed in this study triangulated several sources of evidence which would reduce the bias and doubts about the reliability and validity of the retrospective data used here. For example in order to test the validity of founder’s mental models elicited by cause mapping, the structure of the mental maps were compared to archival evidence of the founders (that included written documents such as magazine articles and newspaper reports), and interviews with his top management team and employees. Furthermore, these maps were then presented back to the founders for confirmation. This not only increased the validity of our data but also provided multiple confirmations of the constructs and activities examined.

**FUTURE RESEARCH**

This research has offered a number of significant theoretical and methodological contributions relating to the understanding of mental models and their use in the building of the employment system. However, in addressing the number of research issues, many
new questions have arisen that should be considered for future research. Future research may shed light on the ways in which these mental models are shared and disseminated among key stakeholders and employees, the cognitive limits to employment system mental models, the relationship between founder’s mental models and performance outcomes and the institutional contexts of employment system mental models.

This study has discussed the importance of the finding that founder’s mental models are significant to the building of the employment system. However, while both practical understanding and theoretical development has been advanced, there are a number of interesting areas in which this research stream can be further developed. Our discussion of the theoretical importance and contribution indicate that these mental models that are garnered from prior business and professional work experiences are important in determining the form and function of the employment system in new ventures. This is an area that has many potential applications for future research, particularly in exploring the mental models of founders in other industries and across different regions. The SPEC project examined high technology firms within the Silicon Valley region and produced five major forms of employment system models. This research has explored the biotechnology industry in New Zealand and therefore we may expect to find significant differences in the mental models utilised by founders in other areas of technology and in different regions. For example, the ICT industry is characterised by different competitive forces, organisational dynamics, business expectations, and push and pull factors for research and development. Furthermore, as we have pointed out, the backgrounds of founders are an important influence of the employment system mental model. Founders in this study all point to their unique technical, commercial and institutional experience as important influences for launching and building their new ventures. Future research could explore the dynamics of competitive forces, organisational make-up and research expectations in other high technology areas and contrast these with the work here and the SPEC project. In addition to this, future research could examine the contexts that may impact on biotechnology start-ups in other regions. The resource constraints and munificence in other regions may provide different pressures on the employment system of biotechnology start-ups in other regions. This may illuminate the course of such firms in different regional and geographical locations. These findings will build greater understanding of the application and breadth of employment system mental models in entrepreneurship across diverse contexts.
This study has drawn on the broad areas of cognitive science to articulate the founders’ mental models. While the links between mental models and the employment system are made clear in this study, future research should establish how these mental models become shared with members of the entrepreneurial team and key stakeholders of the firm. By examining the nature of shared cognition in future research, we may be able to highlight the ways in which employment system mental models become shared within an organisation and industry. The work in shared team mental models and shared cognition may be able to provide a framework for understanding how cognitions become shared and used effectively in organisations (Austin, 2003; Banks & Millward, 2000; Druskat & Pescosolido, 2002; Kraiger & Wenzel, 1997; Mathieu et al., 2000; Peterson, Mitchell, Thompson, & Burr, 2000; Stout et al., 1999). By considering the complexity of shared cognition, particularly within the organisation and within the industry, the issues of how coordinated activities around organisation building may emerge. The case studies in this research suggest that communication and dissemination of the founders’ mental models to the top management teams may incorporate a wide range of activities that includes the gathering of a top management team that shares the founder’s vision (Astley & Zammuto, 1992; Chatman & Cha, 2003; Conger, 1991) or communication of a vision through leadership (Athanassiou et al., 2002; Harris & Ogbonna, 1999; Ogbonna & Harris, 2001; Tedlow, 2001). The findings from this research point to the important use of the top management team and senior scientists to help founders realise their models for organising the work within the firms. Almost all founders in this research utilise their senior management to control and coordinate the work within their organisations. Not only is the organisation of the employment system important because of the inherent benefits it provides as discussed above, the role of the management team is of vital to the ongoing support and viability of the firm (Carpenter, Pollock, & Leary, 2003; Cyr, Johnson, & Welbourne, 2000; Dimov & Shepherd, 2005; Zucker, Darby, & Torero, 2002b). To the extent that founder’s models are important for their organisation building activities, it would be important to study how they come to negotiate and share these models with their managers and perhaps, even key employees.

Another area for future research concerns the shared mental models of key stakeholders, such as venture capitalists and legal advisors, with the founder. This would be a useful extension of this research as it would provide the mechanisms through which the potential success (or potential failure) of combined organisation building efforts of founders and
their stakeholders could be understood. In this study, we acknowledged the important influence that key stakeholders have on some of the founders in our sample. These stakeholders become involved with the founder’s organisation building activities when founders lack the necessary knowledge or experience to build the organisation. This finding provides evidence for the conditions in which stakeholders become involved with the organisation building of the firm. However, it also raises further questions on the extent of involvement these stakeholders have firstly, on the design and makeup of the organisation, and secondly, on how this may be related to the literature on venture capitalists involvement and the performance of the firm (Busenitz et al., 2005; Higashide & Birley, 2002; Wijbenga et al., 2003; Wright et al., 1997). In this study, the influence of stakeholders was shown to be primarily aimed at the organisational strategy of the firm (and for one company, the setting up of stock options for the company). It would be interesting to study the causality of influence between stakeholders and founders utilising a shared mental model approach. This may have interesting implications for the emergence of the employment system including the success of these models for the new ventures.

