An Exploration of Barriers and Enablers to Knowledge Transfer between Venture Capitalists & Deep-technology Ventures in New Zealand

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Abstract

With a global shift towards a knowledge economy, intangible knowledge such as those derived from entrepreneurs have become increasingly valuable. In order to extract and maximize potential from these intangible assets, venture capitals (VCs) are often sought by entrepreneurs to provide both financial and non-financial value-add. However, in reality, study findings have indicated that this may not be the case. Therefore, this study aimed to investigate the VC-CEO interaction in New Zealand through the knowledge transfer perspective to understand value-add from both perspectives. In addition, the study also sought to understand the barriers and enablers to knowledge transfer between VCs and their CEOs, while capturing any potential mitigation strategies.

To achieve this, the research adopted a qualitative research strategy to gather data from fourteen semi-structured interviews split evenly amongst VCs and CEOs. The study used an abductive approach to theory and found the results to be consistent with prior literature on the VC's value-add. The study found an additional VC value-add while uncovering the value-add from CEOs, generating a bi-directional view on value-add. Based on individual propensity and capability, key barriers and enablers to knowledge transfer between VCs and their CEOs were divided into willingness, external input, competence, and learning.

The study provides two theoretical frameworks to organize theoretical value-add and reflect the multidimensional nature of barriers and enablers. Findings from this study offer new insights into the bi-directional value-add, while enriching the knowledge transfer research landscape in New Zealand. This study also offers practical insights for managers and CEOs involved in joint ventures to optimize the transmission and uptake of valuable knowledge in their daily operations.

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1 Introduction

This chapter presents the background and purpose of the study, including research objectives and questions developed to inform methodology and serve the research purpose. An outline of the thesis is also provided at the end.

1.1 Background

Around the 1800s, the Industrial Revolution propelled changes that accentuated the relevance of knowledge-based innovations for economic growth and prosperity. This shift towards a knowledge economy placed greater importance on intellectual capital, as "knowledge has become the resource, rather than a resource" (Husted & Michailova, 2002, p. 60). In other words, value creation relied increasingly on intangible assets such as knowledge rather than on physical and tangible assets (Stam, 2015). In turn, the development and management of intangible assets constitute an increasingly important source of competitive advantage (Carlile, 2002).

While intangible assets can be created internally, entrepreneurial ventures, in particular, rely on external sources of knowledge to bring innovations to the market. One key external source of tangible and intangible assets that entrepreneurs can assess is venture capitalists (VCs). VCs invest in companies with technologies that have high growth potential in the hope of generating returns (Catalini et al., 2019; De Clercq et al., 2006; Samila & Sorenson, 2010; Vassilev, 2005). In turn, VCs are often framed as significant drivers of value creation in the knowledge economy. Not only do VCs supply financing for high-risk start-ups until they become self-sustaining (Lerner & Shepherd, 2009), but they also employ their specialized knowledge to support entrepreneurs with relevant market insights, business and technical knowledge and relevant networks. In doing so, VCs carry out boundary-spanning activities across different entities in the innovation system and transfer knowledge and other intangible resources to entrepreneurial ventures (Malecki, 2018; Sun et al., 2019). In this context, Park (2015) acknowledges that VCs are a major source of knowledge for entrepreneurs. As such, venture growth and survival often rely on the ability of VCs to transfer 'value-adding knowledge' to their portfolio companies.

However, empirical evidence suggests that not all VCs are able to equally accomplish this value-add (Grilli et al., 2019; Wright et al., 2004). For instance, studies indicate that New Zealand investors often provide less value-add compared to US-based investors, implying a difference between geographical contexts (Korber et al., 2022; Krishanasamy, 2019). In addition, Meija et al. (1990) and Zheng (2011) revealed that a VCs involvement in managerial matters was not always perceived as valuable by CEOs of portfolio companies. These examples suggest that although VCs can be an important source of relevant knowledge that supports venture growth, whether value add is accomplished will depend on the relevant knowledge a VC possess, to what extent that knowledge is transferred efficiently and how well knowledge can be utilized by an entrepreneurial venture (Park et al., 2015). Yet, academic insights into the complexities of knowledge transfer between VCs and their portfolio companies are largely missing.

This thesis builds on knowledge management theory to explore this gap in the literature. Grounded in various disciplines, knowledge management theory broadly concerns strategies used to

organize and maximize knowledge assets within a company (Girard & Girard, 2015). Knowledge transfer is a crucial aspect of knowledge management and refers to an organization's ability to harness intangible value through exchange processes (Argote, 2012). In turn, literature on knowledge transfer constitutes an appropriate theoretical lens to better understand when and how VCs can add value to their portfolio companies through the provision of knowledge assets (Cinzia & Zotto, 2003; Dessi & Yin, 2015). Exploring the interactions between VCs and portfolio companies in attempts to transfer relevant knowledge promises valuable insights into how knowledge is shared between these parties, how knowledge transfer processes are managed and what factors hinder or enable successful knowledge transfer.

1.2 Research Purpose and Questions

Building on the empirical and theoretical gap outlined above, this study has two main objectives. First, to understand whether or not New Zealand VCs realize their value-adding roles, in particular, related to adding relevant knowledge to their portfolio companies. Second, to investigate the key barriers (and enablers) that hinder (or facilitate) knowledge transfer between VCs and their portfolio companies in New Zealand. Because knowledge transfer always involves a transmitter (in this study, mainly the VC) and a receiver (usually the executive team of the portfolio company), the above objectives will be explored through the perspectives of VCs and CEOs of their portfolio companies in New Zealand. In turn, this research aims to answer the following research question(s):

1. *Does value-adding knowledge transfer occur between New Zealand-based VCs and their portfolio companies?*
2. *What are the barriers and enablers to the transfer of value-adding knowledge between VCs and their deep-tech ventures in NZ?*

1.3 Research Methodology

A qualitative research strategy was employed to develop an in-depth understanding of knowledge exchange barriers (Argote, 2012; Cummings & Teng, 2003; Pinho et al., 2012; Wang & Noe, 2010). In its focus on individual understandings of what qualifies as 'relevant' knowledge and subjective perceptions of barriers and enablers, this research was grounded in an interpretivist paradigm. The interpretivist study incorporated participants' nuanced views on knowledge transfer with the researcher's interpretations of interview responses (Pham, 2018). Data collection and analysis relied on an abductive approach. While a conceptual framework grounded in knowledge management theory provided a starting point, emerging themes and insights gave rise to more inductive approaches to theorizing (Saunders et al., 2019).

Purposive, convenience and snowball sampling were used, guided by theory-informed criteria to select VCs and venture-backed CEOs in New Zealand's deep-tech industry in the early- and post-investment stages (Berg & Lune, 2017). According to literature, ventures in early-stage and post-investment phases were most likely to be influenced by VC input (Bonini & Capizzi, 2019; Croce et al., 2013; Timmons & Bygrave, 1986). Deep-tech ventures were selected due to their intense focus on

knowledge and other intangible assets (De la Tour et al., 2017; Schuh et al., 2022), which allows the researcher to capture meaningful data relating to knowledge transfer. Fourteen semi-structured, in-depth interviews ranging between 40 and 60 minutes were conducted using video conferencing software to collect rich data about VC-CEO interactions and knowledge transfer. Transcripts of the interview were imported into a qualitative data analysis software (NVivo) for thematic analysis and coding. This process revealed common themes around the barriers and enablers preventing a VC's value-add through knowledge transfer.

1.4 Research Contribution

As the literature on VCs and venture-backed CEOs' knowledge transfer is still limited, this research contributes empirical findings regarding value-add through a different lens. Studies have mostly focused on pre-investment phases of a venture, investment criteria of VCs, or selection criteria of entrepreneurs. Instead, this research includes participants involved in post-investment phase ventures to zoom in on the active value-add and knowledge transfer activities between VCs and CEOs. Additionally, this study includes responses and opinions from both the VCs and CEOs, providing a dual perspective on the same phenomenon.

From a practical standpoint, the study may help entrepreneurs understand the inherent value of VCs through the VC and other CEOs' perspectives. Similarly, both perspectives allow VCs to gain awareness of the significant value brought about by their venture-backed founders. For both VCs and CEOs, as well as other players in the ecosystem, insights can be obtained about the barriers and enablers to knowledge transfer when conveying complex and tacit information. Individuals who find themselves in a similar context could learn to avoid potential barriers while maximizing enabling factors. This enables interactions to be optimized between VCs and CEOs to further the growth and increase the competitiveness of the company in a given market.

1.5 Thesis Outline

The thesis is structured as follows: Chapter 2 introduces the VC's operations and value-added services. This is followed by Chapter 3, which discusses knowledge management theory, knowledge transfer and theoretical variables. Building on that, a proposed conceptual framework in Chapter 4 integrates insights from Chapter 2 and Chapter 3. Chapter 5 presents the justified methodology for this research, while Chapter 6 and Chapter 7 discuss the findings from the data collected. Lastly, Chapter 8 presents the research conclusion, contributions, limitations and avenues for future research.

2 Venture Capital (VC) and their Value-Add

First, this section discusses venture capital firms (VCs) and their importance in the knowledge economy. Then, a VC's structure and objectives are laid out, followed by their typical investment cycles. Finally, both VC's financial and non-financial value-adding roles are presented, with conflicting evidence to serve as a basis for one of the research objectives.

2.1 Venture Capital and their Importance in the Knowledge Economy

Knowledge has become one of the most valuable assets of the 21st century. Nowadays, an organization's competitive advantage often relies on intangible knowledge rather than on physical assets (Pulic, 2004). This holds especially true for deep-tech ventures. These constitute a significant part of this new economic reality and solve complex problems through the use of advanced multidisciplinary technological solutions. With a focus on knowledge-intensive activities, deep-tech ventures have become a major source of technological innovations, while taking up a disproportionately large share of employment growth. In 2019, 2,148 new jobs were created by the technology sector in New Zealand, with a five-year average of 2,910 new jobs per year (NZTech, 2020).

To achieve rapid growth, deep-tech ventures engage in knowledge-intensive activities that require significant capital requirements. These result from the high development costs and long time horizons that the development of cutting-edge technologies entails. Due to strong competition, numerous uncertainties and the long time it takes to generate a profit from novel technology, deep-tech ventures have high failure rates. Studies suggest that more than 60% of new firms fail to survive their first five years (Dahl & Reichstein, 2007). As a result, entrepreneurs in general, and deep-tech ventures in particular, have often restricted access to conventional financing such as bank loans (Brown et al., 2017; Gomez-Mejia et al., 1990). To address this, venture capital firms (VCs) provide an alternative financing method in the form of private equity. Support from VCs can help ventures to bridge the capital gap and to enhance their survival rate (De Clercq et al., 2006). Indeed, one study showed that VCs reduced new firms' failure rates from an average of 80-90% to around 20-30% (Timmons & Bygrave, 1986). This positive impact on firm survival and prosperity is not only attributed to the monetary support VC provides, but to the non-monetary 'value-add' VCs often contribute (Xu, 2022).

Literature suggests that knowledge-intensive companies, such as deep tech ventures, benefit from the VC's strategic, operational, and investment knowledge (De la Tour et al., 2021). For instance, individuals from VCs may possess prior senior management or consulting expertise to help venture CEOs manage their board or formulate business strategies, respectively (Walske & Zacharakis, 2009). Further, the non-financial value-add of VCs can be derived from their "boundary spanning" roles, where they engage in, and facilitate interactions between various actors such as professional associations, universities, research institutes, CPA firms, consulting firms, recruitment agencies, and media or public relation agencies. This vast array of personal and professional networks facilitates an entrepreneur's access to resources and information (Bahrami & Evans, 1995; Sun et al., 2019). Beyond their portfolio companies, VCs also have a positive impact on the

knowledge economy. VCs recycle knowledge by using existing investments to accumulate their value-adding knowledge base for future investments (Bahrami & Evans, 1995; Timmons & Bygrave, 1986). Evidence supports this, with positive and statistically significant effects found between VC investment and regional innovation (Audretsch et al., 2019).

2.2 The Structure and Objectives of Venture Capital Firms

A venture capital fund is usually formed as a limited partnership consisting of limited and general partners. The limited partners are various investors – such as high net-worth individuals, family offices or institutions with large amounts of capital – through which significant capital is sourced to form a large pool of money. In transactions, the venture capital firm serves as the general partner who is directly involved in making investment decisions to generate a return on investment for limited partners (De Clercq et al., 2006).

VCs provide capital to companies they see as having long-term or high growth potential in exchange for an equity stake, an investment too risky for public sources of capital (Wallmeroth et al., 2018). In addition, VC funds have different investment strategies based on factors including, but not limited to, the VC's domain of expertise, specific technology sectors or industries, stage of a business or the expected size of the exit (Norton & Tenenbaum, 1993). Typically, fundraising from potential limited partners begins after an investment strategy has been set. The fundraising process can often take up to a year or more to reach the target amount. Once reached, VCs will look to deploy the capital it gathered for the fund, which typically has a lifetime of around ten years. The capital deployment phase sees the VC engaging in due diligence and deal negotiation to invest in companies that demonstrate the potential for strong returns. The composition of a fund's portfolio can vary greatly. Depending on the sector or technology market (e.g. some technology sectors require lower capital but a faster growth rate while others require significant capital and are associated with longer timelines), the VC fund size can range from 10 to 30 companies (Ramsinghani, 2014). The time VCs invest in companies is 4.9 years on average, with one-third of VC investments held longer than six to eight years (Norton & Tenenbaum, 1993; Ramsinghani, 2014). At the end of a fund's life, its portfolio will usually be comprised of a mixture of ventures, ranging from hugely successful companies that generate 5 to 10 times in return, those with 1 to 3 times the investment capital to those that result in absolute losses and contribute to the VC's learning experience.

VCs typically invest in early-stage, high-risk ventures that are characterized by high levels of uncertainty related to technology development, founding team capabilities or market demands. As a result, the literature suggests that over a third of VC investments resulted in absolute losses between the period of 1969-and 1985 (Norton & Tenenbaum, 1993). The risks from the high uncertainty over long time horizons are reduced by managing multiple funds of varying sizes at once, with diversification based on the number of ventures, sectors involved or stages of development VCs target (De Clercq et al., 2006; Norton & Tenenbaum, 1993). Despite high rates of failure, VCs are willing to risk their investments in companies with high-risk intangible assets because of the potential to generate significant returns from successful investments. Research shows that one of fifteen VC investments resulted in returns ten times more than the initial VC investment (Norton & Tenenbaum,

1993). Since VCs receive a share of the large profits from the managed fund along with an annual management fee from its limited partners, the generated returns are sufficient to sustain the VC's business (De Clercq et al., 2006; Tykvová, 2018).

To enhance chances of success (and positive returns), VCs provide not only monetary resources but also non-monetary value-add to emerging companies with high growth potential. Non-monetary support often consists of the provision of value-added knowledge in terms such as access to VC's extensive network (know-who) and commercial and operational know-how that is relevant for venture survival and growth. Through their investments, VCs gain significant equity stakes in a venture that enables them to get more actively involved in venture decisions (Gomez-Mejia et al., 1990). In turn, a VC's significant capital commitment provides an incentive for VCs to carry out value-adding activities. For these reasons, VC-backed are often said to perform better than internally funded ones (Croce et al., 2013). For example, a quantitative analysis of US-registered firms found that firms backed by VCs are six times more likely to grow than those without VC support (Catalini et al., 2019). To understand when VCs add what type of value, the next two sections outline the typically VC investment cycle and the different forms of value-add they can provide to their portfolio companies.

2.3 VC's Investment Cycle

In general, a VC's investment cycle can be separated into three main phases (depicted in Figure 1) – pre-investment, post-investment, & exit (Tyebjee & Bruno, 1984).

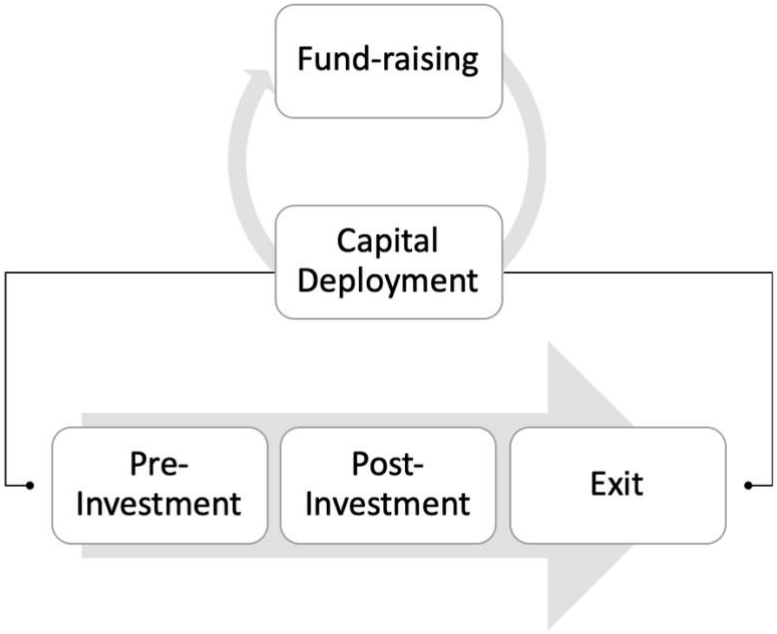


Figure 1. *VC's Operations and Investment Cycle*

2.3.1 Pre-Investment Phase

Before an investment can be made, a VC needs to find and screen technologies and founders who have immense growth potential; this stage is known as the pre-investment phase (Kaplan & Strömberg, 2003). The initiation of contact between a VC and an entrepreneur can occur in many different ways. A VC may actively search for deals by monitoring places such as networking events or technology conferences. They may also maintain a broad network of people in various industries of interest (Wallmeroth et al., 2018)since referrals from prior investees, personal acquaintances, and advisors are one of the major routes for deal origination (De Clercq et al., 2006; Ramsinghani, 2014). In addition, technologies can be brought to VC's attention by cold calls, emails or submissions from entrepreneurs. Following initial contact, a VC would typically have a brief meeting with the entrepreneur. During this meeting, the entrepreneur presents their investment proposal and obtains useful knowledge to understand the VC's operational processes and specialized skillsets. As a result of the initial meeting, both parties benefit from being able to evaluate whether the partnership is a good 'match' (Tyebjee & Bruno, 1984).

To efficiently filter ideas for more in-depth analysis, VCs use a broad set of criteria to reduce the otherwise overwhelming amount of potential investment opportunities. Such 'initial screening' is based on factors such as the size of investment, technology or market, geographic location, and financing stage – all of which allow VCs to conduct quick evaluations on potential investments (Tyebjee & Bruno, 1984). Deals that pass the initial screening move into the due diligence phase, where an in-depth evaluation is carried out to determine if a venture is viable (De Clercq et al., 2006). Different VCs may use various evaluation criteria during deal evaluation, but they share five basic characteristics:

1. *Market Attractiveness* is based on market need, size, growth and accessibility.
2. *Product Differentiation* is determined by the venture's technical capabilities in creating a unique product that can deter competition and enjoy a high-profit margin (i.e. patents)
3. *Managerial Capabilities* of the venture's founders in managing several functional areas.
4. *Environmental Threat Resistance* to uncontrollable pressures from the changing and unpredictable environment.
5. *Cash-Out Potential* of the venture at different exits (i.e. liquidation) (Tyebjee & Bruno, 1984)

Due diligence is followed by the deal structure phase, where a term sheet is negotiated between the entrepreneur and the VCs representative. The term sheet contains objectives, provisions and principles upon which the investment is made. Although not legally binding, a term sheet is a moral commitment and the document which lays the basis for future legal contracts (Klonowski, 2010). The terms in a term sheet may include price per share (ultimate measure of the valuation), capital injection (both financial and non-financial) and share preferences. Theoretically, valuation is determined by projected earnings, while the equity share is determined by pay-out expectations. However, VCs justify their valuation based on a mixture of quantitative and qualitative factors (e.g. stage of the company, founder experience, market need, past financial or performance measures) (Feld &

Mendelson, 2016). In reality, the valuation is also determined by prevailing norms and comparable opportunities that are recently financed. The term sheet will usually contain a summarized capitalization table, where VCs generally receive significant ownership stakes in the ventures, particularly in early-stage deals (De Clercq et al., 2006; Tyebjee & Bruno, 1984). This gives them rights to select the board of directors, provisions that allow VCs to protect their economic position (Feld & Mendelson, 2016) and enables their influence on portfolio companies through their value-adding knowledge. After signing the term sheet, the VC may conduct business, financial and legal due diligence and obtain approval from its investment committee. The deal can be finalized through legally binding contracts (e.g. subscription agreement, company constitution, and shareholders agreement) after all issues have been resolved (Klonowski, 2010).

