UNIVERSITY OF LJUBLJANA
SCHOOL OF ECONOMICS AND BUSINESS

MOJCA SVETEK

DETERMINANTS OF EARLY-STAGE EQUITY INVESTOR DECISION-MAKING

DOCTORAL DISSERTATION

Ljubljana, 2022

AUTHORSHIP STATEMENT

The undersigned MOJCA SVETEK a student at the University of Ljubljana, School of Economics and Business, (hereafter: SEB), author of this written final work of studies with the title DETERMINANTS OF EARLY-STAGE EQUITY INVESTOR DECISION-MAKING, prepared under supervision of prof. dr. MATEJA DRNOVŠEK

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ACKNOWLEDGMENTS

Many have contributed to this achievement. I am grateful to my mentor Mateja Drnovšek for always being patient, responsive, and giving me the autonomy I needed to thrive. My special thanks go to Benjamin Warnick, who inspired me with his research and offered me guidance when I needed it most. Several other professors gave me helpful advice as I wrote, including Paul Mihas, Rai Arun and Robert Kaše.

I would also like to thank those who discovered my academic potential and believed strongly in me. These include my mother Božidara, who enabled my pursuit of knowledge from an early age, Vojko, who always showed interest in my research, Jaka, who encouraged me to pursue my goals with determination, Marko, who opened many opportunities for me, and countless other friends and coworkers. I thank you for your unfailing support.

ZAHVALA

K temu dosežku je prispevalo mnogo posameznikov. Hvaležna sem svoji mentorici Mateji Drnovšek, da je bila vedno potrpežljiva, odzivna in mi je nudila avtonomijo, ki sem jo potrebovala za svoj razvoj. Še posebej bi se rada zahvalila Benjaminu Warnicku, ki me je navdihnil s svojim raziskovalnim delom in mi je bil vedno na voljo, ko sem potrebovala dodatne usmeritve. Mnogo profesorjev je s svojimi nasveti prispevalo k nastanku te disertacije, vključno s Paulom Mihasom, Raijem Arunom in Robertom Kašejem.

Rada bi se zahvalila tudi tistim, ki so prepoznali moj akademski potencial in brezpogojno verjeli vame. Med njimi so mama Božidara, ki je že od malih nog spodbujala moje veselje do znanja, Vojko, ki je bil vedno pripravljen na dolge debate o mojih raziskavah, Jaka, ki me je spodbujal pri odločnem zasledovanju mojih ciljev, Marko, ki mi je odprl marsikatero priložnost, in še mnogi drugi prijatelji in sodelavci. Hvaležna sem za vašo neomajno podporo.

SUMMARY

Access to external equity financing is critical to the growth of high-potential early-stage ventures. However, only a fraction of companies interested in early-stage financing succeed in obtaining it. In this dissertation, we explore which information early-stage equity investors use in their decision-making, how they use the information to make decisions, why they approach their investment decision-making in a particular way, and how their characteristics influence their individual investment policies. We combine primary and secondary research, as well as quantitative and qualitative research methods to answer the proposed research questions.

To set the stage, we begin by defining early-stage equity financing and discussing its role in supporting high growth potential new ventures and its contributions to the economy. Early-stage equity investing has a significant impact on venture survival and growth. In addition, given the size of the early-stage equity financing market, this type of investment has a disproportionately high impact on the structure and growth of the economy. In Chapter 1, we elaborate why it is a worthwhile endeavor to investigate the decision-making of early-stage equity investors. In Chapter 2, we provide an overview of the existing research on early-stage investor decision-making that has employed signaling theory (Spence, 1973). Signaling theory provides one of the main theoretical lenses through which to study how investors select new ventures for investment. We note that there has been a rapid increase in the number of studies using signaling theory to explain ventures' success in obtaining early-stage equity financing. Content analysis reveals that empirical research has well explored the signaling value of grants, prior investments, and human and social capital for angel investors and venture capitalists. A particularly fruitful emerging line of research integrates signaling theory with other cognitive perspectives that help to explain investors' attention to and processing of information. Another promising new line of inquiry appears to be the exploration of the moderating role played by investor characteristics. This research suggests that there is notable heterogeneity in investors' selection behavior as a result of between-investor differences. Based on a detailed analysis of published articles in the field and informed by trends in the related management literature, we suggest several potential avenues for future research.