While the concept of mental models is important for understanding how founders build the employment systems in their firm, future research should also examine how various employment systems that arise contribute to the performance of these firms. The literature on strategic human resource management and entrepreneurship in general suggests that firms with effective human resource or employment practices are able to sustain their viability and competitive advantage (Athanassiou et al., 2002; Barney & Wright, 1998; Chandler & Hanks, 1994; Collins & Clark, 2003; Cooper et al., 1994; Cyr et al., 2000; Daily & Dalton, 1992; Feeser & Willard, 1990). As Boxall and Purcell (2003) argue, the combination of human capital, and organisational process to tap into that capital is critical to competitive advantage. The role and process of the employment system becomes an important part of the knowledge sharing process within the firm and has consequences for the performance of firms. Given the inevitability of organisational inertia on employment practices in shaping the employment system of the firm (Aldrich, 1979; Hannan & Freeman, 1977, 1984), it becomes important to understand how these early structures and employment routines affect the performance of firms. Future research utilising a longitudinal or history-sensitive methodology may provide clues as to the effective performance of initial employment systems and their evolutionary impact on
the firm, particularly within certain industries. This not only implies a critical role for “astutely informed HR strategy” (Boxall, 2003, p. 17), but also suggests which mix of employment system practices contributes to effective employment systems, particularly at the emergent stage of the organisation. The findings from this research highlighted the conditions under which the employment system in our firms emerged. These employment systems owed much of their development to the organisation building of the founders. However, these developments were not linear, the emergence and evolution of the employment system are influenced by moderating variables at various stages of the development. However, from our study of founder’s mental models, we are able to advance the notion that founder’s often direct their employment system building towards goals (such as scientific results or commercial products). These adaptations and responses to the organisation builder’s activities and interactions with organisational and institutional variables inevitably point to conceptions of what works best for the organisation at particular points in time. Understanding these developments with an eye towards the goals for the employment system illuminates the process; however, it does not illuminate the success of these activities. The employment systems in the case studies all employed various methods for the ultimate goal of achieving a commercial product. This points to questions about which employment system lead to success, and under what conditions. Further, as discussed in the theoretical and practical contributions of this thesis, organisational strategy was an important influence for the building of the employment system. The enactment of founder’s employment system mental model was linked to the organisational strategy of the firm. The resulting employment system reflects the links between organisation building and organisational strategy. The organisations of people in knowledge-intensive firms were thus guided by the organisational strategy of the firm. Researchers in the area of employment systems thus would do well to examine the ways in which employment system practices that are embedded in their local contexts have important effects on performance variables such as innovation, knowledge transferability, and profitability. This not only extends much of the research on emergent employment systems and their success on various performance indicators, but may also highlight the important linkages behind founders’ conceptualisations of organisational strategy and HR strategy. Furthermore, as discussed earlier, researchers could also examine the way in which the employment system is organised, such as the spread of employment responsibilities among top and line
managers, HR managers and the employees as these may have an impact on the productivity and capabilities of firms (de Leede & Looise, 2005).

The strategy and success of the employment systems notwithstanding, the theoretical contributions of this thesis also provided a view of the founder’s thinking around their competitive environment. Other companies were an important feature of the founders’ employment system mental model and also played a part in the employment system of firms. As described earlier, the cognitive blindspots or narrow cognitive corridors of founders’ perceptions of their competitive environments may limit the efficacy of their strategic decision making. Alternatively, complete knowledge and understanding of their competitive environments may bring added benefits to the founder’s decision making on the employment system. By better understanding the competitive environment, it can be postulated that a series of improvements can be made to their strategic decision making.

The notion that scientist-founders (who are experts in their areas and have knowledge and expertise around how to control and coordinate work in their expert areas) may be able to combine their knowledge of science and understanding of their competitive environments may be key to understanding how biotechnology firms can successfully commercialise. Future research could examine this dynamic and also examine the extent to which these cognitive blindspots and narrow cognitive corridors play in limiting effective HR strategy in emergent firms.

The need to develop and balance business and science expertise in biotechnology brings up the importance of studying scientists careers for entrepreneurship. Future research could also examine in greater detail the relationship between the bio-entrepreneur’s human and social capital, and the employment system, on important network characteristics such as scientific collaborations and innovation. It would appear that founders of scientific firms who have higher rates of collaboration will also have a large number of students at all levels within their laboratories (Oliver, 2004). Given the potential pool of human resources that these collaborations provide, it would be interesting to examine the ways in which these relationships valorise the scientific human capital of bio-entrepreneurs (including members of their laboratories) as well as the particular processes of the employment system that contributes to important outcomes such as patents and intellectual property are mitigated by these relationships. Company C for example, utilised a PhD and post doctoral “staffing” programme in order to develop
their own talent for the company. This “make” employment system strategy demonstrates that scientist-founders may be able to utilise the significant resources at their disposal, not only from their individual human and social capital, but also from their relationships within institutional settings. The implications from this research area may not only offer explanations of the innovative process among bio-entrepreneurs, but also account for the important roles that founders play in the knowledge transfer and sharing of science and technology (Beltramo et al., 2001; Zucker et al., 2002a). Future research should also examine the ways in which the employment system of firms may encourage successful collaborations and sharing of knowledge with important network ties.

Fostering collaborative strategies within firms are becoming increasingly ingrained in scientific networks (Bozeman & Corley, 2004), the ability to understand the role of employment system practices within firms to complement this increasing imperative becomes a matter not only for specific firms but also as a matter of public and organisational policy. The need to foster successful collaborations and ensure that the generated capital from all levels of the firm are utilised productively and successfully will ensure great returns for most biotechnology industries (Oliver, 2004; Powell, Koput, & Smith-Doerr, 1996).

Our final suggestion for future research lies in the institutional embeddedness of our case study organisations. As discussed previously, the extent of the relationship between the case studies and their institutional origins provided some interesting insights into the development of the employment system. These institutional factors become important for organisations, particularly for spin-offs. Our findings indicate that organisations can and do enjoy the legitimacy and resources endowments provided by their institutional origins. However, our findings also indicate that the relationship that organisations have with their institutional origins provide different forms of endowments and implications for the employment system of these organisations. Company B for example, maintained a fluid relationship with its institutional origins, while Company C maintained a “hands-off” policy by virtue of its independent funding while enjoying the full benefits of being embedded within its institutional setting. Future research could examine the extent to which resources and legitimacy provided by institutional origins affect the quality of their resource endowments. The conflicts of interest and the sharing of resources with their institutional ties may impact on the companies’ ability to build on their capabilities. Future research could shed light on the conditions and contexts to which successful
companies are able to build on their beginnings and develop their own identity and resources. Company A, for example, is testament that a spin-off that renounces ties to its institutional origins can build its own form of legitimacy and obtain resources not tied to the original institutional setting. However, although this finding provides great insight into the relationships between the institutional environment and the organisation’s employment system, further work is required to examine the details of these processes and mechanisms. For some firms, the decision (as in Company A) to forge ahead by itself may be tied to strategic considerations for the future and ongoing viability of the firm. The findings from this research are suggestive; however, it provides some powerful and thoughtful theorising for the institutional environment and its impact on the founder’s employment system mental model and the employment system of firms.