2.3.2 Post-Investment Phase

Once contracts are signed, and capital is injected, a venture enters into the post-investment phase, where financial capital becomes the least significant aspect of growing the company. In this phase, VCs are more extensively involved in the management of the portfolio company than providers of conventional financing. With a high equity stake, VCs become active business partners and provide the venture with value-added services and monitoring activities that reduce agency risks in VC-founder relationships (De Clercq et al., 2006). Investments of higher risk may be staged over multiple milestones to manage founder motivation and performance (Dotzler, 2012; Metrick & Yasuda, 2011). Some examples would be the completion of a minimally viable product, obtaining regulatory approval, securing the first customer, or reaching a certain revenue (Feld & Mendelson, 2016). Owing to the high equity stakes, VCs have an important influence on the way a venture is managed. To provide some examples, VCs provide advice and recommendations on marketing, business strategy, or recruitment of key personnel. They also often sit in board meetings to monitor managerial decisions, financing, R&D, and internal resource allocation (Gomez-Mejia et al., 1990; Timmons & Bygrave, 1986). Throughout the post-investment phase, VCs base their strategic advice and value-add knowledge on the end goal – the exit phase.

2.3.3 Exit Phase

A VC exits when they end their involvement and dispose of their equity stake in the portfolio company. Most VCs will have a few exit strategies in mind from the outset of an investment. Ideally, a VC will aim for a successful exit that generates profit for their limited partners. VCs can exit an investment in different ways:

1. *Initial Public Offering (IPO).* The venture goes public, and the VC sells its stock in the public stock market;
2. *Trade Sale.* Acquisition of the venture in its entirety by a strategic buyer;
3. *Stock buyback.* The venture buys its own stocks back from the VC to offset dilution and increase value to shareholders; or
4. *Liquidation.* The venture is liquidated, and any proceeds are used to pay off any debt.

Each of these exits has different consequences on ownership and flow of financial resources. For example, a trade sale provides immediate, full liquidity to both the entrepreneur and VC, but both parties lose control over the company. In a stock buyback, the entrepreneur's control increases, and the VC exits, but debt is incurred to the venture to finance the buyback (De Clercq et al., 2006). Because they seek to maximize financial returns that limited partners gain after exits, VCs have an incentive to provide a range of value-added activities to portfolio companies to support equity growth (Metrick & Yasuda, 2011).

2.4 Value-Added Roles

Due to the significant cash injections into an entrepreneur's business, VCs have an incentive, and a right, to take an active role in managing a company's development. As mentioned above, this non-monetary value-add often constitutes a key contribution of VCs (De Clercq et al., 2006; Sapienza, 1992; Sapienza & Timmons, 1989; Tykvová, 2018). The nature and form of value-added will depend on the stage in the investment cycle. While financial value adds will be a key consideration in the pre-investment phase, non-financial value add becomes increasingly important in the post-investment phases (Kaplan & Strömberg, 2003; Metrick & Yasuda, 2011). The literature distinguishes between different forms of value-add that VCs can provide. These are illustrated in Figure 2 and discussed in turn.

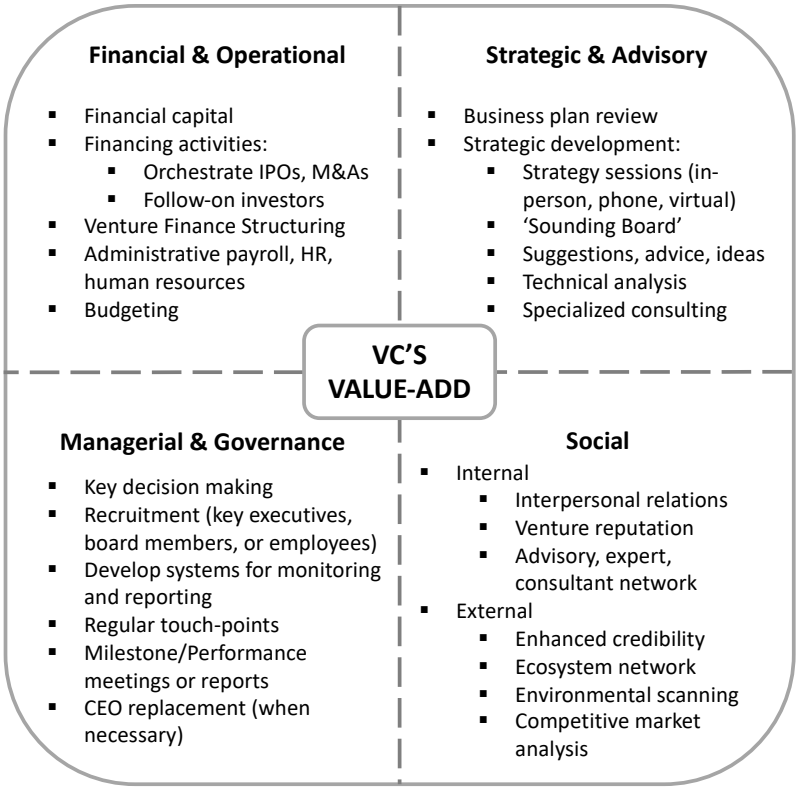


Figure 2. *VC's value-adding roles and activities*

2.4.1 Financial Value-add

Entrepreneurs involved in risky deep-tech ventures require large amounts of capital to carry out their knowledge-intensive activities. A lack of capital can limit the speed of venture development and threatens the company's survival (Colombo et al., 2010). As discussed, conventional financing, such as bank loans, is difficult to obtain for such high-risk companies (De Clercq et al., 2006). While there are many other sources of funding, such as government, universities and research institutes, these usually target knowledge-focused research and are inadequate for bringing new technologies to the market (Audretsch & Lehmann, 2004; Nedayvoda et al., 2021). Conversely, VCs provide the financing required to commercialize and scale knowledge-based innovation (Samila & Sorenson, 2010). This is one of the main differentiators alongside the other non-financial value-adds mentioned in the following subsections.

2.4.2 Operational Value-add

Beyond capital contributions, VCs bring their expertise in financial matters to help a venture structure its finances. For instance, they have knowledge regarding the appropriate combination of financial instruments (i.e. convertible loans, security, equity) to use depending on the portfolio companies' needs for other services (Feld & Mendelson, 2016). VCs may also provide administrative and accounting services to allow their CEOs to focus on the core operations of the ventures. Some VCs may also help ventures with their financial reporting and budgets for progress meetings. Early-stage funding typically lasts a company around 12 to 24 months, after which a venture will require a subsequent round of capital known as follow-on funding (Dotzler, 2012). As part of a VC's financial and operational value-add, they offer their capabilities in organizing and arranging follow-on funding through banks, funds, or other partners and investors. Towards the exit phase, VCs can also play a crucial role in the orchestration of IPOs or acquisitions. In doing so, they can play a critical part in a venture's capital strategy and affect its future roadmap (De Clercq et al., 2006; Gomez-Mejia et al., 1990).

2.4.3 Strategic Value-add

To diversify risks, VCs often invest across different industries or venture stages. However, this can limit the potential for value add as VCs might not always hold specialist experience in each sector. Thus, the literature suggests that some VCs focus their investment activity in markets where they hold an information advantage, instead of diversification (Norton & Tenenbaum, 1993). Complementary and specialized assets can have significant impacts on market entry success and competitive advantage, thus influencing the potential returns. For instance, VCs may invest in ventures with strong intellectual property (IP) positions in their domain of expertise, because they are capable of maximizing the IP's value potential (Gans & Stern, 2003). For this reason, VCs consider the technology market when making investment decisions because it significantly affects the VC's ability to add value to a venture strategically.

VCs may also get involved by participating in "strategy sessions" with founders where they discuss the current situation of the business and future business development plans. They serve as a

sounding board to the CEOs and the venture team on a variety of key decisions by providing advice, assessing entrepreneurs' ideas, and making suggestions (Colombo et al., 2010; De Clercq et al., 2006; Lerner & Shepherd, 2009). This is typically based on their wealth of accumulated experiences as past entrepreneurs, investors, consultants or mentors in the specific industries. During these sessions, VCs may also offer their insights from technical analysis and perform security checks on strategies to ensure success (De Clercq et al., 2006; Timmons & Bygrave, 1986). At times, VCs will arrange hour-long phone calls or meetings between the venture CEO and a VC's contact that has expertise relevant to the venture. These experts usually understand significant pitfalls and hurdles that the CEOs might encounter (Gomez-Mejia et al., 1990). Generally, the VC would emphasize the focus on strategy or future planning even when pressures from current situations overwhelm and postpone such crucial activities (Timmons & Bygrave, 1986).

2.4.4 Managerial and Governance Value-add

The managerial role of a VC is a significant part of a VC's value-add to a venture, despite conflicting responses received from VCs and CEOs (Gomez-Mejia et al., 1990). VCs usually obtain considerable equity stakes in a venture, which allows for significant board representation. The initial venture's board structure typically consists of around five members who are mostly VCs and independent outsiders. The board ensure internal systems for control, monitoring, and reporting are effective. Consequently, board meetings may pay close attention to regular performance reports from its venture to monitor and track performance (De Clercq et al., 2006). Many successful ventures involve management teams formed by the VCs rather than a single entrepreneur (Timmons & Bygrave, 1986). VCs often recruit key executives or management personnel to fill in and compensate for the venture team's lack of business experience. Upon evaluation, they also carry out managerial interventions to reduce business risk and the threat of opportunism. This could involve replacing the CEO if necessary to benefit not the individual entrepreneur but the venture as a whole. Occasionally, the VC may step in to take direct management responsibility for the venture's day-to-day operations if they are dissatisfied with the progress (Gomez-Mejia et al., 1990). Continual monitoring through regular touch-points, progress reports, milestones or performance meetings ensures the venture focuses on reaching agreed objectives. As such, VCs' disciplinary acts add value to a venture by driving overall performance (Colombo et al., 2010).

2.4.5 Social Value-add

The social role of a VC encompasses network, interpersonal, and reputational attributes. VCs are often deeply linked to a complex network within the venture's industry. These may be the players in the entrepreneurial ecosystem, including intermediaries like law firms, universities, research laboratories or institutes, accounting firms, consulting firms, recruitment agencies, investment banks, media and public relations agencies. VCs draw on their network of professional services to help the company with its business strategy and provide entrepreneurs with access to these exceptional resources (Colombo et al., 2010; Sun et al., 2019). Depending on the network, the business contacts of VCs could also help to broaden manufacturing, marketing or distribution operations, establish a

regional or global presence, introduce customers and suppliers, and provide credibility (Timmons & Bygrave, 1986). These benefits in reputation, distribution, expertise and customer relation are examples of social value-add provided by VCs (Knyphausen-Aufseß, 2005).

A venture-backed by a VC with a track record is also often viewed as a potential winner by others in the ecosystem. These reputational benefits make it easier to recruit talent, attract customers, collaborators or investors, and gain acceptance in the public market for IPOs. The valuation of the venture may also be inflated, resulting in a higher capital raise due to the involvement of a highly reputable VC. Furthermore, De Clercq et al. (2006) state that VCs can act as an advisor, mentors, and friends to the entrepreneur within the unpredictable and stressful start-up environment. Because VCs are usually deeply involved in the venture's operations, they share the same understanding and can provide moral support that the entrepreneur may not be able to source anywhere else.

2.5 VC's Value-add: Theory VS Reality

In summary, the above section has clarified that value-add beyond monetary contributions is in the best interest of VC firms (as they can reduce their investment risk) and a venture's founders/CEOs (as they can enhance their chances of success). A VC's non-financial value-add (see Figure 2) is enabled by their technical expertise, specialized know-how, extensive network and intensity of involvement to accelerate new technologies to commercial maturity (Sapienza, 1992; Timmons & Bygrave, 1986). Therefore, the potential for non-financial value-add (value-adding knowledge) is a key consideration for CEOs during the capital sourcing process (Glücksman, 2020). However, VCs vary widely in their practices, level of involvement, resources and capabilities (Colombo et al., 2010). Consequently, the value-add provided by VCs can differ substantially.

Indeed, studies suggest that not all VCs are able, or willing to contribute non-financial value add to their portfolio companies. For instance, a study in 1990 revealed conflicting results when both CEO and VC's perspectives were sought on VC's value-adding roles in high-tech firms (Gomez-Mejia et al., 1990). This study revealed that CEOs viewed financial and networking support as valuable, but managerial interventions received mixed responses, with some viewing it as counterproductive. Within New Zealand, studies identified a lack of experience and maturity both in New Zealand's private equity industry and physical infrastructures, resulting in constraints for New Zealand entrepreneurs to gain support (Deakins et al., 2015). a recent study explored the misalignment of entrepreneur expectations with the capabilities, behaviours and priorities of their investors (Korber et al., 2022). Findings from interview participants consistently highlighted the limited experience and level of expertise amongst New Zealand investors compared to those in other countries, where there were "more robust and deep discussions" with investors.

In sum, the knowledge-related value-add (e.g., regarding know-how and know=who) that is often framed as a key contribution of VCs in the literature is not always accomplished (in New Zealand and elsewhere). To address why VCs may be under-delivering in this aspect, this research explores interactions between VCs and their portfolio company CEOs through a knowledge transfer lens. This theoretical lens is introduced in the next chapter.

3 Theoretical Perspective: Knowledge Transfer

Knowledge constitutes one of the key elements of a firm's competitive advantage (Argote & Ingram, 2000). While knowledge can be developed within organizations, it is also often sourced from outsides a firm's boundaries. For instance, in the context of investors-investee interactions, Park, LiPuma, and Prange (2015) found that VCs add value by providing their portfolio companies access to relevant networks and knowledge. The access to value-adding knowledge enables venture development with fewer resources and capital, thereby improving the venture's efficiency and speed to market (Park et al., 2015). However, as outlined above, VCs are not always able to contribute knowledge-related value-add to their portfolio companies. Considering such VC value-add is achieved through the transfer of knowledge, investigations into the underlying barriers and challenges can add nuanced insights into the observed mismatch between value-add theory and reality. This chapter introduces knowledge management theory, with a particular focus on knowledge transfer processes, as a theoretical lens to explore the outlined research interest. The chapter reviews theoretical foundations and cluster knowledge transfer barriers and enablers that extant literature identifies into four categories. These are incorporated into a conceptual framework that builds the basis for this inquiry.

3.1 Knowledge Management Theory

The first inkling of knowledge management developed in 1776, but it was only in 1963 when anecdotal evidence was transformed into a theory of organizational learning and knowledge management (Argote et al., 2003). Research into knowledge management is grounded in multiple disciplines and draws upon a multitude of theoretical perspectives (Argote et al., 2003; Spraggon & Bodolica, 2012). The most cited definition described knowledge management as a "conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that strive to improve organizational performance" (Girard & Girard, 2015, p. 2). Knowledge management focuses on knowledge acquisition, creation, exchange and the foundations that enable these processes to occur (Argote et al., 2003). In this study, knowledge management is considered as the collection of multidisciplinary approaches used to maximize and optimize knowledge, value and competitive advantage in a team or organization (Girard & Girard, 2015). As discussed, knowledge management has been explored through multiple disciplinary and theoretical lenses (Argote, 2012; Evans et al., 2015; Pinho et al., 2012; Rossi et al., 2020). Argote's (2003) comprehensive review categorises knowledge management literature based on two dimensions: Knowledge management outcome and those contexts. According to Argote (2003), the various contexts affect three knowledge management outcomes, namely, knowledge creation, knowledge transfer, and knowledge retention.

First, knowledge creation, or the acquisition of new knowledge, can occur through observations, formal education or training, research, brainstorming, or expert input (Evans et al., 2015). It alters an individual's beliefs, values, attitudes, and assumptions. This outcome is often studied in the innovation and entrepreneurship literature. Depending on the author, different terms may be used to describe knowledge creation, such as building, contextualization, claim, capture or identification (Argote, 2012; Argote et al., 2003; Evans et al., 2015; Nonaka, 1998). Second,

knowledge retention (also referred to as knowledge storage, holding, and sustaining) is achieved when it is embedded in a repository and exhibits persistence overtime after creation and transfer. This is achieved through methods such as models or prototyping in the case of more tacit knowledge; and organized archiving for explicit knowledge (Argote et al., 2003; Evans et al., 2015). Third, knowledge transfer (which is the focus of this study) refers to processes where experience acquired in one unit – individual, team, organizational unit, organization – affects another (Argote et al., 2003; Spraggon & Bodolica, 2012; Yih-Tong Sun & Scott, 2005). In practice, knowledge transfer is the process that bridges knowledge creation and knowledge retention (Evans et al., 2015). Since knowledge transfer is in the focus of this study, related aspects will be discussed.

3.2 Knowledge Transfer Perspective

Although all three knowledge management outcomes are interrelated, knowledge transfer is often framed as the most crucial aspect. Knowledge transfer constitutes an interface between the knowledge transmitter and receiver in which value is created (Alexander & Childe, 2013). Not only is it important for organizations to create and retain knowledge, but they also need to understand how existing knowledge repositories can be exploited to transfer knowledge internally for competitive advantage (Argote & Ingram, 2000; Cummings & Teng, 2003; Pinho et al., 2012; Tounkara, 2015; Wang & Noe, 2010). Since productivity stems from successful transfer of knowledge (Argote, 2012), exploring knowledge transfer between VCs and their CEOs, and its influencing factors, may uncover insights into the under delivery of value-adding knowledge.

Yet no clear definition of knowledge transfer exists in the literature and the term is often equated to other concepts such as knowledge exchange, integration, sharing, distribution, and dissemination (Alexander & Childe, 2013). Incorporating various definitions (Alexander & Childe, 2013; Easterby-Smith et al., 2008; Evans et al., 2015; Husted & Michailova, 2002; Paulin & Suneson, 2012), this study defines knowledge transfer as *a process involving information transmitter and receiver, through which the recipient unit displays a change in knowledge base or performance*. As such, knowledge transfer concerns the process in which one unit of a network or organization is affected by the experience of another (Argote & Ingram, 2000), and is completed when a recipient unit displays a change in knowledge or performance (Inkpen & Tsang, 2005). In an investor-investee interaction, such value-adding knowledge transfer can happen in both directions. On the one hand, the transfer of different types of knowledge enables VCs to add value to their CEOs and portfolio companies. On the other hand, the CEO engages in knowledge transfer by contributing their ideas and technological expertise from their initial pitch, through their collaboration with VCs in a venture, to the exit phase and beyond (Park et al., 2015).

Knowledge transfer is crucial because both VCs and their venture-backed CEOs need to understand the technology, market, responsibilities, and objectives to reach the desired milestones. These knowledge transfer activities are made possible through the use of a myriad of knowledge transfer channels.

3.3 Knowledge Transfer Channels

Digital technology advancement over the last few decades saw a rapid spread of digital infrastructures, resulting in increased connectivity. This allowed companies to shift away from localization, reducing the cost of market access and enabling firms to grow faster internationally (Jin et al., 2015). In the new mode of operation, people and knowledge sources are more decentralized and dispersed amongst organizational units across the globe, which adds another layer of complexity to knowledge transfer. The importance of knowledge transfer channel selection for successful knowledge transfer is therefore increasingly important. Knowledge transfer channels are consciously or subconsciously selected by the parties engaging in the knowledge exchange process. Different channels exist to facilitate transfer at the interface between transmitter and receiver, such as a VC and its portfolio company CEO, or vice versa (Alexander & Childe, 2013). Common examples of internal knowledge transfer channels from the literature include training programs, meetings, presentations, informal networks and encounters, cross-functional teamwork, and patents. In turn, the selection of the correct knowledge transfer channel is crucial to optimizing performance and value creation (Alexander & Childe, 2013; Spraggon & Bodolica, 2012).

Due to the availability of a myriad of knowledge transfer channels, many scholars have made attempts at categorizing them. The literature distinguishes between informal (coffee break conversations) or formal (training sessions) knowledge transfer channels as well as between personal (apprenticeship) or impersonal (knowledge repositories) and public (conferences) or private (telephone) ones (Argote, 2012; Tounkara, 2015). A more all-encompassing taxonomy for knowledge transfer channels was created by Spraggon & Bodolica (2012). They developed a multidimensional and integrative framework (see Figure 3) to classify knowledge transfer processes in the literature. Four different constructs (degree of programmability, level of discretion, scope of coverage, and process orientation) form a continuum which allows grouping of knowledge transfer channels depending on their characteristics. The multidimensional taxonomy results in four categories as seen in the four quadrants in Figure 3 – static virtual, dynamic virtual, canonical face-to-face processes, and non-canonical face-to-face processes.

