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# The Effects of Different Time Horizons on the Efficiency of Simultaneous and Sequential Ambidexterity: Evidence from Corporate Venture Capital Investing

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## Abstract

A thorough review of the existing literature on ambidexterity and ambidexterity in a Corporate Venture Capital (CVC) context, revealed the need for a deeper research regarding the effects that short- and long-term time horizons play in the relationship between the various forms of ambidexterity and financial performance. First, I attempt to support the positive relation between simultaneous and sequential ambidexterity and firm performance in a broader CVC context (by using Tobin's Q as a general measure). Hereafter, a more detailed analysis on the role of the different forms of ambidexterity on financial performance is attempted by analysing the effects on both short- and long-term time horizons. The models in this paper found evidence that supported a positive relationship between simultaneous ambidexterity and Tobin's Q, a general, short- and long-term indicator for firm performance. No significant relation was found regarding sequential ambidexterity, but the results hinted in a possible positive relation. A significant relation between sequential and simultaneous ambidexterity and the separate measures for short- and long-term performance could not be found. The main cause for this insignificance can be found in the limitations encountered during the data collection. These had a detrimental effect on the sample size, statistical noise and overall accuracy of the variables. Although the model was insignificant, the results hinted to a stronger short-term relationship between simultaneous ambidexterity and performance, and a stronger long-term relationship between sequential ambidexterity and performance.

**Keywords:** Exploitation, Exploration, time, Corporate Venture Capital, Simultaneous Ambidexterity, Sequential Ambidexterity.

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## Abstract (Portuguese)

Uma revisão completa da literatura existente sobre ambidestria e ambidestria num contexto de Capital de Risco Corporativo (CVC), revelou a necessidade de uma pesquisa aprofundada sobre os efeitos que horizontes de tempo de curto e longo prazo desempenham na relação entre as várias formas de ambidestria e desempenho financeiro. Em primeiro lugar, tento sustentar a relação positiva entre ambidestria, simultânea e sequencial, e desempenho da empresa num contexto mais amplo de CVC (usando o Q de Tobin como uma medida geral). Posteriormente, uma análise mais detalhada sobre o papel das diferentes formas de ambidestria no desempenho financeiro é realizada, analisando os efeitos nos horizontes de curto e longo prazo. Os modelos deste artigo encontram evidências que confirmam uma relação positiva entre ambidestria simultânea e o Q de Tobin, um indicador geral de curto e longo prazo para o desempenho de uma empresa. Não foi encontrada qualquer relação significativa concernente à ambidestria sequencial, contudo, os resultados sugerem uma possível relação positiva. Não foi encontrada uma relação significativa entre a ambidestria sequencial e simultânea e medidas separadas de desempenho de curto e longo prazo. A principal causa desta insignificância pode ser encontrada nas limitações enfrentadas durante a coleta de dados. Tal teve um efeito prejudicial no tamanho da amostra, no ruído estatístico e na precisão geral das variáveis. Embora o modelo seja insignificante, os resultados sugerem uma relação de curto prazo forte entre ambidesteridade simultânea e desempenho, e uma relação de longo prazo forte entre ambidesteridade sequencial e desempenho.

**Palavras-chave:** Exploração, Tempo, Capital de Risco Corporativo, Ambidestria Simultânea, Ambidestria Sequencial.

**Autor:** Joris Vanhaverbeke

**Título:** Os efeitos de diferentes horizontes de tempo na eficiência da ambidestria simultânea e sequencial: evidências de investimentos em Capital de Risco Corporativo.

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# 1. Introduction

In 1996, the first mentions of organisational ambidexterity as a means of sustaining long-term firm survival and superior financial performance surfaced (Tushman & O'Reilly, 1996). Here, they defined ambidexterity as *"The ability to simultaneously pursue both incremental and discontinuous innovation and change results from hosting multiple contradictory structures, processes, and cultures within the same firm"* (Tushman & O'Reilly, 1996a, p. 24). Since that time, the idea of ambidexterity has gained a lot of traction. The increased interest in the topic came alongside an upsurge of empirical research, theory papers and review articles.

All this prior research has broadened and deepened our knowledge about ambidexterity and the ways it can affect an organisation. However, it has also shown us that there is still place for contradictory results, confusion and unknowns (O'Reilly & Tushman, 2013). Review of previous literature regarding ambidexterity and corporate venture capital investments suggests that further research on how, when and on which time horizons it affects the financial performance and value creation of a firm is required.

Throughout all the empirical research and theoretical papers, there is a clear consensus about what it entails for a firm to be ambidextrous. Ambidexterity originally means to be equally skilful with both hands. As the definition earlier states, it is also the capacity for an organisation to be equally skilful at two things. The scholars who have researched ambidexterity, have further developed this definition. The overall consensus puts this capacity to handle two things at once in terms of being able to handle and harmonize the competing demands of exploration and exploitation (Gupta et al., 2006; Raisch & Birkinshaw, 2008).

In layman terms, exploration is to look for knowledge in areas where you have no or little prior experience (Gupta et al., 2006; March, 1991). Exploitation is to look for knowledge in areas where you do already have experience, with the idea of incrementally building upon this knowledge and experience (He & Wong, 2004). Explorative investments are characterized by search, experimentation, risk taking, radical innovation (Tushman & O'Reilly, 1996) discovery, uncertain, often negative and new alternatives (Cheng & Van de Ven 1996, March 1991). Exploitative investments, on the other hand, imply firm behaviour that is oftentimes characterized by scholars with terms such as incremental innovation (Tushman & O'Reilly, 1996), refinement and extension of existing competencies, predictable, positive, implementation and efficiency (Cheng & Van de Ven 1996, March 1991). While exploration is about coping with discontinuities by creating variety in experience, exploitation is concerned

with establishing reliability in experience and prospers due to refinement and productivity (Holmqvist, 2004).

Even though scholars agree on the general definition of ambidexterity, there is still a lot of ambiguity surrounding the optimal ways of how to become ambidextrous. The research all agrees that ambidexterity is a firm's ability to extract benefits from and work with exploration and exploitation. The differences come from nuances in both the timing regarding the combination of explorative and exploitative activities and the structures used in deciding the allocation of time and resources between these activities.

There are two main ways of balancing the use for exploration and exploitation described in the literature (O'Reilly & Tushman, 2013). Each with their own advantages and disadvantages. The first of these two being; simultaneous or structural ambidexterity. It is one of the ways to balance the explorative and exploitative activities. This concept alludes to *"the synchronous pursuit of both exploration and exploitation via loosely coupled and differentiated subunits or individuals, each of which specializes in either exploration or exploitation."* (Gupta et al., 2006, p. 693). More generally speaking, it is the pursuit of both exploration and exploitation in the same period in time.

Exploitation has been linked with generating current cash flows, while exploration stimulates the future cash flows (March, 1991). Following this reasoning, this mode of ambidexterity argues for a simultaneous approach so that both short- and long-term performance gets enhanced. Another argument for the synchronous pursuit of both exploration and exploitation is due to the iteratively self-reinforcing effects that the previously mentioned activities have (March, 1991). A sole focus on exploitation leads to the development of core competencies that temporarily translate in great growth and financial performance. But once the environment unavoidably develops, these turn into core rigidities and have detrimental effects on the long-term performance (Leonard-Barton, 1995). On the other hand, a sole focus on exploration leads to a "failure trap". This occurs when a firm pushes all its resources in an activity with a high failure rate. When the activity fails to produce significant results too many times, the firm will try to look for even greater innovations and changes to get back on top by pushing even more resources into the exploratory activity (D. A. Levinthal & March, 1993).

The second concept is called sequential ambidexterity. "Sequential ambidexterity is defined as the sequential pursuit of exploration and exploitation over different periods by transitioning the

structures and routines focused on one activity to another" (Jeon, 2017, p. 202). There are multiple arguments as to why sequential ambidexterity creates advantages for firms.