SUMMARY AND CONCLUSION

The research aim of this thesis was to investigate the relationship between founder’s mental models of the employment system and the employment system in biotechnology start-ups. This research has contributed to our understanding of mental models and their use in organisation building. In this thesis, a number of methodological and theoretical contributions have been made. In addition to this some practical recommendations have been made in which to leverage the impact of mental models and organisation building. All of these contributions are offered specifically within the context of biotechnology start-ups.

Mental models are a useful conceptual lens for enhancing our understanding of organisation building as it encourages researchers to focus on the underlying cognitive blueprints of founders. This current study has shown that the employment system mental model offers an opportunity to explore the cognitive processes that founders utilise in their organisation building. The importance of identifying and studying mental models of founders is profound, and the insights into the founder’s cognitions allow a holistic theory of firm founding and development to emerge by including the contextual and social variables that play a role in the organisation building process. Mitchell et al (2004) stated that “such phenomena as value cognitions are resident in minds that operate only at the individual level of analysis, but which, because of human sociality result in the aggregation of individuals into ventures, ventures into industries, industries into
economies, and so forth, provide compositional consistency/inclusivity across levels of analysis” (p. 515). By exploring multiple perspectives and levels of analysis of the employment system, this thesis has attempted to capture and describe both employment system mental models that founders have and their effects on the employment system of the organisations. This emphasises the founder’s enactment including the antecedents and consequences of their organisation building activities.

History and key decisions at the time of founding have profound consequences on the firm establishing patterns of behaviour that is not easily changed (Baron et al., 1999a; Baron et al., 1999b; Hannan et al., 1996). Founders may subsequently precipitate powerful cultural and family dynamics that affect the evolution of their firms for better or worse (Goffee & Scase, 1985; Handler, 1990). Previous research into the emergence of employment systems suggests that models used by entrepreneurs to guide the ways in which they build their firms vary even in highly homogenous high-technology sectors (Burton, 2001). The design of firms do confirm the idea that bio-entrepreneurs devise organisational forms that are consistent with their own personal values and particular business strategies (DiMaggio, 1991; Fombrun, 1988). This research has shown that the diverse role that founders play in representing the history and interests of their firms is in providing specific knowledge and expertise, networks, and contributing to both the internal and external capabilities of the firm. In this research, the strategic use of employment systems in the New Zealand biotechnology sector shows that founders have deliberate ideas on how to organise people within their firms. Scientific founders indelibly imprint their models of organising work in their firms through the employment system. In addition, the relationship between founder’s mental models and the employment system are moderated by a number of variables such as the organisational resource imperatives, key stakeholders, and the firm’s relationships with the institutional environment.

The emergence of the employment system is a “virtuoso affair”95. It not only points to the important mental models and activities of the founder, but it also involves many factors from the organisation and the institutional environment. This study has built on findings from the analysis of the founder’s mental models and case study data collection

95 DiMaggio (1997) used this term to describe the study of culture
methods to build a theory of employment system emergence that highlights the role of founders, key stakeholders to the organisations, the management team and the contexts of the firm. This not only provides a more complex understanding of how the employment system emerges but it also points to the many varied and myriad forms of employment systems that could emerge even within a given homogenous region or sector. This research has not only provided a means by which we can conceptualise the employment system mental model and its consequences, as well as its origins. The knowledge and experiences of founders become important sources for strategic choices not only in the employment system but also for entrepreneurship. These prior experiences of founders capture the influences of various factors such as social relationships, networks, specific knowledge and experience may lead to entrepreneurship and building the employment system. The focus on scientist’s careers are important not only for the importance of social ties (Granovetter, 1974), but also for the opportunity to explicate the skills and knowledge for exploitation in starting new ventures and organisation building (Carroll & Mosakowski, 1987; Shane & Khurana, 2003).

By examining founders’ ideas about the employment system, this study has provided evidence for founders’ awareness of strategic choices around the employment system. The insight into founder’s strategic choices also highlights the role of the competitive environment on the mental models of founders. This provides not only an understanding of the competitive environment of the firms but also how founder perceive those environments and the impact on their mental models and resultant practices. In this chapter, we also discuss the forms of control and coordination of work through human resource policies and practices that may impact on the employment system mental model and the subsequent employment system. Understanding the intricacies of work and employment offers insight into how founders are able to organise and build their organisations. The employment system mental model works not only to incorporate the founder’s perceptions of the environment but also of the organisational and institutional factors important in the organisation building process. Our analysis of the employment system in this study also highlighted the important role of the institutional setting in the formation of the employment system. The combination of examining individual, organisational and institutional factors in this study not only informs the research objectives of this thesis but also generates insight into many areas of entrepreneurship and organisation building.
In the context of a knowledge economy, the management and organisation of people in the biotechnology industry presents unique challenges in increasingly global workplaces. Understanding how the employment systems emerge from founders’ mental models within these firms is more critical and relevant than ever before. While international researchers have studied the substance and shape of these employment systems, less attention has been paid on the antecedents or cognitive thinking underlying employment system rationales. This research investigated the relationship between founders’ mental models of employment systems and the employment systems that they have built. As the imperative for studying how knowledge intensive firms organise work and people in their firms is important in today’s economy, this study explored the initiatives of founders and their companies in implementing and managing employment issues. A cognitive perspective offered an insight into founder’s mental models and how these impacted, and were moderated, in the building of the employment system. Finally, including multiple perspectives on the employment system allowed an additional frame of reference from which to view both founder’s influence and the employment system of their firms.
APPENDICES

APPENDIX A

Biotechnology: A brief background

The demands of biotechnology have significantly changed the way in which governments look at issues relating to the nature and structure of the science base, its relationship to markets and management structures and regulation. Much of the focus during the next decade or so will have to be on the creation of new systems of management and of institutional development (Acharya, 1999, p.9).