First, static virtual processes such as patents, databases and presentations have the broadest scope of coverage due to their ability to be propagated to a large number of audiences. Second, dynamic virtual processes such as emails, telephone and forums are also technologically-oriented but have high levels of discretion from knowledge transmitters and receivers to voluntarily engage in this process. Their scope of coverage is broad while flexible enough to allow targeted groups of people when required. Third, canonical face-to-face processes are people-oriented methods with a high degree of formalization, thus highly programmable and planned with pre-established agendas. These may include formal meetings, brainstorming sessions and workshops, and cross-functional or project teams. It is often implemented by management and involves a smaller group of individuals. Fourth, non-canonical face-to-face processes, while people-oriented, are unplanned and spontaneous. These processes emerge freely, such as through informal encounters, networks, and social activities (Spraggon & Bodolica, 2012).

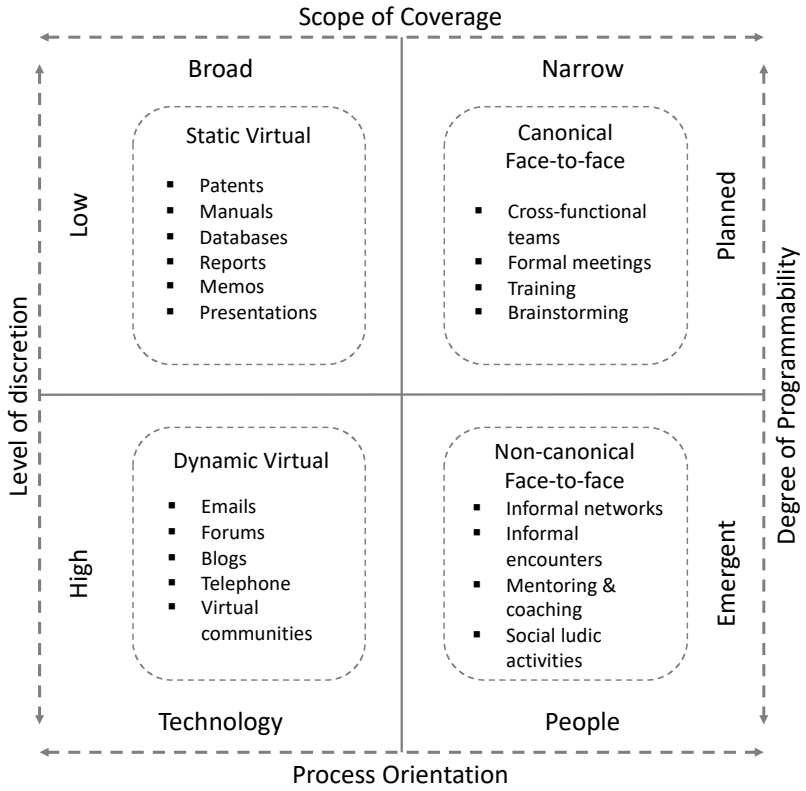


Figure 3. *The Multidimensional Taxonomy of Knowledge Transfer Processes*. Adapted from (Spraggon & Bodolica, 2012)

Depending on the situation and objectives of those managing or engaging in the knowledge transfer activity, different knowledge transfer channels may be more efficient in achieving the outcome. In turn, different channels entail distinct barriers (and potential enablers) to the transfer of value-adding knowledge. Therefore, individuals such as VCs and CEOs warrant a better knowledge transfer outcome when they understand what barriers and enablers exist when using their chosen knowledge transfer channels.

3.4 Knowledge Transfer: Barriers and Enablers

Similar to the literature on knowledge management in general, and knowledge transfer in particular, research around knowledge transfer barriers is grounded in a variety of perspectives (Argote, 2012; Attewell, 1992; Cummings & Teng, 2003; Minbaeva, 2007; Paulin & Suneson, 2012; Szulanski, 1996; Yih-Tong Sun & Scott, 2005). Broadly speaking, these contributions distinguish between factors that have either a positive or a negative impact on knowledge transfer. Knowledge transfer barriers (also called inhibitors or obstacles) are considered factors that hinder various components of knowledge management, including knowledge transfer (Pinho et al., 2012; Szulanski, 1996). In contrast, knowledge transfer enablers (also called facilitators or catalysts) are factors that stimulate, improve and promote knowledge flow (Pinho et al., 2012). This study will primarily refer to these negative and positive factors as barriers and enablers, respectively. It is important to note that both barriers and enablers are equally important because it is the "interplay between the two that allows increasing the

positive consequences of each one" (Pinho et al., 2012, p. 217). In other words, removing the negative factors does not always build the positive, and developing the positive may not guarantee the removal of the negative. Therefore, understanding and acknowledging the barriers and enablers is the first step to planning how to mediate knowledge transfer hurdles (Argote & Ingram, 2000; Minbaeva, 2007; Moors et al., 2008; Pinho et al., 2012; Szulanski, 1996; Yih-Tong Sun & Scott, 2005). Doing so improves a company's performance and competitive edge by maximizing value through proper management of internal knowledge transfer processes (Cinzia & Zotto, 2003; Dessi & Yin, 2015).

Due to the large number of possible barriers and enablers, many scholars have attempted to group them by developing frameworks or categories to allow for ease of digestion (Argote et al., 2003; Cummings & Teng, 2003; Husted & Michailova, 2002; Minbaeva, 2007; Paulin & Suneson, 2012; Tounkara, 2015). Perhaps the most inclusive framework for knowledge transfer barriers was developed by Argote (2003). The framework organizes knowledge management contexts using three categories: properties of units, properties of the relationships between units, and properties of knowledge. These will be adopted to cluster the barriers and enablers for value-adding knowledge transfer between VCs and CEOs. However, knowledge management and knowledge transfer literature commonly suggest the importance of environmental, cultural, and organizational context as a distinctive category (Cummings & Teng, 2003; Moors et al., 2008; Paulin & Suneson, 2012; Pinho et al., 2012; Tounkara, 2015; Wang & Noe, 2010). For that reason, 'properties of unit' will be split into 'properties of individuals' and 'properties of organization'. The remaining parts of this chapter will present the four categories used in this study to group knowledge transfer barriers and enablers – properties of individuals, properties of relationships, properties of knowledge, and properties of organizations. In each sub-section, definitions for each property will be provided, followed by the relevant barriers and enablers.

3.4.1 Properties of Individuals

Properties of individuals concerns the individuals involved in the knowledge transfer process – the knowledge transmitter (source) and the knowledge receiver (recipient). This is a particularly important property, as literature has suggested that out of the three organizational elements – people, technology and tools – the people element is especially important (Argote, 2012). Others have attributed 80 percent of knowledge management to people-related aspects, with the rest to technology (Pinho et al., 2012). The argument stems from the difficulty in transferring tacit knowledge, which is personal and hard to grasp or communicate, therefore requires people to change their ways of interaction, thinking or collaboration to aid the process (Pinho et al., 2012; Szulanski, 1996). Understanding barriers and enablers relating to individuals is therefore pertinent to improving complex and tacit knowledge transfer frequently observed in deep-tech ventures (De la Tour et al., 2021; Gomez-Mejia et al., 1990; Nedayvoda et al., 2021; Timmons & Bygrave, 1986).

Drawing from various empirical studies in the literature, properties of individuals can be broadly categorized under willingness or motivation (personality, power and status, and time

availability), disseminative capacity (of knowledge transmitter), and absorptive capacity (of knowledge receiver).

3.4.1.1 Willingness or Motivation: Personality, Power, Status, and Time Availability

One of the big drivers behind the decision to transfer knowledge is the willingness of the knowledge transmitter and/or the knowledge receiver to exchange knowledge. This is referred to as an individual's motivation, or intensity of effort, where motivated individuals will naturally put forward more time and commitment into the transfer process (Minbaeva, 2007). Seeing as knowledge transfer is interactive, a lack of personal motivation can be detrimental to the success of this information exchange (Spraggon & Bodolica, 2012). Contributing factors towards willingness or motivation in individuals engaging in knowledge transfer can be broadly grouped into personality, power, status, and time availability.

First, personality-related elements like extroversion, agreeableness and openness are positively associated with knowledge transfer success, where individuals show a higher level of curiosity, and actively seek other's ideas and insights. Conversely, close-mindedness sees an individual being so set in their thinking that accepting new ideas become difficult (Minbaeva, 2007; Wang & Noe, 2010; Yih-Tong Sun & Scott, 2005). Confidence levels can alter a person's view regarding the usefulness and relevance of their own knowledge. Lack of confidence can be compounded by an individual's attitude towards mistakes. Individuals who see mistakes as failure or taboo may disengage from knowledge transfer processes to prevent career damage or avoid exposure to judgement and evaluation by others. Hoarding knowledge also means that knowledge receivers have fewer chances of misinterpreting information which would otherwise lead to the transmission of unintended messages (Husted & Michailova, 2002; Wang & Noe, 2010; Yih-Tong Sun & Scott, 2005).

Second, power dynamics can the hinder transfer of unique knowledge transfer when an individual feels that their operational comfort zone is being destabilized (Yih-Tong Sun & Scott, 2005). This arises from an individual's need for a sense of ownership, control and certainty over their accumulated knowledge. A knowledge source may be reluctant to share knowledge for fear of losing individual bargaining power or personal competitive advantage, a characteristic of an individual with low social and relational capital (Pinho et al., 2012). For example, a subordinate may wish to hoard knowledge to avoid a significant change of plans or disagreement with their superior, while managers may attempt to retain power and gain political advantages by withdrawing from knowledge transfer. On the contrary, knowledge sources may be inclined to share knowledge in order to impress colleagues and supervisors for career advancements (Wang & Noe, 2010). Similarly, an individual with strong group affiliation may reject knowledge to prevent disruption in their highly valued group stability, continuity and familiarity. These individuals believe that internal knowledge is superior, so deem external or new knowledge as unnecessary (Husted & Michailova, 2002). Whether or not VCs and CEOs identify themselves as a group or separate entities may be a point of interest and a determinant of knowledge transfer success.

Third, the status of a unit – an individual, team, or firm – is an important predictor of knowledge transfer. For example, knowledge created by a high-status expert is more likely to be accepted than that of a low-status person. Their knowledge may be associated with a "proven record of past usefulness". An expert-level unit usually has more experience and perceived competency, thereby valued more highly by the knowledge receiver to facilitate knowledge transfer (Argote et al., 2003; Szulanski, 1996). At times, knowledge receivers may deem the quality of transferred knowledge as untrustworthy due to the status, competency, or experiences of the source.

Lastly, the time availability of individuals is an important prerequisite for both the knowledge transmitter and receiver to be willing for the knowledge transfer (Husted & Michailova, 2002; Spraggon & Bodolica, 2012). The perceived cost and benefit from the exchange affects an individual's motivation to invest the resource, capital and time for knowledge transfer (Minbaeva, 2007; Paulin & Suneson, 2012). When knowledge transfer is perceived as a time-consuming process that adds a burden to both units, it may appear to be more productive to invest this time elsewhere on other more important activities. Additionally, personal agenda could also stimulate or hinder a person's willingness for knowledge transfer. This is particularly crucial in the VC-CEO context, where a CEO may play several roles in the startup or joint venture, leading to the division of their attention across various streams of work. The level of willingness or motivation to support the transfer process may therefore depend on whether the individual views the transfer project as high or low priority relative to their other commitments (Alexander & Childe, 2013; Cummings & Teng, 2003).

3.4.1.2 **Disseminative Capacity**

Not only does a knowledge transmitter need to have a willingness to share information. They must also have the disseminative capacity to do so. The disseminative capacity of a knowledge transmitter is their ability to articulate and communicate knowledge effectively (Minbaeva, 2007). This may be acquired through education, experience, training, observation, or involvement. The ability to disseminate knowledge for transfer can relate to an individual's communication and persuasion skills in expressing their thoughts (Minbaeva, 2007; Yih-Tong Sun & Scott, 2005). Part of the transmitter's disseminative capacity includes understanding the knowledge receiver's preference for logical structure – textual, audio and visual representation or structural, practical and conceptual illustrations. Establishing an understanding of the recipient's preferred way of thinking and learning allows the knowledge receiver to use the least cognitive effort during knowledge transfer in order to ensure success (Tounkara, 2015).

3.4.1.3 **Absorptive Capacity**

On the knowledge receiver's end, the ability to absorb new knowledge and information is just as important as their motivation to engage in knowledge transfer activities (Szulanski, 1996). An individual's absorptive capacity is used to describe this characteristic, which deals with the ability "to recognize the value of new external information, assimilate it, and apply it to commercial ends" (Cohen & Levinthal, 1990, as cited in Minbaeva, 2007, p. 575). This ability can be derived from a person's basic skills, shared language and relevant knowledge base. Professional background, prior

experiences, level of expertise and degree of familiarity in a knowledge domain can all contribute to a person's shared language and knowledge base as a foundation for knowledge transfer (Paulin & Suneson, 2012; Tounkara, 2015). These will ultimately have a flow-on effect on the receiver's understanding profile and preference for logical structure, a determinant to be considered by knowledge transmitters. Basic skill alludes to the knowledge recipient's competency. Competency explains an individual's learning aptitude, capability or confidence to learn, which can influence the transfer of unique information between units (Castaneda & Cuellar, 2020; Minbaeva, 2007; Pisano, 2006; Tounkara, 2015; Yih-Tong Sun & Scott, 2005, 2005). This also includes the retentive capacity of a person, which reflects the ability of the recipient to internalize and utilize new knowledge obtained from knowledge sources (Szulanski, 1996). Feelings of acceptance or belonging can increase an individual's self-confidence, permitting knowledge transfer to occur without the evaluation apprehension. Conversely, an individual with inadequate competency may not be able to transfer or absorb knowledge effectively, which leads to a decrease in the quality of knowledge transfer.

3.4.2 Properties of Relationship

Properties of the relationship between units relate to the characteristics of the relationship between knowledge transmitter and receiver. Building on extant research, the properties of relationships will be categorized into proximity conditions, the strength of relationships, adopted knowledge exchange channels, and equity positioning.

3.4.2.1 **Proximity Conditions**

Proximity concerns the distance between units. For instance, (Moors et al., 2008) found that knowledge flows are influenced by proximity conditions, such as geographical, cognitive, and cultural proximity. These proximity conditions are important determinants for the flow of information for interactive learning and will be discussed.

First, *geographical proximity* refers to the spatial distance between the knowledge transmitter and receiver. In general, close physical proximity is said to enable interactive learning and the exchange of ideas. Thus, face-to-face meetings benefit knowledge users most when complex tacit knowledge is transferred. In the context of investee-investor knowledge transfer, Tybejee & Bruno (1984) found that VCs involvement and value-add have positive associations with the geographical proximity of the venture. This is because VCs can develop and maintain a closer relationship with the entrepreneur, and oversee the dealings of a venture more immediately (Ansari et al., 2018a). However, despite early and consistent evidence that larger geographical distances inhibit knowledge transfer, there are opposing views. For instance, Cummings and Teng (2003) found that geographical proximity was not statistically significant as a barrier or enabler to knowledge transfer. Rather, the study findings were supportive of effective team decisions and communication through virtual methods over face-to-face methods. They accredit this to the differences in time zones created by the large geographical distance which results in asynchronous communication that allows more time for digestion and leads to less pressure related to group conformity.

Second*, cognitive proximity* between the stakeholders can also influence the effectiveness of knowledge transfer. Broadly speaking, cognitive proximity relates to the notion of information asymmetry (Pisano, 2006). For example, VCs and venture CEOs who come from drastically different disciplines such as business and science will have a higher degree of information asymmetry. Higher degrees of information asymmetry mean there is less cognitive proximity and, consequently, less overlap between the knowledge bases of the source and recipient (Cummings & Teng, 2003). This can make it harder to come to mutually agreeable terms because neither party can appreciate the intricacies of the knowledge of one another (Pisano, 2006). Conversely, if the knowledge base of the knowledge transmitter fits well with that of the receiver, there is more cognitive proximity and greater relative absorptive capacity. With greater relative absorptive capacity – knowledge transmitter and receiver share important prior knowledge bases – assimilation of complex knowledge is much easier (Cummings & Teng, 2003; Paulin & Suneson, 2012; Tounkara, 2015). Although knowledge overlap creates a good foundation for knowledge transfer, zero or total overlap can be counterintuitive as well. For instance, regression analysis reveals a negative relationship between cognitive proximity and knowledge transfer success (Cummings & Teng, 2003). To shorten the cognitive distance between the units, intermediaries like boundary objects are used to allow individuals to exchange knowledge from a mutual starting point. Boundary objects are used to establish a shared context, syntax, or language for individuals to represent their knowledge. They may come in the form of visual aids or analogies to provide a shorthand way of communication, allowing for the shortening of the cognitive distance between units. An effective boundary object should also provide the means for knowledge transmitters and receivers to learn about the differences between their knowledge boundaries and facilitate collaborative transformation of knowledge (Carlile, 2002).

Third, *cultural proximity* relates to underlying incentives between knowledge users such as VCs and CEOs, which potentially induces reluctance to knowledge sharing (Moors et al., 2008). Others have used the term ‘norm distance’ to capture the same concept, where similar culture and value systems allow for smoother knowledge transfer processes. When knowledge transmitters and receivers share the same culture and norms, they establish a common understanding of what is acceptable and unacceptable, which provides predictability to the adopted approach for knowledge transfer (Cummings & Teng, 2003). Cultural proximity can be increased by the presence of a shared vision and goals. When individuals align their incentives and work towards the same goal, they become connected to the same objective. This shared vision acts as a bonding mechanism to encourage the exchange and expression of ideas and resources (Argote et al., 2003; Cummings & Teng, 2003; Inkpen & Tsang, 2005; Moors et al., 2008; Pinho et al., 2012). In a joint venture, a VC may set milestones to de-risk their investment in the portfolio company, as well as to create a shared goal with the CEO to reduce the norm distance for a better working relationship.

3.4.2.2 **Strength of Relationship**

A strong working relationship facilitates social cohesion between units (Wang & Noe, 2010), and the same applies to that between a VC and its venture-backed entrepreneur. A respectful and comfortable style of relationship enhances conflicting ideas to be positively handled, thereby enriching

the problem-solving process (Argote & Ingram, 2000; Yih-Tong Sun & Scott, 2005). It also allows for more open communication, hence knowledge flow in both directions to advance venture productivity (De Clercq et al., 2006). This is especially important when it comes to complex or tacit knowledge which is difficult to codify. In these cases, strong ties can promote knowledge transfer while shortening project completion times (Argote & Ingram, 2000). An arduous relationship between knowledge source and recipient – one that is laborious and distant – has been listed as a major factor that hinders knowledge transfer (Attewell, 1992). Apart from early involvement, high intensity and frequency of interactions (Pisano, 2006; Timmons & Bygrave, 1986), there are several factors to consider when determining how easy or frictionless knowledge transfer is between knowledge transmitter and receiver. These include a relationship based on reciprocal trust, and the existence of a transactive memory system.

First, trust influences social relationships and is tightly coupled with reciprocity (Li et al., 2021). If a VC-CEO relationship involves reciprocal trust, VCs are more likely to devote attention and value-adding knowledge to the venture, and vice versa. The level of trust and comfort often governs the type and level of information each party is comfortable with sharing (Yih-Tong Sun & Scott, 2005). While explicit information can easily be conveyed through platforms that accommodate codified knowledge, the transfer of tacit knowledge often requires bidirectional and face-to-face interactions. This means that both parties need to feel psychologically safe to expose their knowledge to one another. If one feels the potential of dealing with criticism, embarrassment and social rejection, they may hold back on knowledge transfer (Li et al., 2021). Reciprocal trust is the perception that the other individual or unit is also willing to share or absorb knowledge. When there is reciprocation, the knowledge exchange process is mutually beneficial and deemed worthy of engaging in (Minbaeva, 2007). In contrast, if the knowledge transmitter perceives the receiver as untrustworthy, reciprocity is limited. Individuals may not be willing to share knowledge to prevent hosting ‘knowledge parasites’ who are consistently on the receiving end of the knowledge transaction without contributing effort. While mutual and reciprocal trust in a relationship is mostly a positive enabler of knowledge transfer, it is worth mentioning that there are side effects caused by an unjustified trust, where the receiver refrains from questioning the quality of knowledge before applying the knowledge (Wang & Noe, 2010). This could see the knowledge being misused, leading to inefficient or undesired outcomes. Trust is developed through regular demonstration of one another’s integrity. If one individual deems another untrustworthy, they may feel the need to protect themselves from opportunistic behaviour, thus inhibiting knowledge transfer (Alexander & Childe, 2013; Argote et al., 2003; Inkpen & Tsang, 2005; Minbaeva, 2007; Spraggon & Bodolica, 2012).