As previously mentioned, there is a concern in some of the literature that too much of a focus on either exploitation or exploration could lead to the further self-reinforcement of those activities which leads to negative results. However, the literature also argues that sequential ambidexterity creates positive temporal spillovers. The idea behind these spillovers is that current exploitative investments lead to short-term excess returns. These slack resources then become the engine behind the explorative investments (Cyert & March, 1963). Vice versa, the novel technologies extracted from the explorative investments, trigger further exploitative investments so that these could be fully refined and once again create excess returns (Cyert & March, 1963). The continuous changes in structure needed for sequential ambidexterity also helps battle the dangers of misalignment with the environment (Brown & Eisenhardt, 1997). However, when the duration of change is either too long or too short, there could be negative spillovers between the two activities caused by set-up costs and time needed for effective adaptation and implementation (Barnett & Freeman, 2001; Sirén et al., 2012).

What is maybe the most impressive feature all the theories and research done concerning ambidexterity, is that even though different papers use different measures of ambidexterity, industries, degrees of analysis and outcome variables, the results associating positive long-term performance to ambidexterity are robust. There have been a lot of studies that delved into the effects of ambidexterity on different organizational levels and the overwhelming majority positively associated ambidexterity with sales growth, subjective ratings of performance, innovation, market valuation (measured by Tobin's Q) and firm survival (O'Reilly & Tushman, 2013).

However, some studies have shown that under certain conditions, ambidexterity could be inefficient. The research concerning the conditions in which ambidexterity is most likely to succeed or fail aggregated to 3 major results. First, in general ambidexterity is associated with a superior firm performance. Second, the positive effects are subject to the environment an organisation operates in. Firms that operate with more resources (generally large firms) and in an environment with a higher level of uncertainty are more likely to have superior results due to ambidexterity than firms who do not have such an environment (Caspin-Wagner et al., 2012). Finally, research suggests an inverted U-shaped relationship between financial performance and ambidexterity (Caspin-Wagner et al., 2012; Uotila et al., 2009).Meaning that the over- or under-use could lead to sub-optimal results.

As illustrated earlier, ambidexterity has had very significant, robust and positive results in regard to firm survival, financial performance and innovation. However, it also became clear that there are a lot of different aspects to ambidexterity that cause ambiguity. For example, there are arguments that suggest that focussing too much on either exploration or exploitation could lead to self-reinforcing of those activities which in term leads to success or failure traps (D. A. Levinthal & March, 1993). On the other hand, there are arguments for exploitation and exploration being interdependent and being able to act and positively stimulate the other in sequential periods, thus reinforcing each other (Gilsing & Nooteboom, 2006). As mentioned earlier, the research that has already been done consists of a wide variety of organisational levels, outcome variables and types of ambidexterity. And even though these results seem robust, there remain important conditions and specifications in the framework that are ambiguous or not yet fully explored. In conclusion, even though a lot of research has been done regarding this subject, a lot more can be done to fully understand and correctly instrumentalize it in the real world. Throughout this paper I will attempt to add to the existing literature by exploring on which time horizons certain forms of ambidexterity function most efficiently.

My focus for this research will solely be on corporate venture capital (CVC) investments. These investments are direct minority equity investments in privately held start-up companies and small businesses. More specifically, CVC investments are made by funds set up by large, established corporations (Dushnitsky & Lenox, 2005). CVCs have become increasingly popular over the years, this is because they are effective and versatile vehicles that corporations design with the purpose of identifying and capturing external knowledge, know-how and innovations. They do this by making equity investments in entrepreneurial ventures. Oftentimes CVCs exist not solely to create direct financial gains through their investments. Instead they create value indirectly through the ability to access external sources of knowledge that allow them to refine and further establish their own competencies, technologies and innovations and/or establish radically new technologies/competencies through explorative investments that allow them to have a superior strategic position and higher level of survivability in a dynamic, competitive environment.

Firstly, CVC's are set up to function as a vehicle for creating value and increasing the long-term performance of the parent firm. The added value from the CVC investment comes from their ability to identify and capture external knowledge, know-how and innovation while also acting as a powerful tool against dynamic competitive environments and potentially adding extra chains and alliances in a network (Dushnitsky & Lenox, 2005; Maula et al., 2012;

Wadhwa & Phelps, 2011). Previous literature has found that through these factors, CVC investments generally result in an improved financial performance and increased knowledge creation (Schildt et al., 2005; Wadhwa & Basu, 2013).

Secondly, the nature of all CVC investments can be classified as either exploitative or explorative (Hill & Birkinshaw, 2014; Wadhwa & Basu, 2013). CVC funds oftentimes make use of and switch between both types of investments for various reasons. As mentioned in the previous sections, both explorative and exploitative investments result in different benefits for a firm. Exploitative CVC investing allows a firm to search and acquire related and incremental knowledge which is used to further strengthen the firm's existing core capacities and knowledge (Hill & Birkinshaw, 2014; Wadhwa & Basu, 2013). Opposite to that, explorative investments are a great tool for acquiring new technologies, innovations and unfamiliar knowledge (Hill & Birkinshaw, 2014; Wadhwa & Basu, 2013). The benefits derived from both investment types are important pieces in the goal of CVC funds. And because there is always a trade-off between explorative and exploitative investments, CVC's are prone to have different variations and combinations of these investment types over time. This is due to their paradoxical requirements; they have a need of different organisational structures, mindset and routines while at the same time competing for similar scarce resources of the investing firm (Cyert & March, 1963; Jeon, 2017; March, 1991).

Because of these factors CVC investments provide useful data to observe the balance between explorative and exploitative investments and the effects. While also being an appropriate research context since the research itself could benefit the performance and effectiveness of CVC investing. Some research has been done regarding CVCs and ambidexterity, but there is a lot more research that has to be done before being able to narrow down this theory down to an easy to use, non-ambiguous, robust tool for CVCs to rely on.

This paper will be organised as follows: The next section will contain a summarization of the key insights from the existing theoretical and empirical literature on ambidexterity. Hereafter, the entirety of the model and the sample will be discussed. The section thereafter will run through the results produced by the models and sample discussed earlier. Subsequently, a discussion about the limitations and the results will be had to link possible explanations of the theory to these results. The paper will conclude by summarizing the main conclusions, arguments and possibilities of future research.

# 2. Literature Review

## 2.1. Exploration vs exploitation

The difference between exploration and exploitation is referred to as two fundamentally different dimensions of innovation or as two different types of learning activities. The differentiation of these can mainly be characterized by a different focus and different expected outcome a firm has when pursuing these activities. The difference is one between incremental change and radical change (Benner & Tushman, 2003). On one side, by having an exploitative approach, a firm expects to build further upon existing skills, competencies and knowledge (March, 1991). They do this by focussing on activities that include the following characteristics: *"refinement, choice, production, efficiency, selection, implementation, and"* execution (March, 1991, p. 71). On the other side, by exercising an explorative approach, an organisation aims at developing new competencies, skills, products and services. To achieve this, explorative activities can mainly be described by the following characteristics: *"search, variation, risk taking, experimentation, play, flexibility, discovery, innovation"* (March, 1991, p. 71).

It is clear and logical that both of these activities are beneficial and even necessary to an organisation for survival. The main claim of the ambidexterity concept is that correctly balancing exploration and exploitation results in better financial performance, long-term survivability and innovation. The main reason behind this result is also clear across the literature, organisations exploit and leverage existing resources and competencies to fully optimise short-term cash-flows and explore new competencies and knowledge that increase their adaptability in a dynamic & competitive environment while also generating future cash-flows. (D. A. Levinthal & March, 1993; March, 1991). However, there is always a trade-off in the decision between the two activities since they compete for the same scarce resources. Meaning that a larger focus on exploration leads to a decrease in exploitative activities and vice versa. Thus, there is a decision to be made by every organisation on how to allocate its resources across these different activities.

Some scholars claim that there are three main assumptions surrounding exploration and exploitation that can be made. The first one has already been mentioned; there is always a trade-off between exploration and exploitation when it comes to the allocation of the scarce resources a firm has that are required to fuel both processes (March, 1991). Exploration and exploitation can be seen as two sides of one spectrum, a spectrum of search distance (Gupta et al., 2006; Phelps, 2010). On one side of this spectrum, a local or short search distance can be seen as

exploitation. On the other extreme of this spectrum a long search distance can be conceptualised as exploration (Cyert & March, 1963). Therefore, a trade-off has to occur at one static point in time. Allocating more scarce resources to one of the two activities shifts the balance across the spectrum, but it makes it impossible to invest resources in one of the activities without diminishing the other activity. A second general assumption that can be found throughout the literature is that exploration and exploitation have conflicting organisational demands. The mindset, structure and routine needed to exercise each of these two activities are different (Jeon, 2017). Meaning that exploration and exploitation have paradoxical requirements and trying to balance them creates tensions within an organisation that make it hard to correctly do so (Tushman & O'Reilly, 1996).