In Chapter 3, we build on insights from the reviewed literature and hypothesize that early-stage equity investors need to combine different signals to make sense of their meaning and the investment opportunity itself. This is because the information they rely on can be relatively unreliable, ambiguous, and subject to interpretation. Therefore, investors interpret signals in relation to each other, rather than independently, as has been implicitly assumed in the vast majority of research in this area. Building on social-psychological insights into social perception and judgment, we propose that early-stage equity investors use two main dimensions to evaluate entrepreneurs who are seeking early-stage financing: competence and cooperativeness. Eighty-six

angel investors and venture capitalists active in Europe participated in a conjoint experiment. The results show that investors prioritize entrepreneurs' competence over their cooperativeness. Entrepreneurs' competence is even more appealing to investors when combined with coachability. We find that entrepreneurs can compensate for a lack of experience by demonstrating solid market knowledge and appearing to be coachable. Furthermore, the results suggest that investors differ in their consideration of entrepreneurs' cooperativeness, but not competence, when making investment decisions – a finding that is conditional on investors' usual level of involvement in their portfolio ventures.

In Chapter 4, we continue by examining how investors use information about the entrepreneur and the business opportunity in decision-making. Twenty-three early-stage equity investors active in Europe participated in in-depth interviews aimed at exploring how investors use available information about the entrepreneur and the business opportunity to make investment decisions, and why they process information in this particular manner. We find that investors view the entrepreneur and the business opportunity as entwined, rather than as two separate attributes of the investment opportunity. Therefore, investors take a holistic approach to evaluating the investment opportunity. This finding contrasts with much of the previous work in this area, which has assumed that the entrepreneur and the business opportunity are two separate aspects of the investment opportunity, one of which can be prioritized over the other. The results of our research suggest that early-stage equity investors integrate available information about the entrepreneur and the entrepreneurial opportunity in a holistic manner. This approach appears to be adaptive to the high risk and uncertainty faced by early-stage equity investors. Moreover, investors recognize that both aspects (in particular, the entrepreneur's entrepreneurial competences and the market characteristics), and especially the interaction between the two, play a crucial role in the success of the new ventures.

We believe that this dissertation makes several contributions to theory and practice. The theoretical contribution includes enriching research in the field of early-stage equity financing by introducing psychological insights into social perceptions and thinking styles that have previously been overlooked by researchers in the field of entrepreneurial financing. We drew on psychological research that emphasizes the two-dimensionality of social perceptions (Abele, Ellemers, Fiske, Koch, & Yzerbyt, 2021) to categorize entrepreneur-related signals and derive hypotheses about how investors use information pertaining to the same or different categories of entrepreneurial signals. Based on exploratory interviews with investors, we also found that investors think about the investment opportunity in a manner consistent with the thinking style defined in psychology as holistic thinking (Nisbett, Peng, Choi, & Norenzayan, 2001). In this way, our research contributes not only to the entrepreneurial literature, but also to the psychological literature, as such research helps to understand the different conditions under

which decision-makers resort to different types of information and how they process it. These theoretical contributions also lead to insights that are relevant to practice. In particular, we are able to suggest how entrepreneurs should combine information to increase their chances of obtaining early-stage financing. At the same time, we caution investors about how entrepreneurs can manipulate information in an effort to obtain early-stage financing. We suggest that investors look for multiple signals that relate to a single investment criterion and pay attention to how the different pieces of information fit together. We hope to stimulate further research on this topic that enriches signaling theory with different cognitive perspectives. To this end, we highlight current trends and gaps in the literature and point to several directions for future research. We also candidly share the limitations of our research that require further investigation.

Keywords: Signaling, venture capital, angel investment, investment criteria, decision-making, personal characteristics, cognitive sytles

POVZETEK

Dostop do zunanjega lastniškega financiranja je ključnega pomena za rast mladih podjetij z visokim potencialom. Vendar pa le manjši del zainteresiranih podjetij uspešno pridobi zunanje lastniško financiranje. V tej disertaciji raziskujemo, katere informacije uporabljajo vlagatelji zgodnjega lastniškega kapitala pri svojem odločanju, kako jih uporabljajo za sprejemanje odločitev, zakaj na tak način pristopajo k odločanju in kako njihove individualne značilnosti vplivajo na njihovo odločanje o naložbah. Da bi odgovorili na ta vprašanja, združujemo primarne in sekundarne podatke ter uporabljamo kvantitativno in kvalitativno raziskovalno metodologijo.