Second, another element that governs the relationship between units is the transactive memory system (also referred to as group cognition). Transactive memory systems are a group’s shared awareness of ‘who knows what’, which takes time to develop (Argote & Ingram, 2000; Park et al., 2015; Yan et al., 2021). In a VC-CEO relationship, each party holds complimentary knowledge. For instance, VCs usually carry significant commercial expertise, while CEOs are heavily technical, both of which are crucial for technology commercialization. This complimentary knowledge is maximized when both units are aware of each member’s knowledge responsibilities (Yan et al.,

2021). A relationship with a well-developed transactive memory system has been shown to have better performance than those lacking such a system (Argote & Ingram, 2000; Cummings & Teng, 2003).

3.4.2.3 Choice of Knowledge Exchange Channel

While knowledge transfer is enabled by knowledge exchange channels, the choice of knowledge exchange channels can also act as a barrier and enabler to knowledge transfer. For example, a formal seminar with expert presentations and case-study building sessions may help knowledge receivers understand the purpose of the transmitted knowledge by assisting them in simplifying complex information. On the other hand, coffee break conversations are appropriate for facilitating the transfer of knowledge gained via experiences and lessons learnt (Tounkara, 2015). This is consistent with the expected outcomes of process categories based on Spraggon & Bodolica's (2012) taxonomy, where static virtual processes such as presentations would be utilized for wide and rapid dissemination of knowledge across an organization. Conversely, non-canonical face-to-face processes are employed to transfer complex knowledge gained through practical experiences. Apart from a suitable selection of knowledge transfer processes tailored to the targeted outcome, the processes are associated with dominant barriers which need to be taken into consideration to improve knowledge transfer success.

There is a general agreement that tacit knowledge is best transferred through rich media, where the richest form is face-to-face interactions (Spraggon & Bodolica, 2012). Tacit knowledge is often dealt with by VCs and CEOs when discussing deep-technology and complex ideas, so making the correct choice on the knowledge exchange channel may increase the success of the transfer. In-person communication allows for a continuous stream of real-time feedback and synchronized interactions free of disruption by technological components such as internet connectivity or technical errors. Face-to-face interactions also significantly improve transfer, as individuals involved can detect multidimensional cues such as emotion, gestures, and body language to aid in their understanding. Furthermore, an individual is granted immediate access to the transmitter's knowledge if questions arises while internalizing knowledge (Alexander & Childe, 2013; Spraggon & Bodolica, 2012). Depending on the desired objective – specific or general, personalized or impersonal, context-dependent or acontextual, time-specific or atemporal –suitable processes can be chosen by knowledge transmitters and receivers when transferring knowledge. However, choosing the most appropriate transfer channel, while increasing appropriation and transferability, does not eliminate barriers. For example, although face-to-face interactions seem to be effective for tacit knowledge exchange, barriers including cognitive proximity, time availability, psychological safety, and casual ambiguity become more significant, since these instantaneous settings deny an individual time to process information (Spraggon & Bodolica, 2012).

3.4.2.4 Equity Positioning

Equity positioning is a barrier and enabler of knowledge transfer that is specific to a VC-CEO relationship. A VC presents more influence over a venture when it holds significant ownership, or a

lead investor role. This applies mainly to early-staged ventures which have lower valuations and require less capital compared to late-stage companies (De Clercq et al., 2006; Tyebjee & Bruno, 1984). Small investments made at a seed-stage require more VC time and assistance to handle different situations that may arise in a risky start-up environment. Though at later stages, regardless of equity stake, VCs have been found to spend less time with the business, since the management team is mostly complete (Gomez-Mejia et al., 1990). Equity positioning can potentially give rise to imbalanced power dynamics, lack of trust, and competitive confusion and affect knowledge transfer at different levels (Inkpen & Tsang, 2005; Yih-Tong Sun & Scott, 2005). Such an observation is something this study will look to uncover.

3.4.3 Properties of Knowledge

Properties of knowledge can affect the rate, quantity, and ease of knowledge transfer. Knowledge may reside in different knowledge repositories, have different levels of protection, and require different management methods. An earlier study by Szulanski (1996) saw that knowledge-related factors present themselves as major barriers to internal knowledge transfer. For this reason, properties of knowledge are significant when identifying barriers and enablers to knowledge transfer (Argote et al., 2003; Cummings & Teng, 2003; Minbaeva, 2007). The properties of knowledge are separated into the nature of knowledge, transferability, sources of knowledge, and legal protection of knowledge.

3.4.3.1 **Nature of Knowledge: Tacit vs. Explicit**

The term ‘tacit knowledge’, was first introduced by Michael Polanyi, who described it as “things that we know but cannot tell” (Polanyi, 1967, as cited by Tounkara, 2015). The term was popularized by Nonaka (1998), who further elaborates it by describing it as deeply rooted in action to a specific context, and is captured by the term “know-how”. Not only is tacit knowledge developed over years of experience, but it also shapes a person’s cognitive perspectives in a way that the knowledge is hard to articulate or codify by those who possess it. The more tacit knowledge is, the more costly and difficult it is to transfer and replicate (Pisano, 2006). It is for this reason that value is driven by the tacitness of knowledge owned by an organization such as a startup backed by VCs. The transfer of tacit knowledge is contingent on the embeddedness and articulability of the knowledge. As discussed, knowledge can be embedded in people, tools and tasks of an organization. When an organization or team builds a functional transactive memory system, they can extract value from tacit knowledge by assigning the right person to the right tools and task, thereby achieving subnetwork compatibility. Tacit knowledge is also difficult to articulate, so choosing rich media channels such as in-person interactions may facilitate knowledge transfer, as practical training sessions and demonstrations can be utilized to convey the information (Argote et al., 2003; Cummings & Teng, 2003; Minbaeva, 2007).

Tacit knowledge is frequently contrasted with explicit knowledge. Explicit knowledge is declarative enough to be easily captured in tangible forms like text, audio, or images (Tounkara, 2015). Virtual processes such as emails, reports, documents and databases are also common ways to transfer explicit knowledge (Spraggon & Bodolica, 2012). To overcome the barriers created by tacit knowledge, Cummings and Teng (2003) suggest both knowledge transmitters and receivers

undertake a knowledge-preparation process. Such processes involve multiple discussions and dialogues for knowledge users to make tacit knowledge more articulable (for the knowledge transmitter) and internalizable (for the knowledge receiver). Doing so facilitates tacit-explicit conversions to overcome the knowledge transfer barrier presented by tacit knowledge.

3.4.3.2 **Transferability**

Knowledge that fits a context may not work in another. Transferability, compatibility, or congruence relates to how adaptable the knowledge is from one context to another (Argote & Ingram, 2000). If the knowledge recipient is required to put more cognitive effort to adapt the knowledge to their context of use, the transferability of the knowledge is low. This is synonymous with specificity or degree of contextualization, where knowledge that is tightly connected with an experience and culture may pose as a barrier to transfer to other environments (Minbaeva, 2007; Tounkara, 2015). Specialized assets that cannot be easily reused in alternative applications creates a "lock-in" effect (Pisano, 2006). For example, some VCs may have experience taking an oncology drug through its clinical stages, but this may not aid companies attempting to reach an initial proof-of-concept trial for their medical device. Despite being complex and valuable, value-adding services that are highly specialized may sometimes create a barrier to knowledge transfer due to the mismatch in context. This incompatibility may be further complicated by the level of description provided by the knowledge transmitter and the relative absorptive capacity of the knowledge receiver. The recipient may be less motivated and committed to the knowledge if it lacks legitimacy or value in the recipient's context, or the knowledge is too complex to be broken down. Though compatibility is a barrier to knowledge transfer, an individual's ability to adapt knowledge from one context to another can aid knowledge transfer (Argote & Ingram, 2000; Tounkara, 2015).

3.4.3.3 **Sources of Knowledge: External vs. Internal**

An organization gains competitive advantage through internal knowledge transfer while preventing knowledge spillover to external parties. Consequently, external knowledge may be rejected due to the 'Not Invented Here (NIH) Syndrome', the resistance towards knowledge from the outside. A recipient's preference for knowledge may also extend to those that are new. The prestige associated with innovative ideas may result in favouring inventions over renewal. Strong group affiliation can cause an individual to have a bias towards internal sources of knowledge due to the perception that knowledge created from within is superior. Due to competition, external knowledge sources may also be viewed as untrustworthy, and the knowledge transmitters may have ulterior motives for sharing the particular knowledge (Argote, 2012; Argote et al., 2003; Husted & Michailova, 2002). It has been argued, that new knowledge from outside the firm can be an important factor for organizational change and improvement (Inkpen & Tsang, 2005). Data collected from VCs and CEOs may reveal whether they view each other as partners or external parties, which may affect their knowledge transfer activities.

3.4.3.4 Legal Protection of Knowledge

Intellectual property such as patents is a common instrument used in the VC and innovation space to protect novel and unique inventions, processes or methods. Weak intellectual property protection has been suggested to impede the knowledge flow of know-how between parties. If an entrepreneur's IP is weakly protected, it may be exploited by a VC and cause them to disengage in the knowledge transfer process. On the other hand, an entrepreneur may choose not to disclose their technology fully in fear of loss of investment due to weak IP positioning. This disrupts open communication and creates barriers to knowledge transfer (Pisano, 2006). The differences in foci between universities and companies on publications and patents respectively can also lead to conflicts that can affect the defensibility of knowledge (Moor et al, 2008). In some instances, where protection via patents is not possible, contracts or mutual non-disclosure agreements may be used to protect intangible knowledge such as trade secrets. These agreements help to establish clarity over ownership as well as an environment of shared trust to prevent misuse of one another's complementary knowledge (Moors et al., 2008).

3.4.4 Properties of Organization and Culture

"An organizational context that facilitates the development of transfer is said to be fertile" (Szulanski, 1996, p. 32). Properties of the organization refer to arrangements within organizations that enable knowledge or hinder flows. Research highlights the importance of organizational culture and structure.

Organizational culture concerns the culture that an organization fosters. Knowledge transfer quality and success are much higher when an organization fosters a learning culture by delegating responsibility, tolerating mistakes and providing its individuals with time to work on new ideas (Cummings & Teng, 2003). Organizations that foster a "who is to blame?" culture can dramatically decrease the level of knowledge transfer between individuals. As a result, the risk of repeating others' mistakes is increased since lessons learnt from past mistakes are hidden and not transferred across units (Husted & Michailova, 2002). Similarly, the "Not-Invented-Here" (NIH) syndrome, where resistance is seen towards external sources of knowledge, shifts the culture from learning to rejecting knowledge, thereby hindering knowledge transfer (Argote et al., 2003; Husted & Michailova, 2002). The second type of culture an organization should foster is a culture of trust. An emphasis on a culture of trust encourages individuals to transfer their knowledge to one another (Wang & Noe, 2010). Creating a trust-based organizational climate through transparency, receptivity, and consistency can be done in formal and informal settings. Informal relationships are particularly important for breaking down hierarchical barriers between units of an organization (Yih-Tong Sun & Scott, 2005). In an environment where psychological comfort is supported, individuals can express and experiment with different opinions freely, facilitating knowledge exchange and even creation (Husted & Michailova, 2002).

The culture an organization wishes to foster is dependent on the *organizational structure* – the physical infrastructures and other systems put in place. A highly skilled person will not effectively transfer knowledge if the environment lacks the necessary infrastructure to support such activities (Cummings & Teng, 2003; Minbaeva, 2007; Paulin & Suneson, 2012). An organization's IT systems

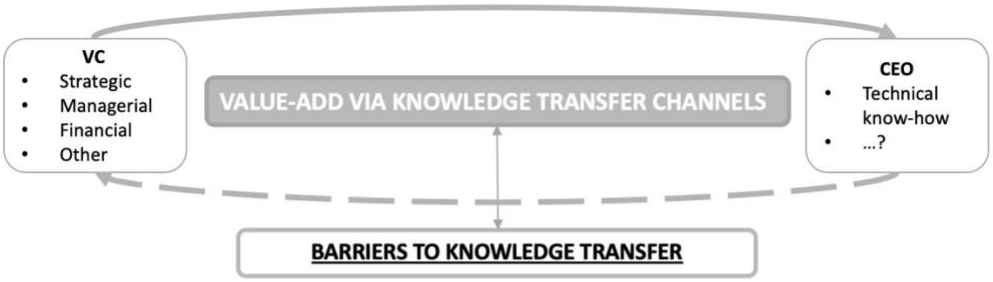
and its industry networks are different forms of organizational structure that can enhance or hinder knowledge transfer (Attewell, 1992; Cummings & Teng, 2003). Additionally, internal reward systems can be used to promote a culture of learning and trust within an organization. VCs are known to set performance benchmarks to motivate and enhance portfolio CEO performance for higher returns on investments (Sun et al., 2019). Incentives in the form of social recognition or monetary rewards that specifically encourage individuals to collaborate can promote knowledge transfer activities (Argote et al., 2003). Forming cross-functional teams to promote collective learning is an example of this. A group that shares the same goal typically has a higher degree of transparency (Wang & Noe, 2010). In addition, a multidisciplinary team can work closely together to utilize each individual's field of expertise (Carlile, 2002; Moors et al., 2008). As a team develops trust through collaboration over time, individuals may feel comfortable with sharing more intricate and personal knowledge (Yih-Tong Sun & Scott, 2005). Further, encouraging cooperation and providing slack time for individuals ensures that knowledge that is transferred from one unit to another is actually internalized and implemented (Cummings & Teng, 2003). Conversely, incentives rewarding individual success increases competition, thus the chance of knowledge hoarding and rejection which obstructs knowledge flow (Husted & Michailova, 2002).

4 Towards a Conceptual Framework

Deep-tech ventures engaging in knowledge-intensive activities require large amounts of financial capital and value-adding knowledge (De la Tour et al., 2017). These can be sought from VCs, who add value beyond the financial capital through their operational support, strategic management and government, as well as social roles via their extensive connections to relevant expertise (De Clercq et al., 2006; Sapienza, 1992; Sapienza & Timmons, 1989; Tyebjee & Bruno, 1984). Though value-add from VCs is well-documented, research shows that such value add is not always accomplished (Gomez-Mejia et al., 1990; Zheng, 2011). Evidence also shows that geographical context influences the level of value-add. For instance, in emerging markets, VCs play an even more important role in governing knowledge flow and fill the gap created by institutional voids (Deakins et al., 2015; Malecki, 2018; Sun et al., 2019). Qualitative research studies in New Zealand which focused on CEO perspectives also reveal that VCs might have inferior value-add knowledge compared to those provided in more mature markets (Korber et al., 2022; Krishanasamy, 2019). The mismatch between value-add theory and reality begs the question of whether or not VCs in New Zealand are able to fulfill their value-adding role, the factors that undermine their ability to do so and related facilitators that can support effective knowledge transfer. In turn, this research asks:

- RQ1: Does value-adding knowledge transfer occur between New Zealand-based venture capital firms and their deep-tech portfolio companies?'
- RQ2: 'What are the barriers to knowledge transfer between VCs and their deep-tech ventures in NZ?'.

Literature on knowledge transfer suggests that knowledge-related value add will depend on the knowledge transfer channels used and whether or not barriers (or enablers) for knowledge transfer are present. Based on a thorough review of the literature, Chapter 3 identified 13 different barriers and enablers to knowledge transfer and categorized them by properties of individuals, relationships, knowledge, and organization (Alexander & Childe, 2013; Argote, 2012; Attewell, 1992; Cummings & Teng, 2003; Minbaeva, 2007; Paulin & Suneson, 2012; Pinho et al., 2012; Szulanski, 1996; Tounkara, 2015). Figure 4 integrates these insights into a conceptual framework (see Figure 4) that will guide the empirical research into the stated research questions. Towards the top of the framework is the value-add accomplished via knowledge transfer channels. The solid arrow (from VC to CEO) shows the theoretical value-add of VCs, while the dashed arrow (from CEO to VC) suggests that CEOs might also add some kind of value to VCs. Building on existing literature, barriers and enablers affecting the success of knowledge transfer between VCs and CEOs are found across properties of individuals, relationships, knowledge, and organization and culture. Each cell represents a potential barrier or enabler in bold, with significant underlying variables found underneath.



PROPERTIES OF...			
INDIVIDUALS	RELATIONSHIP	KNOWLEDGE	ORGANIZATION
Willingness • *Personality* • *Power* • *Status* • *Time Availability*	**Proximity Conditions** • *Geographical* • *Cultural* • *Cognitive*	**Nature** • *Tacit* • *Explicit*	**Culture**
Disseminative Capacity	**Strength of Relationship** • *Reciprocal Trust* • *Transactive Memory System*	**Transferability**	**Structure**
Absorptive Capacity	**Knowledge Transfer Channels** • *Static Virtual* • *Dynamic Virtual* • *Canonical Face-to-face* • *Non-canonical Face-to-face*	**Source** • *External* • *Internal*	
	Equity Positioning	**Legal Protection**	

Figure 4. *Conceptual Framework: Barriers to value-add (via knowledge transfer) between Venture Capitalists and Ventures in New Zealand.*

5 Methodology

Building upon the theoretical gaps outlined in the literature review, the objectives of this study are to understand the following questions:

- RQ1: Does value-adding knowledge transfer occur between New Zealand-based venture capital firms and their deep-tech portfolio companies?'
- RQ2: 'What are the barriers to knowledge transfer between VCs and their deep-tech ventures in NZ?'.

To address these questions, this research is grounded in an interpretivist paradigm and a qualitative methodology and uses semi-structured interviews as the main source of data collection (see Figure 5). This chapter justifies the rationale behind the choices related to methodology and interviewee selection. In addition, data collection and data analysis processes are detailed, followed by an elaboration on ethical considerations and research quality.

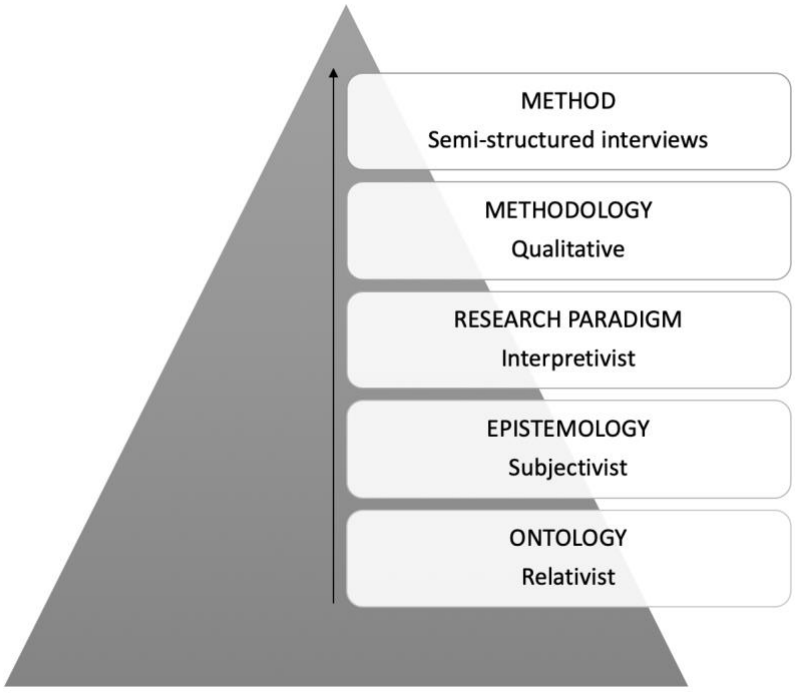


Figure 5. *Research Strategy*

5.1 Research Strategy

Ontology and epistemology in research are necessary points of consideration when constructing a research strategy. Ontology concerns the researcher's assumptions about the nature of the world and reality, and epistemology is the researcher's way of exploring the reality based on their ontological views (Saunders et al., 2019). This research is grounded in a relativist ontology that acknowledges

multiple different realities that depend on individual subjectivities. From this perspective, reality needs to be interpreted by considering individual views so meanings behind observed phenomena can be uncovered. A subjectivist epistemology allows for multiple realities to be considered when understanding the point of interest (Creswell & Creswell, 2013; Pham, 2018; Saunders et al., 2019). With a relativist ontology and subjectivist epistemology, this research is grounded in an interpretivist paradigm. Interpretivism allows individually lived experiences to be considered (Pham, 2018), and to accommodate inter-individual differences in interpretation of the same phenomenon. The study aims to understand how and what individuals perceive as barriers and enablers in their knowledge transfer experiences. By drawing upon an interpretivist approach, participants' feelings, perceptions, and interpretations of the problem are considered (Moss, n.d). Moreover, interpretivism involves the researcher's interpretations of participants' responses as part of the research process (Packard, 2017). Further, it allows the researcher to gain a deeper understanding of the complexities in a unique context rather than a generalization of the investigated phenomenon (Pham, 2018). To make sense of knowledge transfer variables through VC-CEO interactions and discover mitigation strategies that may be unrealized amongst participants, an interpretivist approach is considered appropriate (Creswell, 2009).