The last assumption that is often made by scholars is that exploration and exploitation are iteratively self-reinforcing (Gupta et al., 2006; Jeon, 2017; March, 1991). A predominant focus on exploitation leads to a success or competency trap whereas a predominantly exploratory strategy could lead to a failure trap (Levitt & March, 1988). A success trap is the result of continuously focussing on exploitation to keep up the development of core capabilities. These capabilities will, in the short run, lead to very good results in their current environment but they will also make the firm rigid (Leonard-Barton, 1995). When the (technological) environment changes, and the core capabilities have turned into core rigidities, the firm will no longer be able to properly react. A failure trap occurs when exploration drives out exploitation. Exploration is characterised by a high failure rate, as the firm wastes more and more resources on these failures, it doubles down on exploration to find a source of greater change (Levinthal & March, 1993). In conclusion, a sole focus on either exploration or exploitation is dangerous and could decrease the firm's performance and long-term survivability.

However, this last assumption has been ambiguous throughout the literature and not all literature fully agrees with these mechanisms. There are also arguments for the opposite, that exploration and exploitation are interdependent and reinforce each other. Exploitation in the current period leads to slack resources that can power the exploration in the future periods, and vice versa, the knowledge gained from successful exploration can turn into the base of future exploitation (Gilsing & Nooteboom, 2006).

Even though the literature has agreed on the idea of ambidexterity and how being able to balance exploration and exploitation leads to a better long-term survival rate and better performance (Gupta et al., 2006; Raisch & Birkinshaw, 2008), there are still plenty of discussions on the optimal mechanisms and assumptions of those mechanisms to achieve this

balance between scholars. There are two main mechanisms to optimally balance exploration and exploitation that have emerged throughout the literature. Simultaneous ambidexterity is the first of these mechanisms and can be defined as: *"the synchronous pursuit of both exploration and exploitation via loosely coupled and differentiated subunits or individuals, each of which specializes in either exploration or exploitatio*n" (Gupta et al., 2006, p. 693). The second mechanism, sequential ambidexterity, involves the sequential or subsequent use of exploration and exploitation over different time periods. This is achieved by adapting the necessary structures and routines to fit the current focus. In the following part, I will elaborate on the theories and studies that explain how these two mechanisms result in a better financial performance.

## 2.2.Simultaneous ambidexterity

The main reasons behind simultaneous ambidexterity are clear. On one side, exploitation allows an organisation to fully optimise and leverage the current capabilities, skills and knowledge to maximise their current cash-flows (March, 1991). While the pursuit of exploration helps an organisation secure future cash-flows and helps them adapt to the dynamic and competitive environment that they operate in (March, 1991). Following this logic, the simultaneous combination of both explorative and exploitative activities enables both current and future cash-flows, which in term results in good short- and long-term performance (March, 1991). Another big argument for the success of simultaneous ambidexterity is because these two activities are iteratively self-reinforcing (Gupta et al., 2006; March, 1991). The literature makes mention of two detrimental mechanisms that these self-reinforcing effects can bring. The first one is the risk of a firm getting caught in a success/competency trap, this is a possibility due to too much of a focus on exploitation (Levitt & March, 1988). A continuous and major focus on exploitation has positive short-term performance as a firm is able to fully develop their core capabilities, these capabilities are very useful and powerful tools in their current environment. Since this tactic is very beneficial in the short-term, the firm is likely to double down on this strategy and thus drive out exploration. However, since firms operate in a dynamic and technologically changing environment, these core capabilities could very quickly lose their benefits and turn into core rigidities (Leonard-Barton, 1995). In this new environment their current capabilities and products/services risk becoming obsolete. As the firm has become rigid ,and did not invest in any exploration, it is no longer equipped to deal with the changed environment and therefor the financial performance and survivability decreases (Levitt & March, 1988). A failure trap is in many ways the opposite, it occurs when a firm mainly

allocates its resources to high risk exploratory activities. This puts them in a position where a lot of resources could be wasted on an activity that has a high probability of not bringing forward the innovations necessary to sustain the firm. As this happens, the change needed will become bigger and bigger. And exploration drives out exploitation in the hopes to find the much needed change/innovation (D. A. Levinthal & March, 1993). Also resulting in the decreased performance and survivability of the organisation.

To back-up these theories and assumptions, scholars have done a lot of research. And throughout the empirical literature, there is a consistent positive relation to be found between simultaneous ambidexterity and long-term financial performance (Gibson & Birkinshaw, 2004; Raisch & Birkinshaw, 2008). Additionally, empirical studies have shown that it is beneficial to use a simultaneous approach of exploration and exploitation compared to using one of these separately (and alone) (Cao et al., 2009; He & Wong, 2004; Uotila et al., 2009). Moreover, the smaller the absolute difference in focus on either one of the activities result in superior market value, sales, profit, operational efficiency, and reputation (Cao et al., 2009; He & Wong, 2004). Finally, empirical literature concluded that Tobin's Q has an inverted U-shaped relationship with the relative share of exploratory innovation over total innovation (Belderbos et al., 2018; Uotila et al., 2009). This suggests that a balanced and simultaneous use of exploration and exploitation leads to superior market valuations.

As mentioned before, an important argument for this positive relation is the complementary effects that exploitation and exploration have on the financial performance (D. A. Levinthal & March, 1993; March, 1991). This is due to the simultaneous combination of the short-term, steady returns of exploitation and the more variable and long-term returns of exploration (March, 1991). Furthermore, the literature finds that the capacity to simultaneously use both exploration and exploitation itself is an important contributor to the positive association with firm performance (Farjoun, 2010; Simsek et al., 2009). Scholars also argued that the activity of simultaneously combining exploitative and explorative activities facilitates the paradoxical requirements of the separate environments (O'Reilly & Tushman, 2008).

As CVC funds are created with the main purposes of gaining a strategic and financial foothold through the identification and capturing of extra-organisational knowledge and innovation (Dushnitsky & Lenox, 2006). Since all CVC investments can be characterised as either explorative or exploitative investments (Hill & Birkinshaw, 2014; Wadhwa & Basu, 2013), the research mentioned can also be linked to these financial vehicles. As such, the literature has already shown that there is a positive association between CVC investing and both Tobin's Q

and firm innovation (Dushnitsky & Lenox, 2005, 2006). Tobin's Q, the market valuation over the total of tangible assets, is a measure of the firm value and also a great proxy for a firm's competitive advantage and future growth opportunities (Wernerfelt & Montgomery, 1988). The same generalisations of simultaneous ambidexterity can be extended to CVC investments. Exploitative CVC investing allows the investing firm to strengthen its core capacities through incremental innovation due to the knowledge gained from familiar and local technologies derived from the ventures (Hill & Birkinshaw, 2014). While explorative investments allows the firm to acquire new technologies and innovations that results in more radical innovations (Hill & Birkinshaw, 2014). Hence, simultaneous explorative and exploitative investing brings allows the investing firm to access both incremental and radical innovations that result in a superior financial performance.

*H1: Simultaneous ambidexterity in CVC investing increases firm performance.*

## 2.3.Sequential ambidexterity

The literature evidenced a positive relation between sequential ambidexterity and firm performance. The main argument for this beneficial relation is due to the idea that exploitation and exploration complement one another over distinct periods leading to greater returns (Gupta et al., 2006). To elaborate on this view, these two activities are interdependent and complementary over sequential periods because one activity in the current period results in an input that can be used as an efficient input for the other in the following period (Gilsing & Nooteboom, 2006).

To further explain this mechanism, exploitative investments are very useful tools for the refinement and extension of current knowledge and competencies. This results in strong, positive, predictable and short-term returns (March, 1991). Thus, a successful period of exploitation leads a firm to gain excess returns that lead to slack resources. These slack resources can act as temporary buffers to mediate losses due to technological change, while at the same time pushing organisations to invest in exploration to gain new innovations and knowledge to battle this change (Cyert & March, 1963). This newfound interest and leeway for exploration allows organisations to adapt and realign themselves with their changed environment by creating and implementing new knowledge and competencies (D. A. Levinthal & March, 1993). In conclusion, successful exploitation triggers and allows firms to pursue exploration in the future.