Monografijo začnemo z opredelitvijo zunanjega lastniškega financiranja za podjetja v zgodnjih fazah razvoja in odpremo razpravo o vlogi zunanjega lastniškega kapitala pri podpori mladih podjetij z visokim potencialom rasti in prispevku zunanjega lastniškega financiranja h gospodarskemu razvoju. Prvo poglavje je posvečeno razpravi o pomenu raziskovanja odločanja zgodnjih vlagateljev zunanjega lastniškega kapitala. V drugem poglavju nudimo pregled obstoječih raziskav o odločanju vlagateljev v zgodnji fazi, ki temeljijo na teoriji signaliziranja (Spence, 1973). Teorija signaliziranja je ena glavnih teoretskih perspektiv, na katero se raziskovalci naslanjajo pri preučevanju, kako zgodnji vlagatelji izbirajo podjetja za naložbe. Opažamo naraščajoč trend uporabe teorije signaliziranja z namenom razumevanja, kako (lahko) podjetniki pridobijo zgodnji lastniški kapital. Analiza vsebine razkriva, da so empirične raziskave dodobra raziskale učinek, ki jih imajo na angelske vlagatelje in vlagatelje tveganega kapitala informacije o pridobljenih javnih sredstvih in že pridobljenih investicijah, pa tudi človeški in socialni kapital podjetnika oz. podjetniškega tima. Ugotavljamo, da obstaja veliko priložnosti v združevanju teorije signaliziranja z različnimi kognitivnimi teorijami, saj te prinašajo boljši vpogled v pozornost vlagateljev in v to, kako le-ti procesirajo razpoložljive informacije. Poleg tega raziskovalci vse pogosteje ugotavljajo, da igrajo individualne značilnosti vlagateljev pomembno vlogo pri tem, katere informacije podjetnike pripeljejo do investicije. Na podlagi podrobne analize objavljenih člankov s tega področja in na podlagi trendov na sorodnih področjih raziskovanja, kot sta management in finance, predlagamo več smernic za prihodnje raziskave.

V tretjem poglavju gradimo na spoznanjih iz pregledane literature iz drugega poglavja. Izpostavimo, da so informacije, na katere se zanašajo zgodnji vlagatelji lastniškega kapitala, relativno nezanesljive, dvoumne in s tem podvržene različnim interpretacijam. Prav zato razložimo, da morajo zgodnji vlagatelji lastniškega kapitala združevati različne informacije, ki so na voljo, da lahko razumejo pomen posamezne informacije in naložbeno priložnost kot celoto. V nasprotju z implicitno predpostavko velike večine predhodnih raziskav predpostavljamo, da vlagatelji različnih signalov, ki jih podjetniki pošiljajo, ne uporabljajo enega po enega, temveč skupaj. V tem delu monografije se osredotočamo na informacije o podjetniku, saj naj bi imele prav

značilnosti podjetnika največjo težo pri odločitvah zgodnjih vlagateljev. Pri razvijanju teoretskega prispevka se opremo na raziskave o socialni kogniciji s področja socialne psihologije in predpostavimo, da vlagatelji lastniškega kapitala uporabljajo dve temeljni dimenziji za presojanje podjetnikov, ki iščejo financiranje v zgodnji fazi: kompetentnost in kooperativnost. Šestinosemdeset angelskih vlagateljev in vlagateljev tveganega kapitala, dejavnih v Evropi, je sodelovalo v eksperimentu sestavljenih učinkov (angl. *conjoint experiment*). Rezultati kažejo, da dajejo vlagatelji prednost kompetentnosti podjetnikov pred njihovo kooperativnostjo. Kompetentnost podjetnikov je za vlagatelje še bolj privlačna v kombinaciji z njihovo odprtostjo za povratne informacije, ki je ena izmed indikatorjev kooperativnosti. Ugotavljamo, da lahko podjetniki nadomestijo pomanjkanje izkušenj tako, da izkažejo dobro poznavanje trga in odprtost za povratne informacije vlagatelja. Poleg tega rezultati kažejo na medosebne razlike med vlagatelji pri uporabi signalov, vezanih na kooperativnost podjetnika. Vlagatelji, ki so bolj aktivno vključeni v razvoj podjetij v svojem portfelju, dajejo večji poudarek na kooperativnost podjetnikov. Po drugi strani pa ugotavljamo, da dajejo vlagatelji relativno podoben pomen kompetentnosti podjetnika.