The philosophical assumptions in a study govern the adopted research methods (Creswell & Creswell, 2013). The two major categories of research methods are quantitative and qualitative research. Quantitative research assumes the objective reality concerning 'how many?' and 'how often?', where data can be measured and quantified. In contrast, qualitative research asks the 'why', 'how', and 'what' questions relating to subjective descriptions and experiences of individuals (Gorman et al., 2005, Chapter 4). Many studies focused on knowledge management and knowledge transfer have utilized qualitative strategies to investigate interactions, opinions, thought processes and perspectives in the commercialization sector (Carlile, 2002; Knyphausen-Aufseß, 2005; Krishanasamy, 2019a; Leung, 2014; Moore et al., 2012; Rodriguez Alvarez & Karlsson, 2015; Sudhindra et al., 2017; Torres, 2015). Given the importance of individual experiences and subjectivities, qualitative methods are especially suitable to investigate thought processes without intervening with participants' experiences (Punch, 2013; Sudhindra et al., 2017). Thus, the natural settings of the investigated context, knowledge transfer between VCs and their CEOs, is preserved. More importantly, the researchers are one of the key data collection instruments in their research, because they have the ability to interpret the complexities of participants' lived experiences and interactions to generate more fruitful insights (Packard, 2017, Chapter 1).

In terms of data analysis, an abductive approach to theorizing was employed. Abduction is a qualitative research approach that combines both inductive and deductive reasoning (Berg & Lune, 2017; Creswell & Creswell, 2013). Existing theory developed from reading the literature is modified based on the themes and patterns discovered from collected data (Saunders et al., 2019). In this study, a review of the literature around VC value-add and knowledge transfer informed a framework (Figure 4) that guided deductive data collection and analysis. Yet, the research was open to more inductive insights that generated alternative explanations that were unable to be explained through the conceptual framework (Mithani, 2021). A combination of deductive and inductive analysis allows

both existing and new concepts to be strengthened through a mixture of empirical evidence, real-world findings, and the researcher's thought processes (Sheppard, 2020, Chapter 1; Tavory & Timmermans, 2014). The outcome is a flexible and iterative cycle of the abduction-deduction-induction process around the existing theoretical frameworks (Kaiser et al., 2014).

5.2 Research Context

Knowledge transfer and its barriers and enablers have been explored in various contexts and through different perspectives (Alexander & Childe, 2013; Argote, 2012; Castaneda & Cuellar, 2020; Cummings & Teng, 2003; Minbaeva, 2007; Paulin & Suneson, 2012; Pinho et al., 2012; Sun et al., 2019; Tounkara, 2015; Yih-Tong Sun & Scott, 2005). Although knowledge transfer can be observed in most organizations, certain contexts are expected to engage in knowledge transfer activities on a more regular basis. To narrow the research scope of this thesis and maximize insightful data relative to the research aims, the chosen contexts are 1) deep technology ventures; 2) VC-CEO interactions; 3) New Zealand; 4) Early-staged ventures; 5) post-investment phase ventures. The following sections justify why these sampling choices promise especially valuable insights in the context of the stated research question.

5.2.1 Deep-Technology

While knowledge transfer will happen in many types of entrepreneurial ventures, it is of disproportionate importance for so-called "productive entrepreneurship" (Stam, 2015). Such entrepreneurship often relies on the commercialization of technologies and innovations that require significant amounts of intangible knowledge. In contrast to traditional entrepreneurship such as small businesses and self-employment, productive entrepreneurship has an orientation for growth and rapid scale (Cavallo et al., 2019). In particular, knowledge-based value add is of significant importance for so-called 'high-tech' or 'deep-tech' ventures and for VCs that operate in the technology investment industry. Deep-tech ventures are often multidisciplinary, driven by science and advanced engineering, and require intensive efforts in research and development (R&D) to generate knowledge (De la Tour et al., 2021; Nedayvoda et al., 2021). Such ventures rely on the development and commercialization of breakthrough technological discoveries that are capable of solving the most important societal and environmental challenges. Intending to disrupt or create new markets, deep-tech ventures rely on market knowledge, technical knowledge, and business knowledge for growth and scalability (De la Tour et al., 2017; Schuh et al., 2022). For this reason, deep-tech ventures and their interaction with technology-focused VCs promise especially valuable insights in the context of knowledge transfer.

5.2.2 VC-CEO Interactions

Literature suggests that the effective interaction and collaboration between actors is crucial to innovation and knowledge creation (Moors et al., 2008; Vandeberg & Moors, 2008). In this context, VCs are seen as engineers of innovation who combine different disciplines to accelerate the knowledge economy (Sun et al., 2019). Although VCs interact with many other entities in the ecosystem, value creation ultimately stems from knowledge transfer between VCs and the ventures

they support. Empirical evidence reveals that VCs transfer various types of knowledge to their portfolio companies to assist their development, creating a positive effect on innovation (Dessi & Yin, 2015). However, literature dismisses the transfer of knowledge from CEOs to VCs. Although knowledge transfer barriers have been studied in other contexts, research into barriers to knowledge transfer between VCs and venture-backed CEOs is limited. By incorporating both perspectives, the study allows for a dyadic (two-way) approach to maximize meaningful data when investigating knowledge transfer (Argote et al., 2003; Sun et al., 2019). With a focus on VC-CEO interactions, this research is in line with Gomez-Meija et al. (1990) who suggest a further look into the complex relationship between VCs and CEOs.

5.2.3 New Zealand

Literature relating to VC's value-adding services has focused on the European and U.S. regions, where the innovation ecosystem is significantly more established than in other areas of the world (Chemmanur et al., 2014; Grilli et al., 2019; Knyphausen-Aufseß, 2005; Park & Steensma, 2012; Sapienza, 1992). However, VCs play a significant role in emerging markets as they can add knowledge that local players often lack. Indeed, research suggests that VCs add significant value to ventures where a lack of supportive infrastructure and network creates barriers for local entrepreneurs (Sun et al., 2019). In developing markets such as Brazil, Russia, India and China, VCs govern and direct appropriate resource flow to entrepreneurs through working with business organizations constrained by institutional voids (Ansari et al., 2018; Sun et al., 2019).

As New Zealand's isolated economy is sheltered from the impacts of the global financial crisis, combined with the culture of property-focused investments, it is uniquely positioned amongst other regional ecosystems studied in the literature (Deakins et al., 2015). It is less developed than the European or U.S markets, where investors have a long history of involvement in venture capital – many of whom are successful entrepreneurs with specialized expertise (Ansari et al., 2018). Besides, the immaturity of New Zealand's funding environment could also be reflected in VC-CEO interactions, inevitably influencing the VC's value-add (Ansari et al., 2018; Deakins et al., 2015). Further, a lack of value-adding knowledge transferred by New Zealand VCs has been noted by recent studies (Korber et al., 2022; Krishanasamy, 2019). For these reasons, New Zealand has been chosen as a context for this study.

5.2.4 Early-Staged Ventures

Early-staged companies are targeted due to their tendency to be influenced more significantly by VCs (Bonini & Capizzi, 2019; Gomez-Mejia et al., 1990; Luukkonen & Maunula, 2007; Timmons & Bygrave, 1986) compared to late-stage companies where a strategic direction has been set. Within New Zealand, constraints around funding often lead to late-stage companies seeking overseas investments, leaving more R&D or early-stage companies behind in the deep-technology space (Deakins et al., 2015; Knuckey, 2001; Lerner & Shepherd, 2009). In the early stages, a venture may involve only one or two key entrepreneurs to drive the project to value inflection. Operations run on skeleton staff, and responsibilities are not well-defined. Though lean and agile, these ventures may

also lack relationships with the right intermediaries necessary to progress towards the next steps. Hence, VCs contribute the most value to early-staged ventures: Providing expertise in areas where capabilities are lacking; recruiting and assembling the appropriate management team and key team members; providing industry connections and credibility for the entrepreneurs; and accelerating the development process. Often, a VC has a technical understanding of specific markets, as well as accumulated knowledge regarding who to reach out to in the most time and cost-efficient methods (Timmons & Bygrave, 1986). For these reasons, it was expected that insights into VCs' value-add through knowledge transfer can be gained from those involved in early-staged ventures (Bonini & Capizzi, 2019). In this research, early-stage would include ventures who have received pre-seed, seed, to series A funding.

5.2.5 Post-Investment Phase Ventures

As outlined in section 2.3.2. the post-investment phase refers to the period where the VC's role as an investor expands to a partner. In contrast to the due diligence phase, where knowledge is mostly transferred from CEOs to the VCs, VCs carry out most of the knowledge-related value add in the post-investment phase. For instance, a study by Corce et al. (2013) compared the productive growth of VC and non-VC-backed firms and found that VCs have the most significant "imprinting effect" on their portfolio companies in the post-investment phase. The level of value-added through knowledge transfer activities continues until the VC's exit (De Clercq et al., 2006). As such, it was expected that a focus on interactions in the post-investment phase maximize insights on knowledge transfer (Bonini & Capizzi, 2019).

5.3 Data Collection

5.3.1 Semi-structured interview

To support a deep understanding of how an entrepreneur or individual in a VC perceives the barriers to knowledge transfer, semi-structured interviews were employed to probe the interviewee's thoughts, values, perceptions and feelings (Pham, 2018). This is complementary to the interpretive approach and the qualitative research strategy. Compared to other data collection methods such as questionnaires or surveys, semi-structured interviews enable in-depth questions and allow interviewees to construct their responses in their own words (Sheppard, 2020, Chapter 10). Not only can questions be more personalized but interviews are also more adaptable. This helps to uncover what the participants believe to be the most important or relevant about the topic discussed. The semi-structured nature also allows for flexibility in the interview, uncovering possible biases that may otherwise be missed in a rigid line of questioning. As a result, textured accounts are recorded, and a natural flow of conversation is retained (Berg & Lune, 2017; Sheppard, 2020).

To understand both perspectives, interview guides informed by the conceptual framework (see Figure 4) were written separately for VCs and venture-backed CEOs. Open-ended questions were organized thematically to explore participants' perceptions around the barriers to knowledge transfer from VCs to CEOs, and vice versa. Though the interview guide was organized by topics, questions were not necessarily asked in order, as participant responses differ in each interview. This

enabled participants to be fluid and open in their responses and created the capacity for emergent finding to spark new lines of questioning from the researcher. By letting the interviewee's responses guide the flow of the interview, there is minimal influence and guidance on the responses, preserving the true intentions and weight of importance conveyed by the participants (Belk et al., 2013; Berg & Lune, 2017, Chapter 4; Sheppard, 2020, Chapter 10). Furthermore, questions carefully for ease of understanding to maximize responses from participants and prevent information withdrawal (Berg & Lune, 2017, Chapter 4).

The interview guide was separated into four sections: Background of the participant and their company operations, VC-CEO interactions, value-add, and KT mechanisms and factors. Examples of the interview protocol is outlined in Appendix A and Appendix B.

5.3.2 Participant Selection

Participants were recruited using a combination of non-probability sampling methods: purposive, convenience and snowball sampling. Non-random purposive sampling was utilized to ensure interviewees met the specific research contexts. In this study, participants were selected from NZ's deep-technology investment ecosystem. The individuals had to be involved in an early-stage, post-investment venture either as a VC personnel, or a venture-backed CEO/founder. As the study aims to uncover the essence (barriers) of a given phenomenon (knowledge transfer between NZ VCs and deep-tech venture CEOs), the selection of participants was based on those "who have lived the reality" (Baker et al., 1992, p. 1357). This ensures that selected participants contribute meaningful data to the research (Berg & Lune, 2017, Chapter 2; Sheppard, 2020, Chapter 7). Convenience sampling was also used to reach out to those who were connected to the researcher's supervisors, and who met the study's research contexts. In addition, snowball sampling allowed the researcher to further recruit suitable participants through referrals from previously selected participants (Berg & Lune, 2017; Moser & Korstjens, 2018).

Fourteen participants were interviewed and classified into two groups – VCs and CEO/founders. Of the fourteen, seven worked for a VC (5 females and two males), and seven were deep-tech venture CEOs (2 females and five males). Table 1 shows a list of participants and their assigned codes, which will be used for reference in the following sections. There were four participants from two different VCs who held different positions in the company, thus differ in their interactions with CEOs. Four of the CEOs companies were backed by VCs in the participant sample group.

Table 1. *List of interview participants*

Participant	Description
VC1	A co-founder of the VC firm who has more than ten years of experience in early-stage investments, including multiple exits.
VC2	An investment manager with five years of commercialization experience through various organizations and funds. Has prior commercialization experience as a co-founder of an overseas bio/agritech start-up.
VC3	An investment manager with an engineering background and 17 years of experience in the public sector.
VC4	An investment analyst at a healthcare-focused VC. Background in biology, and prior experiences in commercialization and life-sciences consulting.
VC5	An investment analyst with a medical science background who joined the VC when their experience at a business consulting firm sparked their interest in commercialization.
VC6	A CEO of a VC with a business management background. Gained extensive commercialization experiences through start-ups and managing of portfolio companies.
VC7	A CEO of a VC with a biotechnology background. Early experiences from student organizations and investment committees organically led to the current role.
CEO1	A founder and CSO of an early-staged therapeutics company. Senior lecturer who leads a university academic lab, with commercialization experience and international network through industry collaborations during their post-doc overseas.
CEO2	A CEO of a biotech venture with a background in chemical and process engineering. During their post-doc, they developed the technology to a position where it was ready for commercialization.
CEO3	A CEO founder of a medical device company, who has 15 years of experience in healthcare and nursing with a PhD in exercise science. The company was formed in 2018 around their research project.
CEO4	A CEO of a medical device company formed in 2018 after creating an AI-driven solution for clinicians. Had prior research and start-up experiences while studying.
CEO5	A co-founder and CTO of an AI-based venture. Formed in 2019 to create a solution for a problem found in the software and data science industry through their experiences as an engineer and data scientist.
CEO6	A CEO of a spin-out company created in 2016 around IP generated from various research projects. They are an associate professor who lead a research team in engineering.
CEO7	A venture CEO with extensive commercial experience in the oil and gas industry. Formed the knowledge-driven clean-tech venture in 2021 after obtaining investment following the search for circular solutions.

5.3.3 Interview Procedure

Participants were introduced to the research via an introductory email outlining the study with an invitation to participate. When a potential participant expresses interest to participate, the researcher (with permission) emailed them the relevant participation information sheets (PIS) and consent forms (CF). Once the participant consented to participate, meetings were scheduled based on the availability of the researcher and participant. The researcher ensured all relevant documents and forms were signed and returned before the initiation of the interview. Other participants were connected via existing participants through an introductory email, followed by the same procedure as previous participants.

Due to the COVID-19 pandemic and varying restrictions throughout the study, interviews were conducted through Zoom. The participants were reminded of the research objective(s) and ethical considerations before the interview. All interviews, with participant consent, were recorded using Zoom Pro for transcription purposes. The researcher used the interview schedule to guide the conversation. On average, interviews lasted between thirty to sixty minutes long. During this, respondents' answers were used to guide the flow of conversation to minimize disruptions to their train of thought to maximize the participant's ability to recall detailed information and examples. Enabling video and audio during the interviews allows for observations around the tone and body language through which participants conveyed their responses for a nuanced understanding of the participant's feelings and perceptions (Berg & Lune, 2017, Chapter 4). Real-time interviews promoted a two-way dialogue, and prompts were used to probe for more detailed information when required.

As close to the time after the interview as possible, the interview transcripts were reviewed and edited using the intelligent verbatim method. Repetitive words and verbal fillers were removed for a clean transcript without altering the essence of the dialogue. Participants who wished to receive the transcript were sent the edited transcripts to check and return within 14 days of receipt of the transcript as stated in the PIS and CF. This allowed any inaccurate or commercially sensitive information to be removed by the participant. During transcription, memos or notes were written in the researcher's journal as a reminder for patterns or insights that may become important or interesting for the analysis.

5.4 Analysis

Following transcription and editing by both researcher and participant, the qualitative software (NVivo) was utilized for the organization and analysis of the collected data. The preliminary framework depicted in Figure 4 was used to guide the coding process following sensitization via a review of the literature. The framework method, which sits in the family of thematic analysis methods, is partially adapted to allow a combination of deductive and inductive coding processes. Pre-existing, a priori, codes were set out (see Figure 6) to be "tested" and in indexed the data. Open coding was used to assign data found to be interesting yet incompatible with the framework to ensure that most data is captured (Gale et al., 2013).

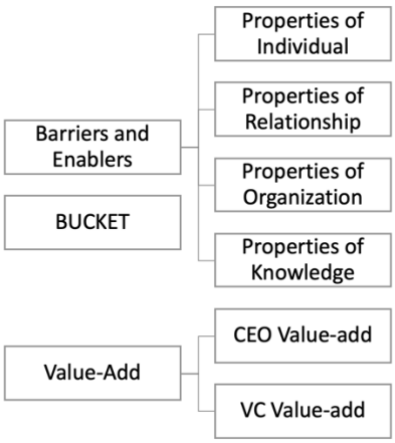


Figure 6. *Broad coding scheme used for thematic analysis*

Using this method, some extracts were left uncoded, coded once, or multiple times depending on their relevance to each of the different themes (Braun & Clarke, 2006). A mixture of "lumping" and "splitting" was used to allow for the generalization of the phenomenon (e.g. how a CEO's technical expertise helped them gain VC investment) and a nuanced analysis (e.g. multiple individual traits which lead to the knowledge recipient rejecting certain knowledge) (Saldaña, 2021). The theory-driven thematic analysis helped to validate existing evidence, while presenting opportunities to identify emergent themes (i.e. data which did not fit into the framework were assigned the code "BUCKET", as can be seen in Figure 6) through thought trials (Mithani, 2021). Throughout transcription and analysis, notes were taken in a journal when a theme can be seen to separate into sub-themes, or when themes appear to interrelate or influence one another. This supported the second cycle coding, where categories, topics and themes were evaluated in the research context to maximize the relevance of the data set (Braun & Clarke, 2006; Maguire & Delahunt, 2017; Saldaña, 2021). This iterative process was repeated until groupings made sense in regard to the research question.

5.5 Ethical Considerations

The research was conducted according to the ethical standards as set out by the University of Auckland Human Participants Ethics Committee (UAHPEC). Approval was provided under course work ethics (protocol number: 022768) with no amendment. As previously described, participants were provided with a PIS and CF outlining the study and ethical considerations, and consent was obtained prior to the interview. All easily recognizable or commercially sensitive information such as names and places were excluded. The research was designed by the researcher and the University of Auckland Supervisor to reduce conflicts of interest that arose from the researcher's employment at Bridgewest Ventures NZ. Transcripts and interview recordings were only reviewed by the researcher with no third party involvement to protect participant identities. All information will be kept in electronic files on a secure network for six years, after which they will be deleted.

5.6 Study Quality and Trust-worthiness

Study reliability in qualitative research is achieved when the work can be repeated by following the same methods to come to similar findings. In addressing reliability, the methodology has been reported in detail for future researchers to reproduce. Additionally, the use of an interview guide across all semi-structured interviews improved the reliability of the study. Descriptions for topics, themes, and nodes were also used while coding through NVivo so the meaning was consistent through each round or days of the analyzing phase (Elliott, 2018; Korstjens & Moser, 2018; Sheppard, 2020, Chapter 4).

Credibility, or internal validity, concerns the "truth-value" of research findings, where the collected information represents the correct interpretation of the participants' views. Improvements made to credibility were made through prolonged engagement and member checks. Most interviews conducted were around 60 minutes in duration, allowing for sufficient time to probe for further information depending on interest areas. The participants were also encouraged to provide examples to support their statements and follow-up questions were asked. Member checks were achieved by having participants review their interview transcripts to match and correct their articulations with their interpretations (Korstjens & Moser, 2018). To ensure a transparent dialogue, participants were reassured of the study's ethical considerations regarding the disclosure of potentially commercially sensitive information. Depending on the interviewer's knowledge of the topic at hand, the interviewer expressed a degree of understanding or curiosity to build rapport. Rapport building along with the maintenance of a conversational tone throughout the interviews also increased the participants' comfort levels to help obtain honest information (Bryman & Bell, 2011). Credibility was enhanced by presenting data extracts filled with thick descriptions to allow readers to make their judgements about the participant's responses concerning the study (Sheppard, 2020, Chapter 6).

Reflexivity refers to the process of critical self-reflection about how the researcher's own biases, preferences and preconceptions may affect the research. To reduce bias, a thesis journal was maintained to record thoughts, questions, decisions and memos throughout the study for the researcher to reflect on. Maintaining this audit trail allowed the researcher to "dump their brain" on any thought processes that arise, to be challenged later on when critically evaluating the researcher's assumptions and biases (Braun & Clarke, 2006; Saldaña, 2021). Furthermore, thick descriptions and participant quotes were presented to help readers make judgements about research findings without the researcher's added interpretations (Korstjens & Moser, 2018; Noble & Smith, 2015; Sheppard, 2020, Chapter 6).