Karl Ereky, a Hungarian engineer, first coined the term biotechnology to refer to “all the lines of work by which products are produced from raw materials with the aid of living organisms” (Bud, 1989). The term has been broadly applied to technologies ranging from the fermentation of products such as wine and beer, to extraction and sewage treatment, to the selective breeding of plants. Over the years, the term has become increasingly synonymous with genetic modification. The change in technology particularly that associated with biotechnology has dramatically altered the definitions of biotechnology, its processes have been supplanted and it is now accepted that biotechnology is a term that represents two divisions or historical delineations. A distinction can be made between “traditional biotechnology” processes and “modern biotechnology”. The term “modern” is used to distinguish processes that have been developed in the last 30 years or so, from the traditional biotech areas such as fermentation and extraction. Orsenigo (1989) for example, traced the use of modern biotechnology to the development of the recombinant DNA techniques in 1973 and hybridoma technology in 1975. The rapid pace and impact of these developments in biotechnology have been referred to as the modern biotechnology revolution. This modern biotechnology revolution has the potential to transform large parts of the global economy and to have a major impact on the way we live. Biotechnology is an all-encompassing term featuring a range of applications and uses. In New Zealand, biotechnology has been defined as the “application of scientific and engineering principles to the processing of material by biological agents and the processing of biological materials to improve the quality of life” by the New Zealand Biotechnology Association which includes a spectrum of organisations in activities ranging from traditional biotechnology through to genetic modification (NZBA, 2001)\textsuperscript{96}.

Historically biotechnology has been characterised by three stages of development. The first generation employed fermentation techniques to produce drinks, food and fuel; large-

\textsuperscript{96} This definition matches the one used by the OECD in that biotechnology is the “application of scientific and engineering principles to the processing of materials by biological agents to provide foods and services”. “Scientific and engineering principles” include microbiology, biochemistry, genetics, biochemical and chemical engineering. “Biological agents” refer to a wider range of biological catalysts, but in particular to microorganisms, enzymes, and animal and plant cells. “Goods and services” include food and drinks, pharmaceuticals, biochemicals, recovery of materials such as petroleum and minerals, water purification, and industrial and domestic waste management. A flood of literature describes technicalities of the different branches of biotechnology and actual or potential areas of their application (Bull, Holt, & Lilly, 1982).
scale fermentation techniques were used around the time of the First World War to manufacture solvents. The second-generation technology emerged after the Second World War from the integration of microbiology, biochemistry, and chemical engineering. Such wide-scaled fermentation technology was used in diverse industries such as sewage treatments, and in the chemical and pharmaceutical industries. The third generation technology grew out of advances in genetic engineering or recombinant DNA technology. It is widely accepted that the development of biotechnology was first commercialised in the US in the mid 1970s that was led by academic research. The first was the results of genetic experiments as carried out by Cohen and Boyer opened up the modern biotechnology industry in the early 80s. Herbert Boyer and Stanley Cohen, researchers at the University of California and Stanford University, found that deoxyribonucleic acid (DNA) could be cut, recombined and inserted into a foreign bacterium that would then express a new gene. The second scientific breakthrough occurred two years later when Milstein and Kohler of the British Laboratory of Molecular Biology at Cambridge University in the UK reported the discovery of monoclonal antibodies. By fusing cells with specific properties, they were able to produce large quantities of specific antibodies. The potential for commercialisation for these developments in scientific research was recognised by a US venture capitalist, Robert Swanson, who pioneered the commercial potential of biotechnology and founded the first venture capital biotechnology company in the US in 1976- Genentech. This in turn led to the birth of the biotechnology industry in the US with an explosion of small firms led by academic entrepreneurs who retained close links with their academic base and were financed by venture capitalists.

The subject of biotechnology has been entwined with the debate on genetic modification and the uses of this technology on society and the environment. Its current and potential impact has been the subject of many media and scholarly debates. Whilst a discussion of these social and political impacts is beyond the scope of this thesis, it is essential in a brief review of the biotechnology industry to highlight the changing landscape in which biotechnology operates.

The impact of biotechnology will be pervasive. Public perception and governmental response will be of paramount importance in setting a regulatory framework and determining the rate and direction of the diffusion of technology. The power of public feeling must not be underestimated; consumer resistance and fears for safety and pollution for example, can seriously encumber commercial prospects (Advisory Council on Science and Technology, 1990, p. 23).

The advances made from biotechnology will very likely alter both the lives of its consumers and the production and industries of its users in very fundamental ways. For example, the first commercial products of transgenic technology entered food supply chains in the late 1980s. Over this period, more than 40 genetic modifications related to 13 different crops were produced by the year 2000 with more in advanced stages of

97 For historical and analytical accounts of the birth of biotechnology the works by Acharya (1999), Bud (1989), Kenney (1986), and Orsenigo (1989) are a good starting point for the antecedents and historical developments of the biotech industry worldwide.

98 Readers are directed to Gaisford, Hobbs, Kerr, Perdikis, & Plunkett (Gaisford et al., 2001), McKelvey (1996), Bud (Bud, 1993), and Fumento (Fumento, 2003) for a view of the public perception and social and political impacts of biotechnology on the public conscience.
development waiting for regulatory approval (Organization for Economic Cooperation and Development, 2000). With biotechnology having the potential to alter fundamentally the constraints that have traditionally defined the interaction of humankind with the biological environment, the debate of its uses and growth will be tied with social and political aspects of its regulation.

Van Vliet (1998) characterises the biotechnology industry as one that is not easily partitioned into traditional analysis of emerging technology. The very fact that it is a young industry, has the potential to have a huge monumental impact on our daily lives, and is a contentious arena for commercialisation leaves it to be described as having “very little consensus regarding any aspect of biotechnology” (Gaisford et al., 2001). While we have some understanding of its vast impact, there remains much that needs to be explicated and understood about the technology and the industry. However, some general principles and characteristics can be described regarding the industry.

In general, the biotechnology industry can be characterised into several different sectors that utilise this technology. The development of biotechnology has been described as being more developed in some sectors than others. For example, the first companies that were formed emerged as a result of breakthroughs in medical technologies. However, in terms of the early rapid adoption of biotechnology, medical pharmaceutical sectors were the first to adopt the application of the technology. Patent approvals for genetic engineering products in the early 1980s were granted to biopharmaceutical products and related products and this is a trend that continues to grow.