In the same fashion, a period of successful exploration can lead to future exploitation. Successful exploration results in new technologies, products, innovations and competencies (Rosenkopf & Nerkar, 2001). The benefits of exploration often take some time to fully develop and settle in before they can be used efficiently. However, once the results have successfully settled, it allows the firm to adapt and survive its changing environment (Rosenkopf & Nerkar, 2001). In the wake of a period marked by successful exploration, the newly developed competencies, technologies and innovations will be

The resulting newly developed competencies, technologies and innovations stemming from the successful period of exploration, then make room for a new period in which these will be exploited again (Lee et al., 2003; Zhou & Wu, 2010). To sum up, successful exploitation is likely to set in a period of exploration, and successful exploration is likely to result in future exploitation.

Empirical studies have evidenced the positive relation between the sequential approach of exploration and exploitation (Boumgarden et al., 2012; Luger, 2014; Mudambi & Swift, 2014). Accordingly, similar results can be found in the CVC literature. Exploration allows investing firms to access new technologies and innovations through their ventures. These translate in more radical innovations which later enable more exploitation (Hill & Birkinshaw, 2014). Similarly, successful exploitation creates slack resources which in term prime an exploratory period (D. Levinthal & March, 1981). Thus, exploitation and exploration also complement each other in separate periods of time. The use of sequential ambidexterity results in an increased Tobin's Q and thus firm value (Luger, 2014).

*H2: Sequential ambidexterity in CVC investing increases firm performance.*

The concepts of both sequential and simultaneous ambidexterity have been broadly and deeply been discussed in previous literature. As previously demonstrated, empirical evidence has found that both of these mechanisms result in increased financial performance, innovation and survivability. However, there is still a lot of ambiguity surrounding their relative performances comparatively speaking. Most of the literature has examined these concepts separately. Although these studies have been of great importance in establishing the circumstances and effects of these concepts, it also made room for confusion. Both mechanisms generally result in increased firm performance, but the theories and mechanisms used to back these findings can be paradoxical and even contradictory.

One of the arguments for simultaneous ambidexterity is related to the dangers of the iteratively self-reinforcing effect of exploitation and exploration and the success- and failure-traps that come with this effect. In contrast, scholars argue for sequential ambidexterity due to the complementarity and interdependency of exploitation and exploration over subsequent periods.

Both theories are based on the different relations exploitation and exploration have with firm performance but each theory has a different nuance as to how to use and when to use exploration and exploitation. As seen earlier, exploitation is a good tool for gaining incremental innovations and steady excess short-term returns, while exploration is a good tool to build future cash-flows. Both sequential and simultaneous ambidexterity have based their theories on these assumptions, and both seem to work. However, simultaneous ambidexterity argues that both should be balanced at a static point in time so that there is a simultaneous focus on the short- and long-term results. While Sequential ambidexterity argues that balancing these in a sequential manner is the way to achieve superior performance.

Even though both concepts result in a positive relation with firm performance, it is not yet clear which of these outperforms the other. Figuring out which of these concepts is superior could help clear some of these ambiguities. Simultaneous use of both exploration and exploitation may have beneficial results, but scholars argue that there are negative externalities stemming from trying to manage the tensions between the different organisational, cultural, and structural requirements (Boumgarden et al., 2012). Some scholars even see it as an almost impossible task (Cyert & March, 1963; Gibson & Birkinshaw, 2004; O'Reilly & Tushman, 2008). Luger (2014) has found that dynamic ambidexterity, a similar concept as sequential ambidexterity, outperforms static ambidexterity, a concept closely related to simultaneous ambidexterity. In the previously mentioned study, the researchers looked at exploration and exploitation activity of insurance companies. Sequential ambidexterity also ensures that an organisation periodically realigns themselves with their environment and needs, preventing them to fall into a long-term rigid structure that is detrimental in the long run. Accordingly, I argue that sequential ambidexterity will have a superior long-term performance compared to simultaneous ambidexterity.

*H3: sequential ambidexterity is superior in the long run compared to simultaneous ambidexterity.*

As for the short-term effects of both mechanisms, not much prior research exists. I argue that sequential ambidexterity will also outperform simultaneous ambidexterity here because it is

based on creating slack returns with the use of successful exploitation, which are later used to power exploration. Since exploitation has a stronger positive relation with short-term returns compared to exploration, I expect a stronger short-term relation between sequential ambidexterity and firm performance.

However, the opposite could also be argued. Since sequential ambidexterity oscillates more between exploitation and exploration, the short-term results will oscillate accordingly. This might result in the more balanced approach of simultaneous ambidexterity outperforming sequential ambidexterity in short-term firm performance.

*H4: simultaneous ambidexterity is superior in the short run compared to sequential ambidexterity.*

# 3. Data & Methodology

## 3.1. Empirical setting

The theories and hypotheses discussed in the previous sections will be assessed in the empirical setting of CVC investments. The sample used to test the previous hypotheses, was constructed using Refinitiv Eikon. More specifically the private equity screener of this platform was used to construct the original sample. The sample was later complemented with performance data found on Compustat. To consistently merge the data from these two databases, some data regarding Standard Industrial Classification codes (SIC) was transformed with the official description – code lists from the United States Census Bureau. This was necessary because Refinitiv Eikon only offers the description of the SIC code. The sample consists of longitudinal data on investments made by CVC funds in the period of 2010-2019. To synergise optimally with the other databases at my disposal, only investments in the United States included. To avoid statistical noise, firms with less than 10 investments during the 2010-2019 were excluded. The sample only includes firms with a total equity invested (aggregated over all their investments during 2010-2019) that is larger than 100 million USD. This is on the grounds of past research that showed that being ambidextrous has a significantly greater positive impact on larger firms and firms with a larger pool of resources.

These configurations left me with a sample of 9766 investments made by CVC's. However, a large part of the data delivered as output was missing. After accounting for all the investments made by undisclosed funds and firms, and for all the investments that lacked sufficient data

regarding the investment size, 5286 investments made by 117 different funds remained in the sample.

## 3.2.Measures

### 3.2.1. Dependent variables

Previous literature suggests that the effects that explorative and exploitative investments have on a firm's performance come to fruition on a different time horizon (March, 1991). Following previous studies, multiple dependent variables are used to capture both the short- and long-term effects (Lavie et al., 2011; Luger, 2014).

Return on Equity (RoE) was used as a measure to capture the short-term performance of a firm (Jansen et al., 2006). The RoE add equation was calculated by dividing the Net Income by the Shareholder's Equity. As a proxy for the long-term performance, the measure Total Shareholder Return (TSR) was selected (Miller & Bromiley, 1990). The TSR was calculated the share price at the end of the quarter minus the share price at the beginning of the quarter plus the respective share of the dividends paid out during that period (Hayward, 2003; Luger, 2014). It is good to add equations for each one to give good impressions for your work

$$RoE_{i,t} = \frac{Quarterly\ Net\ Income_{i,t}}{Shareholders\ Equity_{i,t}}$$

$$TSR_{i,t} = Share\ Price@end\ of\ quarter_{i,t} - Share\ Price@beginning\ of\ quarter_{i,t} + Dividends\ paid\ during\ quarter_{i,t}$$

Tobin's Q was used as a third dependent variable. It was used due to its capacity to measure both short- and long-term performance (Jeon, 2017; Uotila et al., 2009). It is considered a solid proxy for both long- and short-term performance. This is because it incorporates both risk, and future expected earnings making it a great and generally undistorted proxy for market valuation and competitive advantage (Lindenberg & Ross, 1981; Wernerfelt & Montgomery, 1988). Additionally, prior research has already shown the significant positive association between this measure and CVC investments (Dushnitsky & Lenox, 2005; Luger, 2014). The theory behind Tobin's Q is that the overall market value of a firm should equal the sum of all the replacement values of the firm. There are many different approximations of Tobin's Q, but due to working with quarterly data from Compustat, many of these resulted in a large loss of data. In the end, the variable was computed as the product of total common shares outstanding and the share price at the end of the quarter minus the common shareholders' equity plus the total assets,

hereafter this was divided by the total assets (Ji, 2020). A Tobin's Q greater than one follows a market value of a firm greater than the replacement value of all its assets, which implies that the market expects better growth opportunities and a positive outlook. Tobin's Q was calculated using the following formula (SPC= Share price at the end of the quarter):

$$Tobin's\ Q = \frac{Common\ Shares\ Outstanding_{i,t} * SPC_{i,t} + Total\ Assets_{i,t} - Common\ Shareholder\ Equity_{i,t}}{Total\ Assets_{i,t}}$$

All the performance data used to calculate the dependent variables was derived from Compustat.