6 Results and Findings

This chapter presents the findings of this research. The first section, “VC-CEO Interactions and Value-add”, concerns whether or not the value-adding roles of VCs are realized in New Zealand. In the second section, “Barriers and Enablers to Knowledge Transfer”, findings relating to why New Zealand VCs are able or unable to carry out their value-add will be presented. Each section will be broken down into sub-sections that are guided by the theoretical framework.

6.1 VC-CEO Interactions and Value-add

When discussing VC-CEO relationships, participants frequently indicated that interactions and transfer of complex knowledge were highest during pre-investment, especially during the due diligence period. Both parties interact at high frequencies to develop an in-depth understanding and investigate the investment opportunity. This period (one to three months) of intense daily or weekly interactions was described to be collaborative. High-frequency interactions were viewed as necessary for the joint development of a potential new venture strategy. Following deal negotiations, interactions post-investment drop, ranging from weekly to quarterly. In general, interactions occur somewhat regularly but mostly depend on the amount of support the CEO requires. At some point, around series A or series B funding, the CEO will outgrow the VC’s support. Nevertheless, all participants recognized value-add from one another.

6.1.1 VC Value-add

The strategic and advisory, social and other general support from VCs were confirmed through research findings and deemed positive by participants. However, the financial and operational and managerial, and governance roles of New Zealand VCs received conflicting results.

VCs carry out their *strategic and advisory role* through brainstorming or strategy sessions to establish objectives and strategic direction concerning “what’s next?”. CEOs look to VCs as a sounding board when making key decisions for their ventures. As CEO1 justifies, “they have built many companies in the past … Whatever we need, they will have done this 20 times before, so they know exactly what to do”. VCs may derive knowledge from past entrepreneurial experiences or from supporting similar companies. Alternatively, they may assign consultants and advisors to support CEOs in specific areas where they lack expertise in. Social value-add from VCs is brought about by their extensive network with other founders, customers, international stakeholders, lawyers, experts and consultants. These social connections allow a VC to provide support to CEOs in areas that they may be unfamiliar with. CEO acknowledged that these connections could expand their strategic, operation, managerial and governance value-add. For instance, a VC has connected founders to other entrepreneurs who gave good advice around hiring and building a functional team. Some introductions are made on a one-off basis (e.g. consultants) for specific tasks, while others lead to long-term relationships (e.g. customers, advisors, independent directors, or personal mentors). The research also found that VCs with a good track record, a purposeful mission, or international partners can provide their portfolio companies with reputational uplift. Additionally, a part of VC’s social value-add is the creation of a support system for founders to fall back on when difficulties are encountered.

This is achieved by enabling communities and ecosystems of founders who share similar journeys and experiences.

Participants also mentioned *other* types of helpful value-add, separated into general support and specific programs that facilitate the CEO's development of entrepreneurial or soft skills. Some CEOs have utilized assistance from VC employees for bespoke pieces of work; from report writing, applications for funding and improvements to the preparation of pitch decks. Many participants learnt a range of soft skills, from communicating with their shareholders and the board, liaising with customers, managing their team and mediating conflicts, to conducting interviews and leasing an office space. VCs also set up internal workshops or subsidize the cost of external programs; from governance or market strategy workshops to continually support the CEO's professional development. Social events and mental health programs aided founders through stressful moments in their start-up journey. One participant had an internship to develop an understanding of how VCs approach due diligence processes and gain a different perspective on commercialization.

VC's *financial and operational* value-add included setting up the company register, company budget, accounting, payroll and invoice approvals. Most VCs provide capital management services or templates for CEOs to execute financial and operational tasks with less cognitive load. The capability of the VC in arranging or providing follow-on capital was important to CEOs. However, one CEO mentioned the lack of support they received in arranging follow-on funding, which they "would like them to have done". Another area where conflicting results were found is in VC's *managerial and governance* role enabled by taking board seats. Apart from investor directors, the VC may jointly appoint an independent director with the CEO to enhance the board's capabilities. Board meetings are formal mechanisms through which performance reporting and monitoring are conducted. It is also where board members can monitor progress, identify gaps in a company's performance, and fill identified shortcomings through adding specific knowledge or establishing connections to other experts. VC's role on the board may also cover staffing issues, recruitment of key personnel, managing CEOs' management styles, and even replacing the CEOs when required. Executive replacement occurs, but both VC and CEO participants noted the risk of hiring external CEOs. Often, this was related to a lack of accountability or limited appreciation for the intricacies of the technologies. One VC stated they do not take up board seats due to frequently being a minority shareholder. Naturally, this sees them receiving updates less regularly, having less control over venture decisions, and interacting only when their CEOs require specific assistance or introductions. VC's managerial role has also been deemed counterproductive or inefficient by some CEOs. Notably, both of these rather critical CEOs are not only backed by New Zealand VCs but Australia and US investors too.

6.1.2 CEO Value-add

The majority of participants are highly educated people with multiple qualifications in their field of expertise, and who are still heavily involved in academia. The associated knowledge and specialized skillsets obtained through their academic careers allow them to plan, design and execute technically challenging experiments with a lean team. The CEOs are often also the company's chief scientific

officers (CSO) or chief technology officers (CTO) because they are most knowledgeable in what needs to happen to develop or mature a technology. They are also most familiar with the capabilities and limitations of their technology, which can affect the venture's strategic direction. Many VCs recognize and trust the CEOs in running the venture's technical operations due to their solid background and understanding of how to run a development program to realize an idea. Some CEOs even help their VCs with due diligence or provide feedback to portfolio companies in similar industries.

Furthermore, CEOs bring immense value to VCs with their *ground-breaking ideas.* Disruptive concepts and cutting-edge techniques are acknowledged to expand a VC's knowledge base. Some CEO participants note that their technology sits in unexplored territories that the VCs have not come across in the past. The intellectual property associated with these ideas brings significant amounts of potential to the VC, along with invaluable tacit knowledge from the CEOs who are apt to convert these ideas into reality. Since the CEOs are so embedded within their field of expertise, they also have a good grasp of the gaps in the market or drivers behind the need for certain solutions. Besides, CEOs are *well-connected* in their industry and area of expertise. They can tap into their academic networks for expert advice or recruitment. Having worked with these academics, the CEOs are most likely to select the ideal candidate who is thoroughly familiar with the technology and task at hand. Doing so saves significant time and resources that would otherwise be spent recruiting. Some CEOs have had industry or research collaborations both locally or overseas, hence bringing about expertise and commercial contacts from various other countries. These ties can benefit the CEO's venture while providing VCs more points of contact to refer to other synergistic ventures. In addition, VCs could be granted *access to research spaces and facilities* at the institution or universities that the CEO is associated with. Generally, CEOs themselves are also a rich source of connections and referrals for future ventures.

VCs actively highlighted the importance of *CEO attributes* when asked about value-add. CEOs' valuable attributes observed according to participants included passionate, empathetic, driven, ambitious, purposeful, committed and a growth mindset:

> *Their outlook. It's infectious. Their passion and their willingness to trade their life energy for an idea to help humans. Wow what a concept! To me that's cool, and that helps me think about my own life. Am I purposeful in what I'm doing?* (VC5)

Despite start-ups being risky pathways filled with pressure points and uncertainty, CEOs exhibited a propensity towards *risk-taking behaviours*. While the early-staged ventures may or may not pay off, a level of curiosity and genuine enjoyment of creating complex solutions to real-life problems allowed them to stick through the journey. Additionally, participant responses pointed to the *flexibility* of founders who frequently play diverse roles in their companies. CEOs adapt to the various challenges presented to them in an agile manner – quickly picking up new skillsets, or rearranging their priorities to keep the business running:

Whether that is proofreading the web page or writing a press release on one day, or directing a research program the other day, [to] cleaning the toilet. Whatever it is, you do what the company needs you to do. (CEO1)

Surprisingly, only one VC – who has had start-up experiences – recognized and appreciated this quality of CEOs.

Most CEOs have prior work experiences which can benefit the venture and their VCs. For instance, CEOs may possess managerial, legal or other experiences on top of their technical expertise. These skillsets sufficiently sustain the business without the need to recruit an extra employee. Hence the VC benefits, because the venture saves financial resources and the VC's input which would otherwise be required to pay a salary, and carefully select an appropriate candidate for the position, respectively. The CEO's first-hand experiences also add value by providing lessons for VCs to advise future founders who encounter similar problems. However, CEOs stress the drawbacks of using anecdotal occurrences to draw parallels with other ventures. Doing so overlooks the nuances between the challenges encountered by each venture, and dismisses the different contexts in which the companies are situated. The monetary value-add was only brought up by CEO participants. This mainly surrounded return on investment and opportunities for a diverse portfolio.

6.2 Barriers and Enablers to Knowledge Transfer

Similar to the structure of the theoretical framework (Figure 4), the following section will lay out results relating to barriers and enablers will be laid out in four sections – properties of individuals, relationships, knowledge and organization or culture. The results will focus on common findings amongst participants while comparing and contrasting any interesting or conflicting perspectives. Mitigation strategies for barriers or enhancements to enablers will also be mentioned where applicable.

6.2.1 Properties of Individual

6.2.1.1 Disseminative Capacity

Disseminative capacity was a factor discussed amongst all CEOs and three VC participants in this study. The elements which contribute to an individual's disseminative capacity are storytelling, understanding the knowledge receiver's preferences, and proper utilization of time and transfer mediums, including people. The transfer of complex knowledge can be completed by building a narrative that is simple enough for the knowledge recipient to understand using minimal cognitive effort. There is a fine balance between simplifying the knowledge but undermining the complexity and providing crucial details but losing the audience:

you have to convey a complex topic to an audience that has never heard this before. You have to simplify it without oversimplifying it and try to make it exciting (CEO1)

The transfer of complex knowledge can be completed by building a narrative that is simple enough for the knowledge recipient to understand using minimal cognitive effort. There is a fine balance between simplifying the knowledge but undermining the complexity and providing crucial details but losing the audience. Having good storytelling skills excites the audience, captures their attention, and makes highly technical information palatable and easy to understand. Analogies, slides, visual aids, and abstractions are all methods mentioned by participants to help engage the knowledge receiver and promote understanding. When transitioning from superficial to in-depth information, abstractions must be done in small gradients for the recipient to follow. When analogies are used, not only should the knowledge transmitter state the similarities, but differences should also be clarified to avoid any assumptions that could lead to misinterpretations. Allowing the time and space for recipients to ask questions by sparing the details at the start engages the audience to internalize knowledge in their own way.

Understanding the recipient's background and preference for logic is helpful for the knowledge transmitter to structure their narratives for the knowledge receivers. Recipients who come from a technical background may be accustomed to multiple layers of detailed-oriented information, whereas recipients from a commercial background may prefer a top-down approach to an overarching business strategy, rather than hearing about the granular mechanisms behind the technology:

> *Understanding the background of the person you're talking to is quite important… because it's so hard to assume someone's knowledge. Even with people within a very similar industry, the knowledge gaps are very different.* (CEO2)

Disseminative capacity can be improved through understanding the recipient's communication style and priorities. In the VC-CEO context, VCs often juggle multiple projects across different ventures simultaneously, which limits their time for knowledge transfer. Knowing the VC's preferred way of receiving information, as well as the information VCs are looking for can help CEOs reframe their narrative to maximize time for knowledge transfer and knowledge uptake. CEO6 poses the questions:

> *How do you best describe things at the right level of detail for someone that's not involved in your businesses day-to-day? How do you give them the right information, the right amount of information, to help them make decisions?*

Lastly, findings show that it is crucial for knowledge transmitters to check if the recipient has actually understood the information. For instance, CEOs sometimes focus on one-way communication to impress the VCs without being mindful of whether VCs have understood the information correctly. Both VCs and CEO participants use instances of CEO communication when discussing disseminative capacity. Apart from providing time for questions, or noticing signs of reciprocation from the receiver, it is often beneficial for knowledge transmitters to allow time for recipients to process complex information.

6.2.1.2 **Absorptive Capacity**

Participants argued that knowledge transfer and communication is a two-way street involving both VCs and CEOs, so the absorptive capacity of the knowledge receiver is also a point of consideration. First, the knowledge receiver needs to understand clearly the information being conveyed to them:

> *They can explain all this stuff…but if there's something that I misinterpret, that information transfer is no longer accurate. I'm like "Oh yeah I get what you mean" but then I actually don't get it.* (VC5)

When transferring knowledge, CEO5 says "there's an element of self-selection…where the VCs that get the ideas the most are more likely to invest". Knowledge recipients who possess the ability to comprehend complex knowledge can engage in knowledge transfer at a deeper and more technical level. Recipients of knowledge can also increase the success of knowledge transfer by clarifying any misinterpretation or confusion. However, as VC3 argued, "there are [*sic*] just some people who can listen better than others".

6.2.1.3 **Motivation/Willingness**

Findings suggest that the motivation and willingness to partake in knowledge transfer are affected by an individual's time availability and various personality traits. Many participants spoke about *time availability* preventing individuals from being able or willing to engage in knowledge transfer. Time constraints lead to VC's inability to retain large amounts of complex information while transitioning from one project to another. A delay in responses to crucial questions can hinder a portfolio company's progress and work efficiency. Busy schedules may lead to decreasing touchpoints with founders, VCs becoming less detail-oriented and allow company problems to grow instead of identifying and fixing issues early on. The following quotes reveal perspectives from both CEOs and VCs on issues that may arise from time availability limitations:

> *if they were less busy, they'd be able to give more time to each individual venture and they probably would have less mistakes* (CEO2)

> *We're only like 6-8 people with a lot more portfolio companies… it gets hard to…juggle, budget time allocation for each project, so each of those companies get the necessary amount of time.* (VC5)

The same applies to CEOs, who when preoccupied with other tasks may fail to update their VCs and overlook projects or problems which fall under their responsibility. Overall, limited time availability of the individual can give rise to mistakes and prevent individuals from building relationships or trust on a deeper level.

A person's ego that is grounded in perceived status and experience is another factor that can affect motivation and willingness to engage in value-adding knowledge transfer and, therefore, its

success. From the research interviews, examples of egotistic attitudes were found in both VCs and CEOs. Participants who have a wealth of industry experience, or accomplished great achievements in their career have a greater tendency towards arrogance and the belief that “my way is the right way” (VC5). Findings suggest that these individuals value their own opinion higher than others, take criticism poorly, and pay little attention to mistakes or areas where they lack understanding. An observation amongst participant responses is that these individuals are often either senior individuals with a certain status in the industry or highly successful young entrepreneurs who have garnered attention from early accomplishments. Disinterest and lack of motivation to engage in knowledge transfer were further fuelled by factors such as gender, race, age or background. Interviewees suggested that sometimes inputs by women are dismissed by knowledge receivers because they are viewed as less capable of providing value-adding knowledge. In regards to strategic decisions, academics’ opinions are deemed by both VCs and CEOs to be less valuable, because they are assumed to have minimal commercial expertise. This observation was brought up by CEO5, which is contrasted by other CEOs who stated that they lacked the commercial knowledge that VCs have. Disengagement by knowledge receivers is further worsened when the knowledge transmitters were younger than the knowledge receivers.

Close-minded behaviour is contrasted with *openness*, an enabler to knowledge transfer discussed amongst participants. Open-minded individuals were portrayed as not being afraid to display transparent, authentic, and honest behaviours. When CEOs are willing to openly admit their mistakes or knowledge gaps, expectations can be managed, and conflicts or misinterpretations which lead to incomplete knowledge transfer are prevented. An individual who is open to collaboration and new ideas tends to also be self-aware and coachable. VCs agree that screening for coachable CEOs is a way to counteract barriers arising from ego and arrogance. Despite ego and arrogance being an inhibitor, an interesting point was brought up by a participant, who argued that arrogance is sometimes important for entrepreneurs to drive towards their goals when others lack belief in them.

6.2.2 Properties of Relationship

6.2.2.1 Strength of Relationship

Interviewees mentioned the strength of a VC-CEO relationship as positively associated with effective knowledge transfer, with trust being the biggest determinant according to participants. For instance, VC5 claims that “You could offer them all the support in the world, but if they don't trust you, they're not going to use that, or feel like they're able to”. In the due diligence and deal negotiation phase, it is helpful to manage expectations to avoid any conflicts or misunderstandings in the future. Being open and transparent about what is possible through the partnership, resolving opposing viewpoints that could affect venture development, or discussing follow-on funding expectations and milestones are all ways to manage expectations and set out a foundation for trust-building early on in the relationship. The quality of a VC-CEO relationship may improve through increased frequency and intensity of interactions – such as that during the due diligence phase. Trust is built by individuals working together and testing one another over time. Being professional and respectful, speaking up before things go wrong and admitting mistakes, being responsive and receptive, and keeping promises helps

with the trust-building process. The following quotes illustrate strong and trusting VC-CEO relationships:

> *I always feel very valued and appreciated…it just doesn't feel like it's a serious investment conversation, where I have to be on the lookout for questions…It has always been a nice discussion and they ask very difficult question sometimes, but they do it in a professional and nice and curious way, so you never feel like you've been examined or tested or anything like that…Despite the fact that they are the ones giving me money, they still make me feel really comfortable… They never give me the feeling that, "because we give you the money you owe us this and that.* (CEO1)

CEOs also find that once trust is established, VCs try to control fewer aspects of the company's operations. The result can be a comfortable, casual, informal yet professional working relationship with no judgement. However, participants noted that boundaries are required to retain the functionality of the partnership. VCs warned about the consequences of crossing the line. When boundaries are overstepped, it becomes hard for knowledge transmitters to provide advice without bias. Knowledge receivers could become defensive when new knowledge conflicts with the current way of doing things. These form barriers to knowledge transfer, and may even chip away at the trust built between VCs and CEOs.

> *Unfortunately, you can't become their best friend. If you become their best friend or a good friend, then when you need to be that mentor advisor again and put that other hat on, if they take it personally or if they take it as an attack rather than advice, then you're pretty much doomed. You need to get as close as you can while still keeping that separation, so that emotion doesn't get into it.* (VC6)

6.2.2.2 **Cognitive Proximity**

Findings suggest that when two individuals have similar expertise – thus less knowledge distance and greater cognitive proximity – individuals can communicate and transfer knowledge easier:

> *If you talk to someone who's got a PhD in cancer biology, versus if you talk to someone who doesn't have any PhD or maybe has an undergrad degree in engineering from 20 years ago. It's a different conversation.* (CEO1)

Conversely, participants noted that a difference in the educational background (e.g. business versus academic) results in a greater cognitive distance and creates obstacles to knowledge transfer. Individuals with different technical training and backgrounds are likely to utilize different thought processes, languages, and approaches. As a result, more time needs to be spent trying to understand the conveyed information before the individual can digest and contextualize the knowledge:

There's a big challenge around the language that is used across different board members…guys that come from an engineering background versus the clinical background. We spend quite a significant amount of time trying to align ourselves and understand what each person is saying. Often people are in agreement, but are saying things different ways, so that's sometimes a challenge. (CEO6)

This phenomenon is not only observed in people from different industries or educational backgrounds. The same applies to people from the same industry with slightly different specialties. One CEO described that most information was easy to convey to the VC representative who shared the same scientific background, but difficulties surfaced when they delved deeper into specific details relating to the CEO's specific field of expertise. Another CEO made an interesting counterpoint regarding the importance of cognitive proximity for knowledge transfer. While it's important to have cognitive proximity between people, it is also important to have a diversity of expertise and opinions even if it creates a complex dynamic that is difficult to navigate. If there is no difference between people's knowledge, a complete overlap of knowledge bases limits new knowledge creation.

6.2.2.3 **Geographical Proximity**

Every interview participant in this research mentioned the shift of mediums from face-to-face to virtual due to the COVID-19 pandemic. Surprisingly, preferences for being in-person or virtual were mixed amongst the participants. Some companies were already accustomed to operating virtually due to having team members, board members, investors or stakeholders based overseas or in other cities. These companies were less affected by the geographical knowledge transfer barriers imposed by COVID-19. Regardless of the situation or preference, participants recognize the advantages and disadvantages of both virtual and in-person methods.