Three of the mains sectors that recognise the early use of modern biotechnology have been the medical pharmaceutical sector, the agricultural sector and the environmental sector. Acharya (1999) discussed the different developments in these various sectors as indicative of a number of economic and regulatory influences. She notes that the different emphasis in the use of biotechnology-based commercialisation is a result of traditional economic emphasis within the region. For example, in developing countries, the traditional emphasis on an agricultural economy has seen the application of biotechnology primarily within that sector. Investment in the agricultural sector and the industrial remediation technologies were slower to follow that was seen in the medical sector (Acharya, Arundel, & Orsenigo, 1996). For example, the Agricultural sector relates to agricultural biotechnology, food processing and also overlaps biotechnologies relating to animal health and husbandry. In contrast to the pharmaceutical sector, the application of biotechnology in agriculture was slower to be adopted. This was attributed to the fact that the process of commercialisation originated in the biomedical field and the process for product development in the agricultural sector faced significantly more stringent regulations. Product development in agriculture was slower to adopt agricultural applications due to these stringent regulations and gaps in the regulation of biotechnology within that industry. Furthermore the profit margins within this sector were not seen as large compared to the biopharmaceutical industry (Acharya, 1999). Participation of biotechnology in the agricultural sector has been analysed from a largely regional and economic resource perspective whereby developing countries and traditional

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99 This thesis provides a brief overview of the biotechnology industry and the developments in different sectors. However, readers are encouraged to read a number of books that discuss the developments of biotechnology in detail. For example, Acharya (1999) and Orsenigo (1989) has provided an overview of the sectoral development of biotechnologies from an economic perspective, Further, Gaisford et al (2001) and Pardey (2001) both provide an analysis in the agricultural and environmental sectors.
economies of industrialised countries were seen as drivers of the use of biotechnologies within this sector (Acharya, 1999; Acharya et al., 1996).

The third major sector of biotechnology use is the environmental sector. This has been described as the most underdeveloped of the three sectors (Acharya, 1999). Clear use of biotechnologies within this sector is largely seen in the use of biopesticides and bioinsecticides used in agriculture, and technologies used in the cleaning of industrial wastes and spillage. Despite the importance of this sector, activities in commercial application remain relatively small (Acharya, 1999). This is seen as a result of the lack of long-term returns on investment. Other reasons include the lack of coherent environmental legislations and enforcement, and the perception that waste remediation is seen as a cost rather than a profitable exercise (Organization for Economic Cooperation and Development, 1996). In spite of the rapid adoption of biotechnologies within these different sectors, the primary sector of importance remains the biopharmaceutical sector.

As with the industrialised countries, technological learning has been incremental over the years and applications are based largely in sectors with traditional strengths in R&D (Acharya, 1999, p. 23).

The focus of the medical sector R&D on drug discovery promised rapid developments with the advent of new technologies around chemical and biological genomic research. Biotechnology introduced rational drug design to the sector. Rational drug design involves the interdisciplinary process of scientific research that depends on an increased knowledge of cellular mechanisms and control, thereby increasing the understanding of the physiological base of the disease. This specificity and targeted outcome of applying biotechnology in this sector made the process efficient (Acharya, 1999). As stated above, while variations remain from country to country and certainly in different sectors, the majority of companies active in biotechnology are based in the health sector (Sharp, 1985). Traditional incumbents within the sector such as the multinational pharmaceutical companies were slower to adopt biotechnologies within their R&D departments preferring instead to fund outside institutions such as universities. Others appeared to wait and watch the trends and outcomes in the use of biotechnology before committing to any changes (Acharya, 1999; Acharya et al., 1996). With the increasing importance of biotechnology as a potential process, larger multinational companies began to acquire smaller biotechnology companies or to seek strategic alliances including building up their in-house R&D capabilities. As Dodgson (1991) points out:-

There are a number of other reasons why it was small commercialised companies rather than large firms, which initially developed biotechnology. One reason lay with the unproven and risky nature of the technology itself. If these small commercialised companies were developing the technology and undertaking the risks, why should large firms bother developing their own competences when they could clearly acquire them when the science was better established and market opportunities clearer? Conventional pharmaceutical companies’ R&D structures tended to be arranged in line with the disciplines of biology and chemistry. The new skills of molecular biology did not accord well with these existing structures. Furthermore, the traditional methods used in the search for new drugs- the search for new substances, then extensive screening for potential applications- were very different from possibilities provided by biotechnology whereby drugs could be ‘designed’ with a particular application in mind (p.4).
For this and a number of other reasons, the most important of which include the linkages between medical faculties and modern biotechnology research, as well as the expectation of economic profits in the long run, the establishment of modern biotechnology was strongest in the pharmaceutical sector. This sector has since continued to grow and remains by far the successful, especially in the industrialised countries (Acharya, 1999).

Research in science-based firms have typically focused their attention on firm-specific characteristics and thus some identifying factors can be observed (Henderson & Cockburn, 1994; Pisano et al., 1988; Stuart et al., 1999). There are about 4,000 specialised biotechnology companies globally (Ernst & Young, 2002). The biotech companies represent a majority of the developed nations with the most well known and largest, located in the USA and Europe. However, there are significant companies emerging in Canada, Australia, New Zealand and throughout Asia, particularly in Japan. Enterprises in the biotechnology industry can be described as heterogeneous, not only in size but the role they play in advancing biotechnology, the types of biotechnology applications they target, and their industrial behaviour (Saviotti, 1998). However, some common characteristics can be identified regarding the organisations that make up the industry.

As highlighted in the introduction, biotech organisations have high expectations of growth and development due to the potential financial and economic boon from potential everyday applications. In spite of several slumps throughout its 20-year history, the overall trends have been positive by many important measures including the growth of the number of companies, the increasing number of approved products, market capitalisation and revenues (Kermani & Bonacossa, 2003). The biotechnology industry is characterised by large investments of financial resources and time in the face of considerable risk. The costs of clinical trials are costly and time-consuming. Acharya (1999) tracing the emergence of the biotechnology industry noted that despite this, there was a remarkable confidence in commercial biotechnology that was characterised by a spurt of growth and a flurry of activities during the 1980s.

In some cases the relative lack of channels through which to raise money for risky new technology ventures, such as those being undertaken by these firms, severely impeded their ability to grow. The fact that most of them to this day remain unprofitable and have yet to show any new commercial products emerging out of their research, demonstrates the difficulty of ensuring public investor confidence in this technology (Acharya, 1999, p.2).