### 3.2.2. Independent variables

In order to calculate the independent variables; simultaneous and sequential ambidexterity, the exploration and exploitation share has to be measured. The exploration share can be defined as the fraction of the explorative investments in a quarter and the total CVC investments in that same quarter (Luger, 2014). Since the sum of the exploration share and exploitation share in one quarter equals 1, the exploitation share can be found by subtracting the exploration share of 1. First, the level of exploration and exploitation is calculated using 4 digit Standard Industrial Classification (SIC) codes (Wadhwa & Basu, 2013). If the entire SIC code of the investor firm and venture are equal, it is classified as pure exploitation and given a value of 0. If the first 3 digits match, the relation is classified as 0.25. If the first 2 digits match, it is classified as 0.5. If only to first digit matches, it is classified as 0.75. Finally the relationship is classified as pure exploration and given the value of 1 if the first digit does not match (Wadhwa & Basu, 2013). To measure the exploration and exploitation share of a firm i in quarter t, the following formula were used:

$$Exploration\ Share_{i,t} = \frac{\sum_{ij} quarterly\ CVC\ investment_{ijt} * SIC\ Relatedness_{ijt}}{\sum_{ij} quarterly\ CVC\ investment_{ijt}}$$ (Luger, 2014).

$$Exploitation\ Share_{i,t} = 1 - Exploration\ Share_{i,t}$$

Simultaneous ambidexterity is the first independent variable and it is used as a proxy to measure how a firm balances the two types of investments at the same time. Simultaneous ambidexterity in quarter t-1 is then measured by the product between the exploration share in quarter t-1 and the exploitation share in quarter t-1(Luger, 2014).

$$Simultaneous\ Ambidexterity_{i,t-1} = Exploration_{i,t-1} * Exploitation_{i,t-1}$$

The maximum value of simultaneous ambidexterity is achieved when having an equal exploration and exploitation of 0.5 in quarter t-1. The minimum value of 0 is achieved when either the exploration share or exploitation share in the same quarter is 1 and thus the other 0. The value increases the more balanced both investment types are in each quarter.

Sequential ambidexterity is the second independent variable and it is a measure for analysing the amount a firm changed the balance between both investment types over time. Sequential ambidexterity in quarter t-1 is calculated as the average of (1) the product between exploration share in quarter t and exploitation share in quarter t-1 and (2) as the product between the exploitation share in quarter t and exploration share in quarter t-1 (Luger, 2014).

$$Sequential\ Ambidexterity_{i,t-1} = \frac{Exploration_{i,t} * Exploitation_{i,t-1} + Exploration_{i,t-1} * Exploitation_{i,t}}{2}$$

Sequential ambidexterity achieves a maximum value of 0.5 and a minimum value of 0. The greater the change in exploration and exploitation share between 2 sequential quarters, the higher the value of sequential ambidexterity will be.

The SIC codes from the ventures and the equity amount invested by all the firms i in the ventures j were derived from the Refinitiv Eikon private equity screener database. The SIC codes from the investor firms were obtained from Compustat.

### 3.2.3. Control Variables

A set of control variables was added to the regressions in order to avoid misinterpreting the results due to possible alternative explanations. Throughout the regressions in this paper the following variables were controlled for: industry, year, firm size, R&D intensity, firm growth, CVC intensity, unabsorbed slack, absorbed slack and potential slack.

To control for the different industries the investor firms operate in, industry dummies were included. These were based on the 2-digit SIC codes of each firm. In total, the firms in the sample operated in 10 different industries. To control for possible time-varying heterogeneity due to, for example, macroeconomic circumstances, year dummies for the period 2010-2019 were included. Firm size has always been an important antecedent to the performance. Because larger firms tend to have more resources, diversified knowledge and greater economies of scale, firm size can positively influence the dependent variables. Larger firms could also result in

lesser performance compared to smaller firms due to having less incentives to minimise costs. Quarterly net sales from Compustat were used as a proxy for firm size.

R&D intensity was also controlled for since internal R&D expenditure is a good indicator for the active pursuit of innovation (Henrich R. Greve, 2003). This in turn leads to a greater capacity to absorb new external knowledge which positively affects the performance (Cohen & Levinthal, 1990). R&D intensity was calculated as the proportion of quarterly R&D expenditures to quarterly net sales. This data was obtained from Compustat.

$$R\&D\ Intensity = \frac{Quarterly\ R\&D\ expenditures_{i,t}}{Quarterly\ Net\ Sales_{i,t}}$$

The control variable firm growth was added since prior research showed a positive relation between firm growth and firm performance (Dushnitsky & Lenox, 2006). As a proxy for firm growth, the return on sales (ROS) were calculated. The data used to calculate this variable was obtained from Compustat. The following formula was used to operationalise the return on sales:

$$Return\ on\ Sales = \frac{Quarterly\ Operating\ Income\ After\ Depreciation}{Net\ Sales}$$

Highly active CVC programmes are more likely to increase the visibility of that programme and thus increasing the attention received by the stakeholders (Luger, 2014). To control for this, the ratio of the quarterly firm-level CVC investments to sales was calculated as a proxy. This proxy showed high levels of skewness. The log-transformed version of this proxy was used throughout the paper. This data was obtained from Compustat.

$$CVC\ Intensity_{i,t} = \frac{Total\ Quarterly\ CVC\ Investments_{i,t}}{Quarterly\ Net\ Sales_{i,t}}$$

Prior research discussed how different types of slack can affect a firm's performance. Slack tends to have a positive relation with firm performance due to its ability to mediate the negative effects of technological dynamism and dynamic environments (Cyert & March, 1963). Three different forms of slack were controlled for. (1) Absorbed slack, calculated by dividing Selling, General, and Administration Expenses (SG&A expenses) with Sales. This form of slack focusses on the slack resources gathered from short-term operations (Singh, 1986). (2) Unabsorbed slack involves the uncommitted slack resources such as cash funds. There is a positive relationship between unabsorbed slack and the amount of risk taken by managers (H. R. Greve, 2007). As a proxy for this variable, the quick ratio was used (Singh, 1986). The quick ratio is the ratio of current assets to current liabilities. (3) Potential slack alludes to the capacity

to attract extra resources such as loans (Bourgeois, 1981). As a proxy for this variable, the quarterly debt to equity ratio was used. The data for these 3 slack variables, was obtained from Compustat.

$$Absorbed\ Slack = \frac{Quarterly\ SG\&A_{i,t}}{Quarterly\ Net\ Sales_{i,t}}$$

$$Unabsorbed\ Slack = \frac{Quarterly\ Current\ Assets_{i,t}}{Quarterly\ Current\ Liabilities_{i,t}}$$

$$Potential\ Slack = \frac{Quarterly\ Debt_{i,t}}{Quarterly\ Equity_{i,t}}$$

## 3.3. Estimation approach

The sample used in this paper consists of longitudinal data. Since sequential ambidexterity measures the changes between explorative and exploitative investments over time, this choice was deemed most appropriate. Panel data regressions were used to test the hypotheses. Firstly, a Hausman test was conducted to determine if the models were going to be estimated using fixed effects or random effects. Based on the results of the Hausman test (table 3), all 3 regression models used linear panel regressions with random effects.

To test the four hypotheses, three different models were created. For each model one of the three dependent variables; TSR, ROE and Tobin's Q, was used. The independent variables for all three models were sequential and simultaneous ambidexterity.

As previously mentioned, multiple control variables were added to the models to exclude other potential explanations. In an effort to finetune the models used; multiple combinations of the regressions were performed. The model automatically excluded the industry dummy variables due to multicollinearity. This occurred in all three models. In the following section, it was found that absorbed and unabsorbed slack are also highly correlated. After confirming their multicollinearity, the control variable unabsorbed slack was also omitted from the three models.