Virtual methods were described by a few participants as being impersonal, making it difficult to build rapport. This is especially true in the early stages of a relationship when individuals are learning each other's personalities and workstyle. One participant stated that once a working relationship is established over time, the impersonal nature of virtual processes dissolves and is no longer an issue. Another participant said that subtle problems are left unaddressed through virtual methods because individuals are more reserved and share less in virtual settings. Organic encounters, spontaneous cross-pollination and informal communication cannot occur when working remotely, and immediate access to people or help is also limited. While lack of geographical proximity limits knowledge transfer, this restriction also has its benefits – particularly in terms productivity and efficiency of knowledge transfer:

The amount of efficiency that virtual brings is crazy. In a four-hour span, you can have four one-hour meetings. If you have to travel between meetings you can have two…the efficiency and productivity is much larger. (VC6)

Although virtual methods encourage more concisely delivered messages for optimal knowledge transfer, people are often more distracted. Delayed responses via virtual methods are possible, creating inefficiencies for the knowledge seeker's workflow. CEO2 elaborates by saying they "find it easier quickly knock on someone's door and be like, 'Hey, what do you think about this?' versus sending them an email and waiting for three or four hours for a reply". Moreover, many participants strongly value the rapport building aspect that in-person methods allow, as it shows commitment and appreciation towards the other party. I was acknowledged that complex knowledge is also easier transferred in person. Under face-to-face settings, individuals can read the audience's body language, and quickly adapt to different means of knowledge transfer to engage the knowledge receivers' attention. The following quote emphasizes the argument for in-person methods:

> *97% of communication happens through non-verbal language and it's just easier to form a rapport in person, because you're with them. I made time for you, I went through traffic for you. Not that you should be honoured, but the intention and the purpose* that *I'm here to meet this person and we're going to talk about this. It's just more personable than online. It can be very sterile online.* (VC5)

6.2.2.4 **Cultural Proximity**

Cultural proximity is a variable to knowledge transfer between VCs and CEOs. Although both parties form a joint venture partnership to achieve the same goal, there is a slight misalignment in objectives – investors need return and founders need money. The commercial versus academic incentives, and the pursuit of money or knowledge have frequently surfaced during interviews as the source of conflict between VCs and CEOs. Due to a slight difference in objectives, the knowledge that is considered important by one may be regarded as less important by another. Individuals with differences in discipline can find themselves with dissimilar routines and larger norm distances – the coordinated way of doing things. The next quote is a concrete example where a slight difference in approach due to a large norm distance leads to conflict and incomplete knowledge transfer:

> *Coming from a university, things are often slower… Are you sure? Has this been tested? Do we have enough evidence to say these things? Whereas for a VC it's, "Yes, this is it! What are you doing? Get out of here, go and do it."…if you are wanting us to do something, then what is it that we need to let go? …what is it then that you don't want us to do because our bandwidth is limited?* (CEO3)

According to participants, this balance is usually achieved after multiple discussions. Cultural proximity is also increased once a deal is structured between the VC and CEO. When goals are established, the VC-CEO relationship strengthens and is less adversarial.

I think it's so much easier when both parties understand that it's just honest, open communication. There are no other ulterior motives, it's not the company trying to look like they're still doing well, because they want follow-on investment. You can tell when a company is just being open and honest. (VC4)

Interestingly, due to the diverse roles of a VC, internal cultural proximity barriers can arise. As an existing investor to the venture, a VC's advisor role means they wish to maximize the venture's valuation. However, the VC simultaneously play the role of a potential follow-on investor, who wishes to minimize the venture's valuation. The conflict of interest which gives rise to a trust barrier can be mitigated by providing CEOs with the option to obtain third-party capital or managing expectations upfront. The quote below shows a VC discussing this phenomenon:

I make the argument that it's not worth it for an investor to do that [try to minimize valuation of a venture as a follow-on investor] because you're inhibiting your own investment that you've already made, but that's the conflict that we've seen our founders bring up. (VC6)

6.2.2.5 **Knowledge Transfer Channels**

Most participants consistently utilized static virtual processes such as documents, reports and presentations, and dynamic virtual processes like emails, and phone calls for VC-CEO interactions. Face-to-face processes have been fairly limited between VCs and CEOs largely due to COVID-19, but where possible, non-canonical face-to-face processes such as coffee meetings have been deployed to discuss any minor issues, while canonical face-to-face meetings are used for formal board meetings and regular updates. There were also some surprising channels used to transfer knowledge. One CEO provides status updates and new industry knowledge or trends to their stakeholders via a fortnightly newsletter, while one VC enjoys going for a walk with their founders to ease tension and encourage information sharing. A few participants talked about the use of *other personnel* as an additional tool to increase knowledge transfer successes. This leverages others' expertise to elevate the legitimacy of the new knowledge, thereby convincing the knowledge receivers to take up the knowledge with less doubt. The following quotes are evidence of using people as knowledge transfer channels:

I also brought on our quality manager to the board [discussion with the VC] … He [the quality manager] is able to communicate complexities [to the VC] in what it takes to get regulatory approval. The onus of regular audits be that internal or external audits. The amount of work that goes into just documentation. (CEO3)

it could be getting (the CEO) to speak to them and say the same thing in a different way. (VC5)

The choice of knowledge transfer channel is also in part influenced by geographical proximity. In-person processes are available when there is close geographical proximity between VCs and CEOs, whereas only virtual processes can be chosen when the geographical distance between the two is large. In the case where geographical distance poses a barrier to knowledge transfer, unplanned phone calls have been said to be a powerful tool to show camaraderie. Most participants use a variety and mixture of methods to optimize knowledge transfer.

> *It's what makes sense for the situation. If I need to quickly ask someone to fix something, Slack makes sense. If I need someone to explain their strategy and thoughts on something, then emails make sense.* (CEO7)

6.2.2.6 **Equity Positioning**

The common response regarding equity positioning is that there is no effect of equity on knowledge transfer between parties. One CEO raises capital in convertible loans to retain their ownership hence control over the direction of their company for longer, thereby avoiding any potential conflicts arising from equity positioning. Although perverse behaviours were observed in past CEOs who are driven by aspirations for equity, most VCs suggest that equity is not an issue. VCs provide support to their portfolio companies regardless of the amount of equity stake they have. VC3 agrees and states, "Once we're partnered and we're determined, we don't count the hours compared to the equity position". For most, and particularly CEOs, equity positioning is purely a necessary aspect of deal negotiation. Participants understand that either side wants to make a better deal for themselves. It is best to be professional and respectful to build a good working relationship after a deal is negotiated.

6.2.3 Properties of Knowledge

Within the properties of knowledge barriers, external or internal knowledge and level of protection were not significant. Once the VC-CEO relationship has been established post-investment, there is a baseline level of trust established. This section will therefore only discuss the nature and transferability of knowledge.

6.2.3.1 **Tacit vs. Explicit Knowledge**

The quote below summarizes tacitness as a barrier to knowledge transfer:

> *There's quite a lot of knowledge that is in our head that you can't just put down in a codified knowledge base. The only way you can share it is in-person face-to-face…It's all stuff that's in our heads and our experiences. That's a limiting factor, too, because that's depending on our time and our availability. Also our ability to recall, which is a huge barrier too.* (VC7)

Tacit knowledge is better transferred in person, where individuals can use multiple different mediums apart from verbal communication to convey knowledge. Things like whiteboards, visual cues, demos

and prototypes become available via in-person channels to facilitate tacit knowledge transfer. Tacit knowledge transfer also requires time, both for the knowledge transmitter to disseminate, and for the knowledge receivers to process the incoming information. Since tacit knowledge is deeply embedded in practice, for knowledge to be transferred in the first place, it needs to be identified and then recalled.

6.2.3.2 **Transferability**

Barriers arising from the transferability of knowledge have been experienced by a CEO pitching a certain population-specific problem to a panel of investors who do not belong to the target population:

> *It's a very difficult thing to pitch…When you don't have an issue yourself and you can't relate to that issue, or you don't see the issues being quite as bad as the person that's talking to you is making out.* (CEO3)

In the above situation, the investors only started to appreciate the scale and size of the problem once they observe their loved ones experiencing the same issue. Another example of transferability is the knowledge that may not necessarily translate from a historical to the present context. The limited transferability of knowledge from one point in time to another can also create challenges for knowledge transfer:

> *Someone might have done something in 1970s and it didn't work and there's a new and legitimate technology, but they can't accept that, because from their experience it hasn't worked before.* (VC5)

One CEO participant pointed out that barriers arising from the transferability of knowledge is the fact that the information provided has no value to the knowledge receiver. Instead, the knowledge transmitter should select the right pieces of knowledge to deliver to the knowledge recipient:

> *there is a common misconception that just because something was hard to do means it's valuable to someone. [it's about] the value of what you do ... what it will do for someone. I don't tell my customer, "Hey, here's how it works. Here's the whole whiteboard session on it." I say, "… what we care about is if this does this this this for you." And you say the same thing to your investors….* (CEO4)

6.2.4 Properties of the Broader Context

While results related to the properties of the organization as outlined in section 3.4.4 (Properties of Organization and Culture), participant interviews also revealed many unexpected themes. Some of those which were discussed under relevant sections included COVID-19-induced changes, people as a knowledge transfer channel, managing expectations and women in entrepreneurship. However, two themes, namely the *differences across geographies* and *education on commercialization and*

entrepreneurship, can be logically grouped with the properties of the organization to create a broader context. Organizational culture and structure will be discussed first, followed by the new sets of findings under relevant headings.

6.2.4.1 Organizational Culture and Structure

Findings suggest that knowledge transfer is optimal when an organization maintains an open and honest culture, where individuals feel comfortable sharing knowledge without judgement. A system where differences in opinion, diversified representation, and allowance of room for error creates a culture of collaboration and learning. An organization with standard operational procedures or protocols set in place allow for VC-CEO interactions to occur consistently without any unwanted surprises. For instance, one participant suggested to their VC to roughly outline the steps from their due diligence to deal finalization, and provide an approximate timeline for each step. The protocols provide both parties with a rough guide of what to expect and allow for time and space to prepare efficiently for their interactions and knowledge transfer processes to maximize their time together. The first quote illustrates the nascent and amorphous nature when transitioning into a start-up, while the second quote reveals experiences with an organization lacking formal protocols:

> *When I worked in the multinational, everything was extremely regimented… When I left that, it's just like there's nothing so you're free but…You've got to figure out what to do and there is no path… it feels like it comes out of the blue because I didn't know what was coming next* (CEO7)

> *a lot of processes are still in development and being worked out. My company has been – not a guinea pig – but the protocols aren't set in stone…Give them a couple more years and a few more companies, that process will become a lot more refined. That will really help.* (CEO2)

6.2.4.2 Differences Across Geographies: New Zealand vs. the Rest of the World

This study was able to gain insights into the comparison of New Zealand investment space against other countries due to interview participants who have vast experiences with VCs or CEOs from other countries. The main point of comparison was the United States, where participants provided both first-hand experiences and second-hand stories. Firstly, US investors are said to be more hands-off, while New Zealand investors are more likely to micro-manage venture operations. US investors weighed more importance on the end result rather than the process. One CEO attributed this to the quantum of capital, as a million dollars matter more to a New Zealand investor than it would for a US investor.

> *US investors …care less about the details of implementation…they don't care about how you get to your milestone unless you ask for help. With NZ investors…they like to control the process a bit more. That's a point of frustration a lot of time for a lot of founders.* (CEO5)

Both VC and CEO participants have voiced the lack of global ambition or vision in New Zealand CEOs and VCs. One participant talked about their foreign investors who have exited multibillion-dollar start-ups and understand how big the market could be. Another difference is the level of professionalism seen in the US. New Zealand founders tend to be more casual and informal, but their preparedness for important meetings and presentations can sometimes suffer as a result. They overlook legal boundaries due to the small size of the New Zealand investment ecosystem. In contrast, US founders are said to be more professional, ready and polished, with “more business acumen” (VC3).

Furthermore, New Zealand’s innovation and investment ecosystem was said to celebrate ‘kiwi ingenuity’. Yet, this has built up a preference of local value creation, resulting in the rejection of outside knowledge. One participant sheds light on the need to recognize that value is not always maximized locally:

> *The [New Zealand] VCs are kind of freaking out like, "we need to keep talent here, we need to keep this…we're Kiwis." That doesn't mean anything unless you can help them, doesn't matter where you're from.* (VC2)

The growing yet immature New Zealand investment ecosystem gains a lot of support from the government and society as a whole, which contributes to the increased ego in founders who have a know-it-all attitude, as well as a sense of entitlement when it comes to public sources of capital.

> *When it's a public funded fund… people feel that they're entitled to get funding. I still need to ask the question, I still need to make a sensible investment, because it is taxpayer money. But they tend to flip it as well, "I'm entitled to this because it's taxpayer money it's my right"…so they feel more equal or like they could tell me what to do* (VC2)

6.2.4.3 **Education on Commercialization and Entrepreneurship**

A lengthy switch in CEO’s mindset from purely academic to commercial is observed due to a lack of understanding of the objectives of commercialization. CEOs talk about the commercial mindset and thought processes they are required to equip themselves when they choose to take start-ups as their career pathways. While some CEOs were lucky enough to gain early exposure into the commercial world, many CEO participants discussed their lack of business knowledge as a source of difficulty and hardship during their commercial pathways.

100% I was full on academic…I thought if I do all this great academic science and I write all these publications and get the ideas out there, get the knowledge out there, then that is eventually going to be picked up by pharma and they will eventually make my drugs and everything's going to be sweet. Until I realized that this is not how the system works. The only way to really translate my findings to the real world, to really have anyone benefit from the research that we're doing is through commercializing it. (CEO1)

understanding the process that we were working through at the time was difficult. Lot of things even when I'm doing now…I'm doing them for the first time…lots of these things happen really quickly and if you don't understand everything you sort of feel a little bit left out… (CEO7)

Many participants from both groups laid blame on the lack of education around commercialization and entrepreneurship throughout their academic careers. This was the reason why founders may not be equipped with the skills and knowledge needed to navigate business discussions with their VCs, adding to the long list of knowledge transfer barriers. The following quotes illustrate this observation:

I didn't even know what the word 'Entrepreneurship' meant, and it's so interesting It doesn't help us as a nation trying to get into the knowledge economy if we don't have all of our great minds at least trying to think of disruptive ways and means of doing things. (VC3)

7 Discussion

This chapter will discuss the empirical findings in light of extant literature. First, the chapter introduces a theoretical model that integrates research findings and the conceptual framework. Then elements of the model, namely VC-CEO value add and barriers/enablers for knowledge transfer are discussed.

7.1 Modified Conceptual Framework

Depicted in Figure 7 is a conceptual model that incorporates research findings with the conceptual framework (see Figure 4). The skeleton of the framework consists of the bidirectional value-add between VCs and their portfolio companies' CEOs on the left and right, connected via the double-ended grey arrow. Value-add confirmed and discovered (in the case of CEOs) from research findings are listed in the respective VC and CEO boxes with solid black borders. While all value-add occurs during the post-investment phase, only the value-add marked by an asterisk (*) has been observed in the pre-investment phases. Central to the model are the barriers and enablers to value-adding knowledge transfer between these parties. Two axes – barriers and enablers; propensity and capability – divide barriers and enablers into four quadrants: willingness, external input, competence, and learning. Each quadrant identifies second-level factors that contribute to the first-level barriers and enablers.

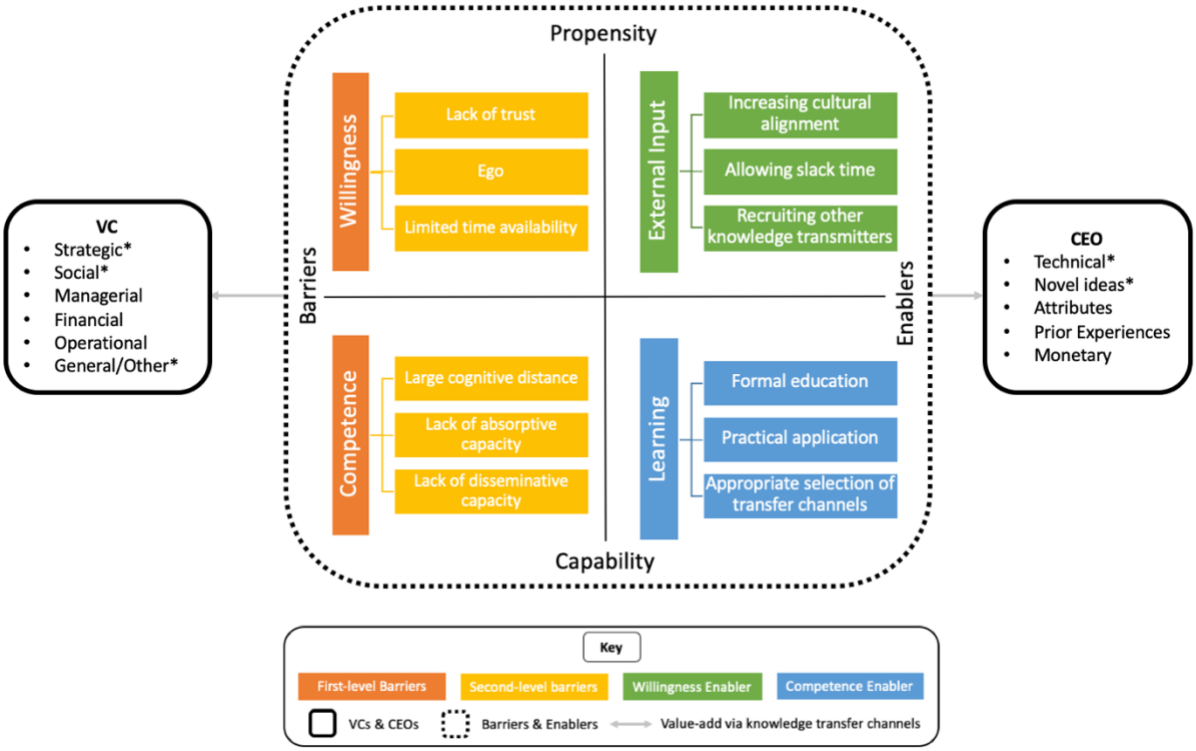


Figure 7. *Conceptual Model: Value-adding Knowledge Transfer Barriers and Enablers Between New Zealand VCs and their Portfolio CEOs*

7.2 VC-CEO Interactions and Value-add

In answering the first research question, '*Does value-adding knowledge transfer occur between VCs and CEOs in New Zealand?',* the study investigated the interactions between New Zealand VCs and their portfolio company CEOs. Findings suggest that the occurrence of knowledge transfer is dependent on three elements: (a) the venture stage; (b) the types of value-adding knowledge; (c) the direction of knowledge transfer. These will be discussed in turn.

First, interactions between VCs and CEOs were found to be highest during the pre-investment phase, but rather than value-add, complex knowledge relating to a venture's deep technology was transferred. Although VCs do supply some strategic, social and other value-adding knowledge in the due diligence phase, knowledge transfer is mostly unidirectional – from CEOs to VCs. Establishing a sufficient grasp of the technology during the pre-investment phase is crucial for VCs to make decisions around the investment. Once the investment is made, value-adding knowledge – relating to business strategy and monitoring and alignment (Kaplan & Strömberg, 2003) – is transferred to achieve value uplift. This is in line with De Clercq et al. (2006), in that the post-investment phase is where "the VCs can add or detract the most value". Unlike what was proposed in previous studies (Gomez-Mejia et al., 1990; Timmons & Bygrave, 1986), results suggest there is no correlation between equity positioning and knowledge transfer activity. VCs are willing to support and transfer value-adding knowledge to any ventures in need of support regardless of their equity stake in the company. Further, it was found that the frequency of interactions did not necessarily correlate to value-add.

Second, findings from this study confirmed VC's financial, operational, strategic and advisory, social and managerial value-add. Regarding financial value-add, the CEO's side of due diligence involved checking their VCs' capabilities in providing follow-on funding or instrumenting exit strategies. Although the literature suggests this to be the case (Audretsch & Lehmann, 2004; Xu, 2022), it is unclear if VCs in New Zealand have the financial capability to provide or arrange future funding opportunities. The presence of VC's strategic and advisory value-add was strongly supported, and CEOs found a VC's specialized knowledge derived from prior work experiences – in specific technology areas or disciplines – to be helpful. VC's industry expertise was confirmed to benefit CEOs and their early-staged ventures by reducing the uncertainty and time related to technology commercialisation (Kaplan & Strömberg, 2003; Luukkonen & Maunula, 2007; Xu, 2022). Positive views on VC's social value-add through bringing on advisors, customers, experts, other founders and other connections were also consistent with existing literature (Luukkonen & Maunula, 2007; Samila & Sorenson, 2010; Xu, 2022). Another finding from this study that was in line with the literature was the mixed opinions about a VC's managerial and governance role (Gomez-Mejia et al., 1990; Kaplan & Strömberg, 2003; Wallmeroth et al., 2018). Although VCs are a good source of managerial support and are appreciated by inexperienced entrepreneurs (Luukkonen & Maunula, 2007), some CEOs consider a VC's involvement in governance unnecessary or excessive. Finally, general support and programs created for CEOs are new findings that are added to the literature about VC's value-add. The presence of the extra support is perhaps due to VCs' attempts in plugging the voids (Sun et al., 2019) of New Zealand's inexperienced and immature investment ecosystem (Deakins et al., 2015;

Lerner & Shepherd, 2009). A lack of education around entrepreneurship and commercialization – a consistent finding among most participants – is one example of this institutional gap.