Other common characteristics in the biotechnology industry have to do with its size. Organisations within the biotechnology industry are generally small and relatively young. The major types of biotechnology companies form either small biotech firms with large pharmaceutical backing or partnerships of small biotechs in participation in multiple members R&D consortia. The emergence of new small biotechnology firms in the United States has attracted a lot of attention to the biotechnology sector and its role in innovation (Bud, 1993). There are a number of reasons for the importance of small biotechnology firms in the biotech industry. Firstly, in the United States, these small firms have contributed greatly to the early product development prompted by new technologies from the academic sector and adapting them for large-scale production (Galhardi, 1994). These small medium sized enterprises have been described as new biotechnology firms.
(NBFs) or small-medium sized enterprises dedicated biotechnology firms (SMEs/DBFs) or dedicated biotechnology firms (DBFs) (Dodgson, 1991; Galhardi, 1994; Saviotti, 1998). However, for the purposes of this research, this thesis will adopt the SMEs/DBF description as this better describes that the companies represented in the literature are small medium sized companies and dedicated to biotechnology-based processes and science.

The potential for rapid adoption of technologies and commercialisation as a business has also prompted the development of the industry by forming linkages with large corporations in the latter stages of product development. This two-way interdependent “synergistic” relationship between large firms and small biotech firms has been largely responsible for the production and marketing of biotechnology in the United States. It has been put forward that SMEs/DBFs have indeed become the liaison or bridge between academic sciences and large corporations (Galhardi, 1994). The development of these unique organisational forms has sparked several books looking at these dynamic forms and its relationships within the sector (Dodgson, 1991; Galhardi, 1994; Saviotti, 1998). These SMEs/DBFs have been described as a very important feature of biotechnology-based sectors: the new form of industrial organisation mainly based on highly knowledge/science-intensive small and medium-sized enterprises and a sharply increasing frequency of inter-institutional collaborative agreements (Saviotti, 1998).

However, SMEs/DBFs have not been the only types of firms that represent the biotechnology industry, although their significance is substantial. Larger, diversified firms (LDFs) such as large pharmaceutical companies, as well as academic and research institutions, also play a part in the biotech industry (Saviotti, 1998). It is estimated that the cost of bringing a drug to clinical market can be a very time-consuming and very expensive business. It is estimated that the cost of bringing a drug to clinical market can be over US$100 million, and a sales force for a successful drug can number in the hundreds of millions. These financial demands place the SMEs/DBFs in a difficult position and the costs may be insurmountable to market their own drugs. Therefore, the relationships with LDFs are crucial in many cases (Dodgson, 1991).

The future for DBFs lies in their ability to develop dynamic and synergistic relationships with large firms, based on their comparative advantage in technological learning and creativity (Dodgson, 1991, p. 10).

There appears to be a high level of collaborative activity between firms in biotechnology. Pisano et al (1988) presented data from a random sample of 200 biotechnology collaborative agreements and found that 62 percent were between SMEs/DBFs and established firms, ten percent were with established firms and five percent were between other SMEs/DBFs, the remainder were with universities and research laboratories. This is supported by another study that looked at large US pharmaceuticals and the showed that on average, large pharmaceuticals had an average of three partnerships with SMEs/DBFs (Yarrow, 1988). The majority of these collaboration is within R&D (Hagedoorn & Schankenraad, 1990; Pisano et al., 1988). Hagedoorn & Schankenraad (1990), in a sample of 638 joint biotechnologies R&D collaborative arrangements, found that the three most common motives behind the collaborations were: technological complementarity (38.1 percent), lack of financial resources (12.1 percent), and reduction

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100 These abbreviations are standard usage from the literature
of innovation lead times (31 percent). These motives appear to be a mixture of strategic and tactical concerns ranging from a short-term to long-term focus. Apart from the vertical collaborative agreements between large and small firms in the biotechnology industry, there have been several high profile acquisitions of SMEs/DBFs by large firms (Dodgson, 1991).

The establishment of biotechnology as a commercially viable set of techniques has taken place most rapidly in countries that are industrialised such as North America, Europe and Japan. Location also appears to also be a major factor in the emergence and evolution of the biotechnology industry. The biotechnology industry appears to be bounded by geographical, regional and national complexities that reflect resource munificence and network linkages. There have been several analyses of regional and geographical areas (Fogel, 2001; Gnyawali, Dibner, & Bean, 1994; Lundvall, 1992; Muller et al., 2004; Nelson, 1993; Porter, 1990; Senker, 1998). The majority of these articles cover the obstacles for commercialising biotechnology such as the lack of venture capital and industrial structures as well as the social, political and economic environment in the biotechnology industries around the world. Once the potential of the technology was recognised, governments put together national plans and policies to encourage and enable commercialisation and diffusion of the new techniques (Acharya, 1999). Most industrialised countries, other than the United States, commercialise their biotechnology through large pharmaceutical and chemical companies. This development is paralleled by countries such as Japan and Germany (Galhardi, 1994). The developmental boom seen by the American phenomenon has not been seen to the extent in other countries. In order to understand the unique development and emergence of the biotechnology sector, it is crucial to understand the developments that have occurred around the world with particular reference to the US experience.

**Biotechnology Firms**

An important place to begin understanding the role of biotechnology firms is to trace the development of the industry with reference to important regional contexts. As stated, the USA is particularly important in the development of the biotechnology industry. The success story of the biotechnology industry in the USA has proved to be a role model for many other countries attempting to mine the technological revolution evident in the biotech industry. Many developed countries, for example, have strategic and economic policies for their biotechnology sectors that attempt to promote growth and innovation in the technology race. Therefore most of the available literature has focused on the unique context of the American experience. In order to understand the significance of the SMEs/DBFs phenomena, it is important to understand the role that these firms have in the advent of the biotechnology industry in the US.
APPENDIX B

Interview Guide

Thank you for participating in this research. I’m interested in finding out about your work and how you have built this organisation. Specifically, I’m interested in the issues of employment and the organisation of work in particular. I’m interested in understanding how this company formed and how it operates.

The interview is completely confidential and everything you say will be held confidentially and will be anonymous. I am interested in your reflections and responses according to your own views and experiences.