After the entire data selection process, the sample used for the calculations of the longitudinal dataset consisted of 840 investments made by 15 CVC programmes over a period of 40 quarters. After calculating the variables for each quarter, a total of 297 datapoints remained.

# 4. Results

Table 1 presents the descriptive statistics and correlations of the dependent, independent and control variables used in all 3 models. The dummy variable describing the industry effects had already been omitted from the model due to a high multicollinearity. The correlations depicted in table 1 also show a very high correlation between absorbed slack and unabsorbed slack. To verify if there is any problematic multicollinearity between the control and independent variables, the Variance Inflation Factors (VIF) were calculated which can be found in Table 2. Generally, a threshold of VIF>10 is used as an indicator for multicollinearity. Given the high correlation and VIF's (unabsorbed slack: 170.42 and absorbed slack: 161.24) multicollinearity can be assumed. The control variable with the highest VIF, unabsorbed slack, was omitted from the final models to avoid problems stemming from this multicollinearity.

Table 1 produces an average Tobin's Q value of 1.926. This implies that the market value exceeds the book value of all the company's recorded assets. This can be interpreted as the market and its investors having positive expectations about the future performances and growth opportunities of the company in question (Wernerfelt & Montgomery, 1988).

The average simultaneous ambidexterity for the sample used is 0.03. As the maximum value of 0.25 is achieved by a perfectly balanced use of both explorative and exploitative investments in one period, the value 0.03 implies a highly imbalanced simultaneous use of both these activities. More specifically, a simultaneous ambidexterity of 0.03 corresponds with an exploration share of 3.1% and an exploitation share of 96.9% or an exploitation share of 3.1% and an exploration share of 96.9%. The average sequential ambidexterity found in table 1 is 0.048. Sequential ambidexterity values range from 0 to 0.5. The higher the value, the greater the change in exploration and exploitation share over 2 quarters. This low value shows that the firms in the sample generally did not have substantial changes in their balance of explorative and exploitative investments between two time periods.

The results of the linear panel regression with random effects of the final models can be found in table 3. The dependent variable of the first model is Tobin's Q. The estimated coefficient of simultaneous ambidexterity is significant at the 5% level. The coefficient is 1.766. To further illustrate; when a firm achieves a maximum simultaneous ambidexterity and thus a perfect balanced use of exploration and exploitation, on average its Tobin's Q will be higher by 0.4415 compared to firms who have a perfectly imbalanced use. The marginal impact of simultaneous ambidexterity can be seen in figure 1. This result supports the first hypothesis. The second

independent variable of the first model is sequential ambidexterity. This variable is positive but insignificant at a 10% level. Due to its insignificance, the data is insufficient to draw any conclusions regarding the impact of sequential ambidexterity and its impact on Tobin's Q. Even though the coefficient is not significant at a 10% level, it is in line with the second hypothesis. Its marginal effect is also shown in figure 1. However, due to the high p-values of this coefficient, we are unable to make any definitive conclusions about the second hypothesis.

The second and third model both make use of the same independent and control variables as the first model. The dependent variable for the latter is Return on Equity (RoE), while the former uses Total Shareholder Return (TSR). Model 2 and 3 were set up to explore the third and fourth hypotheses while also supporting the first two. While the first model produced significant results, visible in table 3, as seen by its high R-Squared ($R^2 = 0.724$) and significant coefficients of all but 2 variables at a level of 10%. The second and third model, in which the only difference is the financial performance measure used as dependent variable, did not perform at all. As seen in table 3, the R-Squared of the second and third model were, respectively, 0.0722 and 0.0701. Meaning that only 7.22% and 7.01% of the variation in TSR and RoE can be explained by the model. The coefficients of these two models can also be found in table 3. And for both models, the independent variables; sequential and simultaneous ambidexterity, are not significant at a level of 10%. As is also visible in table 3, most of the control variables that were significant in the first model also turned insignificant in the second and third model.

The first model used a dependent variable, Tobin's Q, that is a measure for both short- and long-term performance. The second and third model endeavoured to separately measure the effects of simultaneous and sequential ambidexterity for the long- and short-term to analyse the time implications these two types of ambidexterity had. As the independent variables for both of these models were insignificant, the data was insufficient to make a conclusion about the third and fourth hypotheses.

## 5. Discussion

In the past, the theory and research concerning ambidexterity has provided many useful insights, theories and results that have been and will continue to be influential for the performance and survival of firms (D. A. Levinthal & March, 1993; March, 1991). Due to the gaining popularity of this subject different types and strategies behind how to best implement ambidexterity have emerged (Gibson & Birkinshaw, 2004; Tushman & O'Reilly, 1996).

Alongside the theories came the empirical research that generally confirmed positive relationships between different types of ambidexterity and firm survival (Hill & Birkinshaw, 2014), financial performance (Luger, 2014; Uotila et al., 2009) and sales (Caspin-Wagner et al., 2012; He & Wong, 2004; Lee et al., 2003).

Even though most of the research supported positive relations between forms of ambidexterity and overall performance. There were still conditions under which ambidexterity could be considered inefficient (March, 1991). There are also theories and studies that point out possible flaws and detrimental effects of trying to achieve ambidexterity, such as the danger of success and fail traps and the self-reinforcing mechanism that exploration and exploitation can have in certain environments (Gupta et al., 2006; D. A. Levinthal & March, 1993; Levitt & March, 1988; Luger, 2014). Additionally, the majority of the studies focussed on finding empirical evidence that supported ambidexterity itself and not on which types of ambidexterity outperformed the others and how timeframes affected this. And the studies that did focus on these items, have only covered a small portion of the possible environments for which these results could be meaningful (Jeon, 2017; Luger, 2014).

It is on the crossroad of this part of ambidexterity research and the CVC literature that this paper attempts to make contributions. The contributions of this paper are as follows.

Firstly, this paper attempted to build and support prior empirical research that attempted to connect the organisational research of ambidexterity and the practical setting of CVC's (Jeon, 2017). The first two hypotheses tried to strengthen and broaden the prior empirical research regarding ambidexterity in a CVC setting. The first two hypotheses state that there is a positive relationship between firm performance and simultaneous and sequential ambidexterity in a CVC setting. Evidence for a positive relationship between simultaneous ambidexterity and Tobin's Q was found in the first model. However, the results regarding sequential ambidexterity were inconclusive due to insignificant coefficients in all three models.

As previously discussed in the result section; the average values of both simultaneous and sequential ambidexterity are extremely low. One possible explanation for the low values of sequential ambidexterity might be that the quarterly time frame limited the amount of change that could be captured in each period since it is a continuous process that plays out over more time. However, the average simultaneous ambidexterity value is also extremely low. This hints at another possibility; one that has already been discussed throughout literature. The low results of both simultaneous and sequential ambidexterity point in the direction of the widely discussed

integration issues of explorative and exploitative investments. Prior literature in organisation theory has put a large emphasis on the issue that the clash of differences in structure, knowledge, culture and resources plays in achieving ambidexterity (D. A. Levinthal & March, 1993; March, 1991, 2003).

Secondly, this paper tried adding to both the CVC literature and Ambidexterity literature by attempting to find empirical evidence regarding the effect of different time horizons on the results and efficiency of the different types of ambidexterity in a CVC setting. In the paper, this was done by analysing the effect of both simultaneous and sequential ambidexterity on short- and long-term. Model 2 and 3 were constructed with this goal in mind. As discussed in the previous section, these 2 models did not perform as well as the first model. The independent variables were insignificant and thus no conclusions could be drawn.

There are many different possible contributors to the insignificance of the variables and the model itself. One of them being that the insignificance of the coefficients is most likely due to a too low signal-to-noise ratio. There are multiple possible causes for the imbalance between statistical noise and signal power of the variables. Another reason could be the limitations regarding the configuration of the models itself.

The first one being that the strength of the signal is too small, meaning that the effect that the predictors have on the reduction in the residual variance is too small. Notably, the model with the dependent variable Tobin's Q, which is widely used in CVC and ambidexterity literature as a financial performance measure, is significant. TSR and RoE have also successfully been used as dependent measures in ambidexterity literature (Luger, 2014), but in general these two measures are less tested performance measures with less established relationships with ambidexterity. A second possible origin is that there is too much statistical noise (i.e. variance in the data sample itself is too big). Finally, the sample size could also be too small. These three points or any combination thereof are most likely the cause of the insignificant models.