Third, findings suggest that CEOs also transfer value-adding knowledge to their VCs which indicates that value-add is a two-way street. This agrees with the collaborative innovation literature, where actors' "complementary knowledge is needed in breeding innovative ideas for products and services" (Blomqvist & Levy, 2006, p. 32). Deep-tech ventures aiming to solve complex problems through advanced technological solutions require complementary commercial and technical knowledge from VC CEOs, respectively (De la Tour et al., 2017; Korber et al., 2021). CEO's value-add to the VC-CEO relationship is an area that has not been explored in prior literature. As this study shows, CEO's unique and disruptive ideas (Bahrami & Evans, 1995) not only form the essential foundations of a start-up and generate monetary value-add for VCs (De Clercq et al., 2006). Further, CEOs 'up-skill' VCs in knowledge related to novel technology markets. In doing so, CEOs' experiences provide their VCs with unique lessons to add to future investments (Dahl & Reichstein, 2007), while the CEOs themselves become part of VC's extensive network. In other words, CEOs carry out a social and technology-related value-adding role. Another consistent finding related to CEO value-add is their various entrepreneurial attributes. A founder's relentless work ethic, risk-taking behaviour, passion for singular focus, ambition and flexibility in itself is not a novel concept (Bahrami & Evans, 1995), but considering these attributes as one of the CEO's value-add is surprising.

7.3 Barriers and Enablers to Value-adding Knowledge Transfer

Knowledge transfer activities between New Zealand VCs and their portfolio CEOs were explored to answer the second research question, 'What are the barriers and enablers to knowledge transfer between VCs and their deep-tech ventures in NZ?'. This allowed the researcher to detect any inefficiencies or signs of dissatisfaction related to value-add. Although findings provided evidence for many previously stipulated barriers and enablers to knowledge transfer, three main factors became prominent – trust, competence and motivation. Upon further literature-informed analysis, trust and motivation were encapsulated in the term 'willingness'. This conceptualization is captured in the modified framework (see Figure 7), which saw four main barriers and enablers (split by an axis formed by propensity and capability): willingness, external input, competence, and learning. The following sections will discuss the different variables that contribute to the first-level barriers and enablers based on the researcher's interpretations of data retrieved from research participants.

Willingness as a first-level barrier is influenced by lack of trust, ego, and limited time availability. This is consistent with the importance of trust, professional pride, and commitment that collaboration and knowledge transfer studies identify (Blomqvist & Levy, 2006; Korber et al., 2021; Li et al., 2021; Minbaeva, 2007; Vangen & Huxham, 2006; Yih-Tong Sun & Scott, 2005). *Trust* is vital to any functional relationship such as that between a VC and a portfolio CEO (De Clercq et al., 2006). As one VC5 sums up, "You could offer them all the support in the world, but if they don't trust you, they're not going to use that [knowledge], or feel like they're able to." Secondly, resistance or rejection of knowledge due to *ego* is contrasted with transparency, openness and flexibility to new ideas. Though the literature has suggested that status plays a part in knowledge-rejecting behaviour (Argote

et al., 2003; Husted & Michailova, 2002; Szulanski, 1996), ego was the consistently chosen word amongst participants to describe these instances. A plausible explanation for the lack of mention of ego in prior literature could be caused by study participants' unwillingness to offend those with a higher status, influence, and power. CEOs' reliance on their VCs may give rise to an imbalanced power dynamic, resulting in participants withholding such information (Zheng, 2011). Nevertheless, this study found that barrier due to ego elicits knowledge rejection in individuals but not knowledge-hoarding behaviours. Thirdly, active value-add is constrained by limited time availability (Kaplan & Strömberg, 2003). While many participants view this as a downside to knowledge transfer and a source of error, other CEOs appreciate it when they are left to their own devices.

Willingness-based barriers were found to have fewer mitigation strategies (enablers) compared to competence-based barriers. Trust, ego and time availability are closely tied to an individual's propensity, which takes significantly more effort to eliminate (Goh, 2002). Nevertheless, manipulation through external inputs such as increasing cultural alignment, allowing slack time, and recruitment of another knowledge transmitter can decrease willingness-based barriers. Findings also highlight the importance of increasing cultural alignment to shorten the 'norm distance' and prevent misunderstandings during knowledge transfer (Vangen & Huxham, 2006; Wang & Noe, 2010). These include maintaining responsiveness and receptiveness; acting respectfully, in good faith and as procedurally expected; making sure the right information has been delivered and obtained; and keeping each other well-informed (De Clercq et al., 2006). In addition, cultural alignment can be achieved through organizational structures such as a shared vision to create a sense of collective purpose (Korber et al., 2021). Evidence exists to support this mitigation strategy (Cummings & Teng, 2003), where organizations encourage teamwork and collaboration through collective incentives (Goh, 2002). When individuals place the same level of priority and significance on the same project, there is greater motivation to engage in knowledge transfer (Wang & Noe, 2010). To further facilitate this, organizations may provide spaces to accommodate groups or allow slack time for idea generation. Not only does slack time help with value creation, but it also allows individuals to build trust through collaboration and to develop an understanding of one another's character over time (Argote & Ingram, 2000; Cummings & Teng, 2003). On ego, there appears to be a hidden solution. When egotistic people display knowledge-rejecting behaviour, results indicated successful mitigation through the recruitment of another knowledge transmitter with relevant expertise to deliver the same information. Knowledge transmitted by a higher social or expert status source is perceived as more trustworthy, reliable and valuable (Szulanski, 1996).

Competence is a key barrier that captures lack of disseminative capacity, lack of absorptive capacity, and large cognitive distances (lack of cognitive proximity). All three factors correlate with the capabilities of individuals involved in the collaborative, knowledge transfer process (Blomqvist & Levy, 2006). First, an individual with a lack of disseminative capacity fails to be a persuasive, convincing, and engaging storyteller (Minbaeva, 2007; Yih-Tong Sun & Scott, 2005). Good storytellers understand the knowledge receiver's preferences for logic and communication and are capable of adjusting accordingly (Leung, 2014; Tounkara, 2015). Second, comprehension, retention, and utilization of knowledge cannot occur when individuals lack absorptive capacity, which may be influenced by their

education and prior experiences (Castaneda & Cuellar, 2020; Minbaeva, 2007; Tounkara, 2015). A lack of absorptive and disseminative capability results in poor knowledge transfer outcomes. Third, a large cognitive distance – or the lack of overlap between individuals' knowledge bases – introduces difficulty to knowledge transfer processes (Tounkara, 2015). To illustrate, simple phrases from different disciplines which vary in meaning may easily give rise to conflicts and impede knowledge transfer (Vangen & Huxham, 2006). The knowledge gap between a knowledge transmitter and receiver can also be so wide that knowledge transfer becomes impossible. Conversely, higher cognitive proximity permits more complex knowledge transfer to happen with greater ease. While this was frequently stated in interviews, one participant noted downsides to an excessive overlap in knowledge bases, which compromises value derived from transferring knowledge. This is in line with the negative relationship found between knowledge distance and knowledge transfer success (Cummings & Teng, 2003). In other words, a certain amount of knowledge distance is required for knowledge transfer to be valuable.

Competence-based barriers can be mitigated by learning through formal education (on commercialization), practical application (learning by doing), and an appropriate selection of transfer channels. In developing competence through learning, a knowledge user develops their skills around the appropriate selection of knowledge transfer channels for a given situation. Disseminative capacity and competence can then be improved through the use of knowledge transfer channels to tell a compelling story (Alexander & Childe, 2013). Depending on the situation, knowledge transmitters can modify their use of transfer channels and tools to suit the audience's preferences (Tounkara, 2015), thereby facilitating knowledge sharing and learning (Blomqvist & Levy, 2006). Increasing geographical proximity maximizes the availability and options for different knowledge transfer channels. In addition to virtual channels, it enables in-person methods which are rich media channels suited to transfer complex and tacit information (Spraggon & Bodolica, 2012). Furthermore, in-person transfer channels make allowances for knowledge transmitters to adapt their delivery based on real-time responses and the body language of the target audience. Meanwhile, questions or misinterpretations from the knowledge receivers can be addressed more easily when geographical distance is eliminated (Alexander & Childe, 2013). More importantly, formal education around commercialization, or opportunities for practical applications of knowledge feed into all aspects of an individual's knowledge transfer competence – disseminative capacity, absorptive capacity, and cognitive proximity (Goh, 2002). Such education requires institutions such as universities to provide relevant programs centred around research commercialization while also providing opportunities such as placements or internships for individuals to learn by doing (Cummings & Teng, 2003). A shared appreciation for the value of commercialization aligns both parties to better the outcome of knowledge transfer between VCs and CEOs.

Though many knowledge transfer barriers and enablers have been identified, findings of this study found the most significant factors to be tied to people and their relationships, such as that between a VC and their portfolio CEOs. Willingness and competence are examples of these key barriers to knowledge transfer that are mitigated by using enablers such as external input and learning. Although organizations and knowledge itself play a role, it is actually through knowledge

seekers and providers through which knowledge transfer is executed. This is in line with other knowledge transfer studies, which found that barriers and enablers associated with individuals and their relationships weigh more importance over other factors (Minbaeva, 2007; Pinho et al., 2012).

8 Conclusion and Implications

This chapter summarizes the research findings. Following this, the contributions and implications of this study, along with limitations and future areas for research will be outlined.

8.1 Research Summary

The shift towards a knowledge economy has placed great importance on intangible assets, such as intangible knowledge frequently brought about by entrepreneurs (Stam, 2015). Large amounts of financial capital, as well as non-financial value-add, are required to maximize and extract the potential of an entrepreneur's intangible knowledge (Carlile, 2002). Both capital and non-financial value-add can be sought from VCs (Catalini et al., 2019; De Clercq et al., 2006; Sun et al., 2019; Vassilev, 2005). However, existing studies investigating VC-CEO relationships and interactions revealed that CEOs may not always share the same view as their VCs on the quality of a VC's value-add (Gomez-Mejia et al., 1990; Krishanasamy, 2019; Zheng, 2011). Addressing this gap in the literature, this study sought to understand if VC value-add is realized in New Zealand, and why it may or may not be happening through a knowledge transfer lens. Using both perspectives of VCs and CEOs, the research aims to answer the research questions:

1. *Does value-adding knowledge transfer occur between VCs and CEOs in New Zealand?*
2. *What are the barriers and enablers to knowledge transfer between VCs and their deep-tech ventures in NZ?*

This was achieved by adopting a qualitative research strategy governed by the interpretivist research paradigm which considered differences in individual perceptions, including the one of the researcher. An abductive approach to theory development saw a conceptual framework developed to guide the semi-structured interviews and data analysis process.

The study found that value-add in New Zealand ventures was highest in the post-investment phase, despite the high-frequency interactions during the pre-investment phases. This suggests that interactions do not necessarily equate to value-add. VC's non-financial value-adding roles were confirmed from findings, but their financial capabilities for follow-on funding and managerial roles were doubted by some CEOs. A new finding which could be attributed to New Zealand's nascent ecosystem is the extra support and programs offered by New Zealand VCs. On the other hand, the CEO's value-add was found to be return on investments, technical expertise and intangible ideas. In addition, CEO's entrepreneurial attributes were an unexpected value-add that was considered pivotal by many VCs. All types of value-add from both VCs and CEOs were found in the form of knowledge, which validated the study's use of a knowledge transfer perspective. Throughout the data collection and analysis process, key barriers and enablers to knowledge transfer were uncovered and

subsequently grouped by individual propensities or capabilities. Factors tied to propensities were grouped as willingness-based barriers, while capability-related variables were clustered into competence-based barriers. Both willingness and competence must be present to achieve knowledge transfer between VCs and their CEOs. Value-adding knowledge transfer is compromised when one of the two barriers is missing.

Overall, New Zealand VCs and their portfolio CEOs engaged in bidirectional value-add. The key transfer barriers of willingness and competence heavily were associated with individuals and their relationships, while external inputs and learning opportunities are enablers which can help to mitigate these barriers for a better knowledge transfer outcome.

8.2 Contributions and Implications

This study contributes to the VC and entrepreneurship field in three main ways: (a) insights into value-adding knowledge transfer between New Zealand VCs and their CEO; (b) identification of knowledge transfer barriers and mitigation strategies; (c) practical implications for relevant stakeholders.

First, the study findings offer a glance at VC's value-add, confirming its occurrence in the New Zealand context, while providing the reasons behind VCs' controversial managerial role. An additional value-add was found in New Zealand VCs to support CEO education around commercialization, perhaps in part compelled by the nascent ecosystem (Ansari et al., 2018b; Lerner & Shepherd, 2009; Sun et al., 2019). While confirming existing literature around VC value-add in the New Zealand context, this study contributes by introducing the phenomena of a bidirectional value-add between VCs and their portfolio company CEOs. Not only do CEOs contribute intangible ideas and assets, but their ambitious and risk-taking attributes have been considered a value-add. Such contribution was created through the exploration of both VC and CEO perspectives, further enriching insights into value-add. Different levels of VC representatives were also interviewed to encapsulate the variety of VC-CEO relationships that exist.

Second, this paper logically organized potential knowledge transfer barriers and enablers from various literature into a theoretical framework for ease of digestion. Although literature has looked at value-add of VCs and strategies for knowledge transfer, the two concepts have largely been investigated by separate streams of literature (Argote, 2012; Luukkonen & Maunula, 2007). Upon synthesis of research findings, a strong correlation was found between value-add and knowledge transfer. Thus, this study provides a link between knowledge management theory and entrepreneurial finance literature in an attempt to explore knowledge transfer barriers and enablers in the VC-CEO context. Literature around VC value-add has highlighted both the positive and negative aspects of value-add, but has failed to investigate underlying dynamics (Gomez-Mejia et al., 1990; Zheng, 2011). In framing value-adding knowledge as willingness and competence related, this research shows that certain barriers can be mitigated while others can be developed (Blomqvist & Levy, 2006).

Lastly, from a practical point of view, the study also has implications for portfolio managers, general partners and venture founders. Identification of the key barriers and enablers to knowledge transfer along with potential mitigation strategies provide practical insights to overcome barriers.

Findings based on interview participants help VCs understand why their managerial value-add may not be appreciated by the CEOs, and whether the effort is better focused elsewhere, such as in general support for their portfolio founders. It also supports both parties to identify areas of misalignment and disagreement, thereby understanding through one another's perspective. Providing mitigation strategies and enablers from both (VC and CEO) perspectives allows either party to self-evaluate and discover areas of improvement to achieve a better functional relationship.

8.3 Limitations

Several limitations have been identified in this study. Sampling constraints, participant behaviour, and the nature of this study limit the generalizability and study reliability.

Firstly, due to the time constraints of the study, the sample size was restricted to participants who not only fit the selection criteria but were also available during the limited data collection period. Similarly, the selection criteria for ventures – deep tech, early-stage, post-investment – further narrowed the eligible sample population in the already small New Zealand investment ecosystem. As such, larger sampling slices in other ecosystems are needed. Secondly, qualitative interviews rely on participants' ability to accurately and honestly recall incidences and events (Sheppard, 2020, Chapter 10), so the data collected may not be a comprehensive representation of reality. To add to that, participants may have held back certain details to prevent relationship damage. Regardless, the researcher ensured that participants were reassured of the study's ethical considerations around the disclosure of any information. A conversational tone was also maintained to ensure participants felt comfortable sharing information during the interview. Lastly, a qualitative study such as this involves the researcher's interpretation in the analysis processes, determined by the researcher's background and preconceptions (Bryman & Bell, 2011). A different researcher attempting to replicate the study may lead to different results due to their own background and sets of biases. This was mitigated by keeping a researcher's journal, attaching an interview guide and presenting the framework for coding.

8.4 Future Research

Given that this research provided new findings and different perspectives, there are several opportunities to explore in future research. Three types of research could follow on from this study – continue, expand or compare.

This study provided a theoretical framework of various knowledge transfer barriers and enablers identified from the literature categorized by four properties. Though findings confirm most of the barriers and enablers, a few factors relating to people and relationships weighed more significance than the rest. Future research could continue the investigation by developing a schematic representation of the interconnectivity between knowledge transfer barriers and enablers, as well as the significance of each factor. One way to achieve this could be via mixed methods research (Bryman & Bell, 2011). In-depth interviews could uncover the relationships between knowledge transfer barriers and enablers, while qualitative measures could be employed to reveal participants' perceived weighted importance of each variable.

To expand on research around knowledge transfer between VCs and their CEOs, it could be interesting to broaden the scope of the research to include later-stage companies. Doing so may unveil findings that address the uncertainty in this study relating to VCs' financial capabilities and managerial role in their portfolio companies. An expansion could also be achieved by investigating value-add and knowledge transfer in a longitudinal study to observe the significance of value-add and changes in knowledge transfer barriers and enablers over time.

Lastly, future research could perform case studies to address the differences in the geographical context identified in this study between New Zealand and mainly the US. For example, a three-case case study including ventures with New Zealand investors only, New Zealand and US investors, and US investors only could reveal operational differences in VCs across regions. This study had fourteen participants evenly split amongst the VC and CEO group. There were three VC-CEO pairings, seven different venture CEOs and five VCs in total. Future research may benefit from sampling complete pairings to focus questions around the specific VC-CO interactions and knowledge transfer processes. This enables direct comparison of VC and CEO perspectives on the same phenomenon and activities, whilst allowing comparison between VC-CEO pairings.

9 Appendices

Appendix A: *Interview Guide – VCs*

Background

1. Tell me a little bit about yourself, your background & experiences, and what brought you to the role(s) you have today.
2. What does your current role involve (in relation to your company operations)?
3. Tell me a little bit about your company's operations.

VC-CEO interaction

4. Could you describe your relationships & interactions with your portfolio CEOs?
    - *Frequency, Intensity, Formality*
5. When do you think this interaction is most active?
    - *Why is that?*
6. How did interactions look before and after investment?
    - *Why did it change? Or why not?*

Value-Add

7. From your perspective, what value do you add to the venture?
    - *What kinds of knowledge do you bring in?*

    (Financial, strategic, management, governance, social, administrative, network)
8. What values do CEOs bring into the relationship?
9. When do you feel that your value is maximized?

    (Experience, equity, geographical location, early-stage…etc)

Knowledge Transfer (KT) Mechanisms & Factors

10. What are some mechanisms of information exchange?

    (Face-to-face, virtual, phone calls, informal encounters, slides/documents/demos…etc)
    - *When and why do you opt for xxx?*
    - *Do you think this is an efficient way? Why or why not?*
11. Can you think of anything that makes transfer of knowledge or communication difficult?

    (individual traits, interactions, nature of the knowledge…etc)
    - *Could you provide an example of when this has been difficult?*
        - *How did you overcome this?*
12. What could help to alleviate this?

Wrap up

13. Is there anything I haven't asked in regard to your experiences and interactions as a VC with portfolio CEO(s)?

Appendix B: *Interview Guide – CEOs*

Background

1. Tell me a little bit about yourself, your background & experiences, and what brought you to the role(s) you have today.
2. What does your current role involve (in relation to your company operations)?
3. Tell me a little bit about your company's operations.

VC-CEO interaction

4. Could you describe your relationships & interactions with your VC(s)?
    - *Frequency, Intensity, Formality*
5. When do you think this interaction is most active?
    - *Why is that?*
6. How did interactions look before and after investment?
    - *Why did it change? Or why not?*

Value-Add

7. From your perspective, what value do you add to the venture?
    - *What kinds of knowledge do you bring in?*

    (Financial, strategic, management, governance, social, administrative, network)
8. What values do the VCs bring into the relationship?
9. When do you feel that the VC's value is maximized?

    (Experience, equity, geographical location, early-stage…etc)

Knowledge Transfer (KT) Mechanisms & Factors

10. What are some mechanisms of information exchange?

    (Face-to-face, virtual, phone calls, informal encounters, slides/documents/demos…etc)
    - *When and why do you opt for xxx?*
    - *Do you think this is an efficient way? Why or why not?*
11. Can you think of anything that makes transfer of knowledge or communication difficult?

    (individual traits, interactions, nature of the knowledge…etc)
    - *Could you provide an example of when this has been difficult?*
        - *How did you overcome this?*
12. What could help to alleviate this?

Wrap up

13. Is there anything I haven't asked in regard to your experiences and interactions as a venture-backed CEO?

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