1. General

What was the impetus for forming a company?  
Tell me about the history of this company, how would you describe it?  
What is your background?  
How do you see your role in this company?  
What are some features of a ‘typical’ day at work?  
What are some of the things you like about your company?  
What are some of the things you wish were different about the company?  
What are the things you like most about your role in the company?  
What are some of the things you liked about founding this company?  
What are some of the things that were difficult about founding this company? Why?  
What would you say are some of the most interesting aspects of founding this company?

2. Founding Conditions

Who were the founding team members?  
Did any of the founding team members have experience founding a company before starting this one?  
What kinds of expertise did team members have (primarily technical or managerial)?  
How were responsibilities allocated among team members?  
Please describe how the founding team was put together.  
Who was primarily responsible?  
Were people other than the founders themselves (e.g., venture capitalists, executive search consultants) involved in the process?  
What role did everyone play in building this company?  
Who was primarily responsible for hiring and putting together the human elements of this company?  
How were people selected?  
How were people enticed to come on board?  
Which, if any, of the founders knew each other prior to forming the company? How?  
What was your relationship (e.g., co-workers, friends, relatives?)  
What part did the specific members of the founding team/lawyers/venture capitalists/financial investors play in creating the organisation?

3. Organisational Blueprint
Did you/the founding team have a clear notion for what the organisation would look like? Was there a model or blueprint? Where did that come from? Did the founders have a model in mind for how the employment relationship/managing employees should be managed? Did you have ideas about how to coordinate people’s efforts? Were there specific companies whose employment practices you wanted to emulate or conversely companies that you wanted to avoid emulating? Was explicit attention given to personnel issues? Was someone initially given responsibility for this domain? Did you have long-range human resource plans or goals? Did you set out to create a particular kind of organisational culture? How did you set out to do this?

4. Strategy

Competition
What did the market look like when you first formed the company? Who were your product/service competitors? Who were your workforce competitors? What did you envision would be the firm’s source of competitive advantage? How would the firm be different from its competitors?

Plans
Did you start out with goals about where the firm would be in terms of size, revenue, etc. at various points down the road? Was there a target labour force size? Was there a limit, a point beyond which you did not want to grow?

Implications of strategy
At the time of founding, what was the single most important issue/challenge facing the firm? What were some of the employment issues? How did you deal with them?

5. Employment system

Hiring
How do you hire for this organisation? Was the hiring effort focused on particular types of employees? Where did the firm look for employees? Were there particular organisations from which you regularly recruit people? Did the firm use agencies? Why or why not? How were prospective employees evaluated and selected? What were the screening criteria (e.g., particular credentials, experience) How formalized was the process? What made the firm attractive to candidates? What were the main recruiting challenges?

Outsourcing
Did the firm use contractors or temps?
What functions? Why?

How was work accomplished?

How was work divided?
Was there an emphasis on breadth of skills or depth of knowledge?
How clearly were individual jobs delineated?
Are jobs tied to tasks or to individuals?
How was work controlled or coordinated?
Did the firm try any work innovations such as teams or quality circles?

Development

What opportunities were available for people to advance in the firm (e.g., rotations, larger projects, increased responsibilities, formal careers paths)?
Were people being promoted? How quickly? What was the pattern of mobility?
How commonly were positions filled by current employees versus outsiders?
How did people grow in their jobs? Did the firm offer training/educational opportunities?

Performance Evaluation

How was work evaluated?
What were the criteria for evaluating employees?
How frequently were evaluations performed? By whom?
How tightly linked were performance evaluations and compensation?

6. Additional:

Is there anything that you're really proud of as an employer?
Is there anything unique about working at your organisation?
When you think about yourself as an "employer", is there anything in your experience or training that influences your decision making or thinking?
APPENDIX C

COMPANY INFORMATION SHEET

Title: Human resource strategy in biotechnology new ventures: Founder influences on the emergence of employment systems

To: the participant

My name is Marcus Ho. I am a student at The University of Auckland enrolled for a PhD degree in the Department of Management and Employment Relations. I am conducting this research for the purpose of my thesis on the creation of the employment system in biotechnology new ventures and have chosen this field because biotechnology is an important field where knowledge and the management of human capital is key to its success. Jobs within the field are mainly scientific and technical and tend to be filled by people with post-graduate degrees. The study of employment systems has been of interest to the human resource management and strategic human resource management fields. Employment systems are the set of formal and informal practices and procedures that govern how employees are recruited, selected, trained, motivated, controlled, evaluated and compensated. Employment represents an important sociological arena in so much as they represent the actual mechanisms that determine success for the vast majority of individual organisations.

Your company is invited to participate in my research and I would appreciate any assistance your organisation can offer me. As part of my thesis I would like to conduct a case study on your workplace and want to look at what employment systems and human resource management practices have been introduced here in the last two years or so and see how they have changed your work and your workplace.

I would like to interview you and the members of your organisation but they are under no obligation at all to be interviewed. Interviews will be conducted at the workplace or at a place of convenience for the participants of your company. The interviews will take place in person in which topics such as the creation of the organisation and its human resource management policies and practices will be covered. The interview will be used to gather information about your company and its history, and your experiences in creating an organisation around individuals. Each interview session would take half an hour to an hour and would be during work time. I would prefer to audiotape the interview but this would only be done with the participant’s consent and could be turned off at any time or they may withdraw information at any time up to 1st July 2004. In addition, I would also like to be given the opportunity to talk informally with members of your organisation and have access to archival information about your organisation such as company reports and employment contracts. The information from these informal talks and archival information will only be used for the research that is being conducted. Any information that is collected will be held confidentially and your company and the participants will not be identified in any way in the research. Your company will be allowed to withdraw the information at any time up to 1st July 2004.

If you require any further information about the research project, please let me know by phoning me on Tel: 3737599 ext. 85762 or 021 114 7406 after hours. All information you provide in an interview is confidential and any information about your company will not be used in any reports of the data.