The models used in past empirical research concerning simultaneous and sequential ambidexterity in organisational literature and in a CVC context mainly used Tobin's Q as a dependent variable. Thus, the insignificance of the short- and long-term models also suggest that these models are not yet optimally configured to measure the impact of simultaneous and sequential ambidexterity on these time horizons. Even though the coefficients of sequential and simultaneous ambidexterity are insignificant in these two models, the coefficients themselves do hint to the relations that were proposed in the third and fourth hypothesis. As seen in table

3, sequential ambidexterity has a positive impact on TSR (long-term) while simultaneous ambidexterity has a negative impact on TSR. The opposite is true for the short-term model, here simultaneous ambidexterity has a positive coefficient and sequential ambidexterity a negative one. It is impossible to draw any real conclusions from these coefficients since they are not significant, but them being in line with the theories does suggest it is worthwhile to further investigate these hypotheses.

## 5.1. Future Research

The limitations encountered in the data collection, variables and potentially the model itself open up many different avenues for future research. This paper attempted to support previous findings regarding the positive relationship between ambidexterity and financial performance in a CVC setting. This was done by collecting a sample of investments made by CVC funds in the past decade. As mentioned in the discussion, the sample showed a very imbalanced use of exploration and exploitation in one period and not much intertemporal change over time. This is most likely due to the inherent difficulties of attempting to switch and combine the paradoxical demands of exploration and exploitation. To more clearly analyse the different effects that a more varied use of sequential and simultaneous ambidexterity have on short- and long-term financial performance, it could be helpful to select a more balanced sample (i.e. a sample build to include more variation in the exploration and exploitation share). This way there will be a larger variation in simultaneous and sequential ambidexterity and its effects on the performance will be easier to analyse.

Another possible avenue for future research is finding more optimal configurations of the models used for the short- and long-term performance. As mentioned in the limitations; due to a limited availability of variables, some less accurate and more statistical noisy proxies had to be used as predictors. Additionally, the literature has not yet fully explored and tested the models using TSR and RoE as dependent variables. In future research, if the data allows it, there is still room for improvement by acquiring more data and by using more accurate predictors. In future research it would also be useful to further operationalize the short- and long-term models and test and increase their overall robustness so that these can be a more solid foundation to facilitate related ambidexterity research.

## 5.2.Limitations

As in most empirical studies, there have been several limitations that potentially hindered the models or research in some way. In the previous section, multiple potential factors were given as to why the second and third model underperform and return insignificant predictors. These potential causes can often be led back to a limitation that was encountered.

During the data collection process, the first limitation that was encountered was linked to the databases at my disposal. As mentioned in the data & methodology section, my initial sample of investments was collected from the Refinitiv Eikon private equity screener. Multiple problems arose from the use of this database. Firstly, the sample had to be cut down to less than 10 000 observations, meaning that for the same timeframe and same conditions, you could maximally gather 10 000 observations. Even if there were more investments in that timeframe available there was no way of extracting this data. From that point onwards, almost immediately half of the data was dropped due to incomplete observations (e.g. a lot of firms had firm name: undisclosed firm).

A second limitation stemming from this database was the way it listed SIC codes. The SIC codes of the ventures are essential for my independent variables and thus entire research. There was an option to extract the SIC codes of the ventures of the investments, but you could only get the SIC description. Since there are lists available of SIC codes and their corresponding description this issue seemed very solvable. However, after not being able to match all of the codes with their most recent description, I noticed it might the descriptions might be from an outdated older version of the SIC codes (these get changed/updated every couple years). Unfortunately, I was only able to match all SIC codes to their appropriate descriptions using multiple different versions. This results in the possibility of having matched certain descriptions with outdated versions. This adds the possibility of outdated/wrong SIC codes being compared to the up to date SIC codes available on the investing firms (from Compustat). In turn, this could lead to the wrongful allocation of the exploration and exploitation share. This has potentially added extra statistical noise.

The last major limitation I encountered also had negative effects on the sample size and the statistical noise. Even after having a heavily reduced and “noisy” sample due to the limitations of the Refinitiv Eikon database, a lot of data had to be dropped due to incomplete performance data from Compustat. Because this research made use of quarterly intervals for the longitudinal data, some variables could only be found as annual variables. Because of this reason, other,

sometimes less accurate, proxies for certain variables had to be used. Additionally, even the variables that were available oftentimes missed large parts of the data.

In summary, multiple limitations that potentially had detrimental effects on the models were encountered. Most of these limitations originate in the data collection. Firstly, there were limitations originating due to the use of the Refinitiv Eikon platform. The major limitations here were related to an upper limit in sample size, missing data, and the way SIC codes were presented. Similarly, another limitation came alongside the use of another database; Compustat. The limitations were similar as in Refinitiv Eikon, the missing performance data further limited the sample size. Additionally, due to the unavailability of certain measures, less accurate proxies had to be used which also negatively affect the model.

# 6. Conclusion

This dissertation worked on bringing the CVC literature and organisational literature on ambidexterity together while also attempting to support and elaborate on prior theories and research from these two. The paper started off by taking a deep dive in the literature to find the theories, relationships and evidence concerning ambidexterity in general. The insights such as the existing consensus on the positive relationship between firm performance (measured as Tobin's Q) and the models constructed to analyse these relations in different settings, were then used to build models in a CVC setting to find evidence to support the prior literature of ambidexterity. The first two hypotheses and first model of this paper were built with this goal in mind. Evidence was found in the first model to support the positive relationship between simultaneous ambidexterity and Tobin's Q in a CVC setting. However, the coefficient of sequential ambidexterity was insignificant in this model and thus no conclusions could be drawn to support the positive relationship between sequential ambidexterity and financial performance. The coefficient itself hinted that the positive relationship actually exists, but due to too limitations of the model and data this result could not be proven.

After this, the paper set out to build further upon the already existing literature to more clearly understand the different effects of sequential and simultaneous ambidexterity. To elaborate on this, prior research mainly focused on establishing the relationships between ambidexterity and financial performance or other factors. However, throughout the literature it is clear that scholars had different theories on whether sequential or simultaneous ambidexterity would be more efficient and when and why one of these would be more efficient. Many relations between the efficiency of ambidexterity and antecedents such as the environment of a firm, size, sector,

etc. had already been proven. But still, very little research had been done to analyse how the efficiency of simultaneous and sequential ambidexterity is affected on different time horizons. That is why this paper attempted to analyse how both sequential and simultaneous ambidexterity affect the financial performance of the CVC firm in the short- and long-run.

Because there had been little similar research, especially in the CVC setting, there were a lot of limitations and uncertainties regarding the efficiency of the models used to estimate this effect on the short- and long-term performance. This combined with limitations regarding data collection and statistical noise in the data collected resulted in insignificant models. Even though these models were insignificant and no real conclusions could be drawn regarding the different effects of simultaneous and sequential ambidexterity for the short- vs long-term, the sign of the coefficients of simultaneous and sequential ambidexterity in the short- and long-term models does hint in the direction that simultaneous ambidexterity performs better in the short-run while sequential ambidexterity is more efficient in the long-run.

There were also other contributions found in the data. The exploration and exploitation shares found in the sample were all extremely one-sided and showed little variation of simultaneous and sequential ambidexterity. This itself lead to the significance of the regression dropping. Even though this resulted in not being able to draw significant conclusions regarding the efficiency of ambidexterity on different time horizons, it did support another important theory from the ambidexterity literature. The literature has always suggested that one of the major hardships and problems for achieving ambidexterity is the implementation of systems that either allow a simultaneous and balanced use of exploration and exploitation or the ability of a firm to continuously switch its structures, organisation, resources between the two activities sequentially. The highly unbalanced results of exploration and exploitation in this sample, suggest that this issue is highly present and persistent in CVC's.

The failure of the last two models and the supporting evidence of the integration problems also leads to new possible avenues of research. Samples with a higher variation in exploration and exploitation could be constructed to more clearly analyse the efficiency of the different forms of ambidexterity on different time horizons. The models themselves can be improved by decreasing statistical noise, increasing sample size and by searching for more accurate predictors. The CVC's that do successfully integrate both exploration and exploitation either simultaneously and/or sequentially can be analysed up close to improve and add antecedents, relations, and theories to the literature while also being useful to improve overall performance of CVC's in general.