Thank you very much for your time and help in making this study possible. If you have any queries or wish to know more please phone me at home at the number given above or write to me at:

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For any queries regarding ethical concerns please contact:

The Chair, The University of Auckland Human Subjects Committee, The University of Auckland, Research Office – office of the Vice Chancellor, Private Bag 92019, Auckland. Tel: 373 7999 ext. 87830

APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN SUBJECTS ETHICS COMMITTEE on 12 December 2002 for a period of 3 Years, from 12/12/02 reference 2002/357
CONSENT FORM

THIS CONSENT FORM WILL BE HELD FOR A PERIOD OF SIX YEARS

Title: Human resource strategy in biotechnology new ventures: Founder influences on the emergence of employment systems

Researcher: Marcus Ho

I have been given and have understood an explanation of this research project. I have had an opportunity to ask questions and have them answered. I understand that as part of this project that the CEO and top management team will be also be interviewed.

I understand that I may withdraw myself or any information traceable to me at any time up to 1st April 2004 without giving a reason

• I agree to take part in this research

• I agree/do not agree that the interview will be audio/videotaped

Signed

Name:  
(please print clearly)

Date:

APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN SUBJECTS ETHICS COMMITTEE ON THE 12TH DECEMBER 2002 FOR A PERIOD OF 3 YEARS REFERENCE 2002/357
APPENDIX D

Comparative Cause Mapping: An Overview

One of the advantages of the comparative cause mapping approach is the ability to produce rich data around central concepts and causal ideas that the researcher is interested in (Laukkanen, 2001). This advantage also approaches the study of cognitive phenomena without approaching with any *a priori* preconceived ideas about the form and nature of founders’ thinking around the employment system. Thus, founders’ key concepts and causal linkages regarding the employment system represent the raw and naturalistic cognitive phenomena of founders’ conceptualisations of the employment system.

CMAP2 standardisation may eliminate the original data richness, however due to standardisation, it is sometimes unavoidable due to the need to remove redundancies caused by synonymous expressions and for comparability of the utterances of the founders (Laukkanen, 2001). Therefore, mapping actually used words into a standard meaning space is critical. This study used a soft approach that replaced synonymous expressions with some typical term, close to the respondents’ natural vocabulary. This approach allows greater reliability to the standardisation process and allows meaningful comparisons to be made across founders. Validity of this approach can be obtained by getting the respondent to review and affirm the ensuing cause maps for external validation.

There is an established set of procedures and steps in analysing data for comparative cause mapping (Laukkanen, 1990, 1996, 1998). For ease of analysis and data processing, software called CMAP2 was developed (Laukkanen, 1998). The software comprises a database management system that also incorporates simple statistical calculations. The software covers the stages from data processing and the comparative analysis of cognitions. The software is not a commercial programme, it was designed and distributed free for research use.

The objective of the comparative cause mapping approach as stated by Laukkanen (1990) is to construct a manifest representation- a model or some description- of the covert theoretical constructs before studying them. Thus, the comparative cause mapping approach offers a systematic and rigorous approach to analysing the thinking that underlies founders’ cognitions when building the employment system within their organisations. In particular, results of the systematic standardisation of the data from the interviews with the founders allowed a comparison and analysis of the cognitions that founders’ have of the employment system as well as the causal thinking that they might have on these structures. The CMAP2 software was used to expedite the data processing required for this large number of data sets in constructing meaningful and ordered analysis across all cases. This approach allows for critical comparability in terms of the respondents knowledge bases and allows an analysis over several domains giving a rich description of the respondents’ situations (Laukkanen & Peltoniemi, 1995). The tool has become a standard analytical platform in comparative cause mapping research (Budhwar & Sparrow, 2002; Laukkanen & Niittykangas, 2003; Laukkanen & Peltoniemi, 1995). Comparative cause mapping highlights the role that subjective knowledge has in management. It enables an understanding and explanation of phenomena in the context and its supports some level of predicting what might happen as a consequence of planned action or autonomous occurrences of events in the environment (Laukkanen, 2001).
Following from Laukkanen (1992), standardised concepts were examined in detail and domain maps constructed around the focal concepts. The standardisation of the natural language units into standardised concepts allowed an analysis of the founder’s employment system mental models. These domain level constructs can be grouped and understood according to academic research and conceptual similarity. This is a useful basis for analysis as firstly, they are \textit{a priori} important and secondly, they represent important theoretical inferences. Analysis of the founder’s cause maps around key focal concepts and domain maps reveal that founder’s cause maps were centred around four main areas for analysis. These areas were employment system antecedents, employment system, organisational culture and organisational goals.

\textbf{Locating Central Phenomena}

It is useful to explore the relative status of the standard concepts used by the founders. CMAP2 calculates the centralness of each SNT by examining the indegree and outdegrees and their sum total degrees. The analysis identifies the number of linkages into (\textit{Id} = indegree total) a standard concept (SNT) and of outgoing linkages (\textit{Od} = Outdegree total) from one standard concept to another in the total cause map. The number and the relative weight of the \textit{Od} vs. \textit{Id} are broadly indicative of the concept’s centrality or weight. A concept with a high total degree suggests salient, contextually influential phenomena (Axelrod, 1976; Bougon, 1983). Concepts which have a high \textit{Od} but low \textit{Id} suggests less controllable, yet critical external factors and vice versa (Laukkanen, 2001). This simple analysis allows us to indicate the cognitive complexity (Eden et al., 1992). This analysis has some similarity to the implication grid and repertory grid methodology in the analysis of cognitive complexity (Bieri, 1966; Eden et al., 1992; Hinkle, 1965). For this purposes, the calculation of the number of indegrees and outdegrees from each node that is in its immediate domain does not only indicate cognitive complexity but rather the local importance of particular nodes. Analysis of this indicates the richness of meaning of each particular construct. Moreover, it is used as a method for identifying core constructs used to summarise or overview the cause map. In past studies, these central concepts may depict organisational knowledge or an organisation ‘recipe’ similar to the notion of the industry recipes- also described in the literature as cryptic constructs (Bougon, 1983; Smircich, 1983; Spender, 1989; Weick & Bougon, 1986). The meaning derived from these cryptic constructs are taken to have intersubjective convenience in organisational conversations (Eden et al., 1992; Langfield-Smith & Wirth, 1992). The CMAP2 database allowed calculation of the degree of similarity and differences based on the concepts and their linkages. Locating central phenomena among the founders and their shared causal linkages can be examined in detail in cross case analyses.
## Table E. Standard concepts of Founders

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