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## Appendix

**Table 1.** This table includes the average values of each variable used in the 3 models, the standard deviation of these average values and the Pearson-correlation coefficient.

| | Mean | S.D. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Tobin's Q | 1.926 | 1.180 | 1.000 | | | | | | | | | | | |
| 2. TSR | 2.174 | 8.038 | 0.266*** | 1.000 | | | | | | | | | | |
| 3. RoE | 0.037 | 0.250 | -0.078 | 0.081 | 1.000 | | | | | | | | | |
| 4. Simultaneous ambidexterity | 0.030 | 0.070 | 0.378*** | 0.058 | -0.010 | 1.000 | | | | | | | | |
| 5. Sequential ambidexterity | 0.048 | 0.099 | 0.295*** | 0.062 | -0.052 | 0.681*** | 1.000 | | | | | | | |
| 6. Firm size | 18,886 | 11,874 | -0.444*** | -0.118* | 0.151*** | -0.214*** | -0.222*** | 1.000 | | | | | | |
| 7. R&D intensity | 0.085 | 0.106 | 0.754*** | 0.196*** | -0.053 | 0.319*** | 0.267*** | -0.597*** | 1.000 | | | | | |
| 8. Firm growth | 0.216 | 0.131 | -0.268*** | 0.017 | 0.026 | -0.026 | 0.069 | -0.168*** | -0.147* | 1.000 | | | | |
| 9. CVC intensity | 3.394 | 0.682 | 0.449*** | 0.097* | -0.088 | 0.192*** | 0.192*** | -0.460*** | 0.375*** | -0.030 | 1.000 | | | |
| 10. Unabsorbed slack | 1.448 | 1.315 | 0.367*** | 0.184*** | -0.011 | 0.222*** | 0.290*** | -0.587*** | 0.562*** | 0.373*** | 0.256*** | 1.000 | | |
| 11. Absorbed slack | 1.322 | 1.215 | 0.384*** | 0.190*** | 0.001 | 0.219*** | 0.284*** | -0.559*** | 0.551*** | 0.372*** | 0.259*** | 0.996*** | 1.000 | |
| 12. Potential slack | 1.462 | 26.682 | -0.020 | 0.016 | -0.010 | -0.108* | -0.057 | 0.069 | -0.040 | 0.099* | -0.007 | -0.030 | -0.026 | 1.000 |

Significant at: *p<0.1; **P<0.05; ***p<0.01

**Table 2.** The Variance Inflation Factor (VIF) and 1/VIF of all independent and control variables.

| Variable | VIF | 1/VIF |
|---|---|---|
| Unabsorbed Slack | 170.42 | 0.005868 |
| Absorbed Slack | 161.24 | 0.006202 |
| Firm Size | 2.47 | 0.404697 |
| R&D intensity | 2.37 | 0.421917 |
| Simultaneous Ambidexterity | 1.97 | 0.506852 |
| Simultaneous Ambidexterity | 1.96 | 0.509442 |
| Sequential Ambidexterity | 1.54 | 0.647907 |
| CVC Intensity | 1.38 | 0.722468 |
| Potential Slack | 1.04 | 0.965760 |

**Figure 1.** The marginal effect of Simultaneous and Sequential Ambidexterity on the firm's performance measured as Tobin's Q.

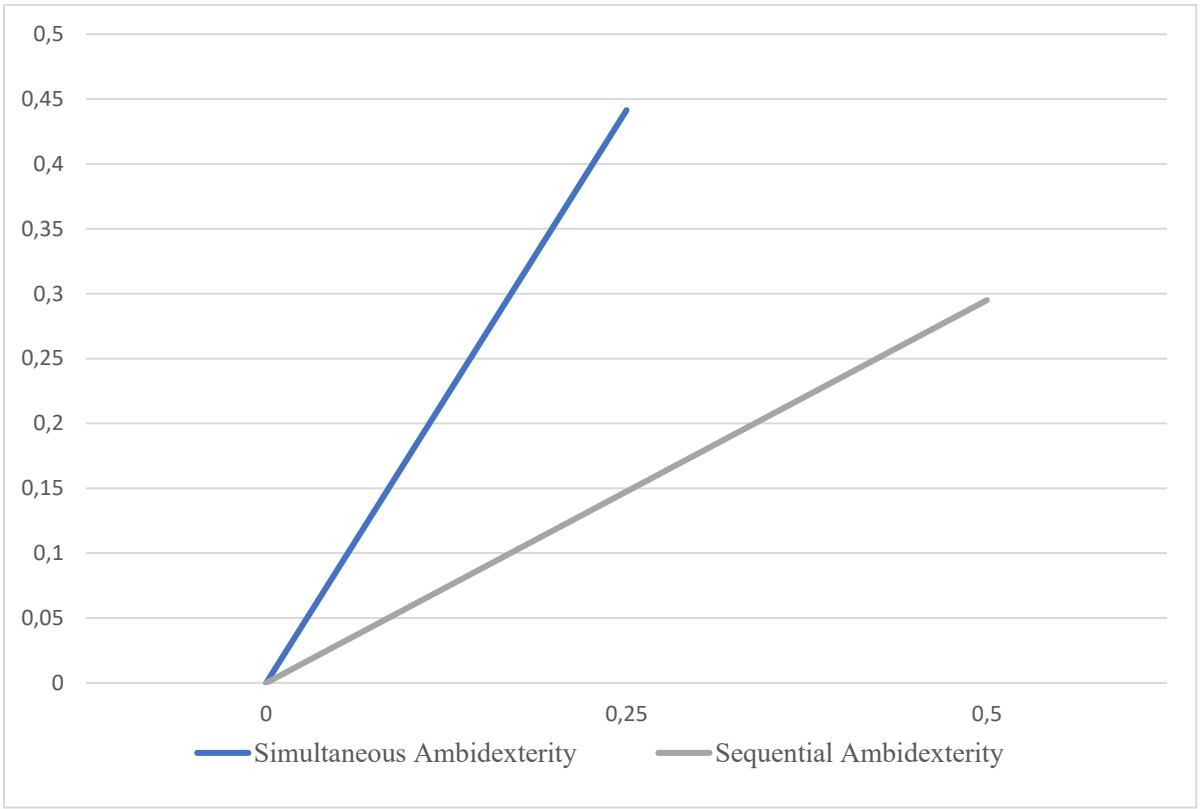

**Table 3.** Coefficients of the linear panel date regressions with random effects. The p-values of the coefficients are presented underneath the coefficient in between brackets. The P-values for the Hausman test are also included.

| Dependent variable | Model 1<br>Tobin's Q | Model 2<br>TSR | Model 3<br>RoE |
|---|---|---|---|
| Simultaneous Ambidexterity | 1.77 | -3.18 | 0.19 |
| | (0.02) | (0.74) | (0.51) |
| Sequential Ambidexterity | 0.59 | 0.52 | -0.27 |
| | (0.27) | (0.94) | (0.20) |
| Firm Size | 0.00 | 0.00 | 0.00 |
| | (0.05) | (0.65) | (0.01) |
| R&D Intensity | 5.65 | 9.06 | 0.02 |
| | (0.00) | (0.19) | (0.93) |
| Firm Growth | -2 | -0.75 | 0.05 |
| | (0.00) | (0.87) | (0.71) |
| CVC Intensity | 0.10 | 0.27 | -0.01 |
| | (0.16) | (0.75) | (0.70) |
| Absorbed Slack | 0.10 | 1.05 | 0.03 |
| | (0.04) | (0.07) | (0.09) |
| Potential Slack | 0.00 | 0.01 | 0.00 |
| | (0.01) | (0.51) | (0.98) |
| Year Fixed Effects | Included** | Included | Included |
| Constant | 2.25 | 1.11 | 0.04 |
| | (0.00) | (0.80) | (0.79) |
| No. Observations | 296 | 296 | 296 |
| No. Groups | 15 | 15 | 15 |
| Hausman test: prob>chi2 | 0.821 | 0.998 | 0.870 |
| R-Squared | 0.724 | 0.0722 | 0.0701 |

Significant at: *p<0.1, **P<0.05, ***p<0.01