V četrtem poglavju se poglobimo v to, kako vlagatelji pri odločanju uporabljajo informacije ne le o podjetniku temveč tudi o poslovni priložnosti. Triindvajset zgodnjih vlagateljev lastniškega kapitala, dejavnih v Evropi, je sodelovalo v poglobljenih intervjujih, katerih cilj je bil raziskati, kako vlagatelji uporabljajo razpoložljive informacije o podjetniku in poslovni priložnosti za sprejemanje naložbenih odločitev ter to, kaj je razlog, da informacije uporabljajo na tak način. Ugotavljamo, da vlagatelji vidijo podjetnika in poslovno priložnost kot prepletena in ne kot dva ločena aspekta naložbene priložnosti. Zato vlagatelji k ocenjevanju naložbene priložnosti pristopajo celostno. Ta ugotovitev je v nasprotju z (implicitnimi) predpostavkami večine predhodnih raziskav na tem področju. Te namreč predpostavljajo, da sta podjetnik in poslovna priložnost dva ločena vidika naložbene priložnosti, ki tekmujeta za vlagateljevo pozornost in se razlikujeta v pomembnosti. Rezultati naše raziskave kažejo, da zgodnji vlagatelji lastniškega kapitala celovito integrirajo razpoložljive informacije o podjetniku in podjetniški priložnosti. Tak pristop je adaptiven, upoštevajoč visoke ravni tveganja in negotovosti, s katerimi se zgodnji vlagatelji soočajo, pa tudi pomembne vloge obeh vidikov (predvsem podjetnikovih zmožnosti in tržnih značilnosti) in predvsem interakcije med njima za uspešnost mladih podjetij.

Ugotovitve, ki izhajajo iz pričujoče disertacije, nudijo številne teoretične in praktične prispevke. Teoretični prispevek vključuje bogatenje raziskovanja na področju zgodnjega lastniškega financiranja z uvajanjem psiholoških spoznanj o socialnih zaznavah (Abele, Ellemers, Fiske, Koch in Yzerbyt, 2021) in o slogih mišljenja (Nisbett, Peng, Choi in Norenzayan, 2001), ki so bila do sedaj spregledana, čeprav lahko pripomorejo k pojasnjevanju odločitev zgodnjih vlagateljev. Teorije o dvodimenzionalnosti socialnih zaznav so bile naša osnova za kategorizacijo signalov o podjetniku in izpeljavo hipotez o tem, kako vlagatelji uporabljajo informacije, ki pritičejo isti ali

različnim kategorijam signalov o podjetniku. Na podlagi eksplorativnih intervjujev z vlagatelji smo ugotovili tudi, da vlagatelji o naložbeni priložnosti razmišljajo na način, ki sovpada s slogom mišljenja, ki je v psihologiji opredeljen kot holistično mišljenje (Nisbett et al., 2001). S tem pa naše raziskovanje ne prispeva le k podjetniški literaturi, temveč tudi k psihološki literaturi, saj tovrstne raziskave pomagajo razumeti različne pogoje, v katerih se odločevalci zatekajo k različnim tipom informacij in kako jih obdelujejo. Ti teoretični doprinosi pa se odražajo tudi v spoznanjih, ki so koristna za prakso. Na podlagi naših ugotovitev lahko podjetniki optimizirajo svoje signaliziranje zgodnjim vlagateljem in si povečajo svoje možnosti za pridobitev financiranja v zgodnji fazi. S premišljenim signaliziranjem lahko uspešno kompenzirajo tudi nekatere svoje pomanjkljivosti. Naši izsledki so koristni tudi za vlagatelje, saj kažejo, kako lahko podjetniki manipulirajo z informacijami, da bi pridobili financiranje. Predlagamo, da vlagatelji kombinirajo signale, ki pritičejo posameznemu kriteriju za ocenjevanje naložbene priložnosti, in so pozorni na kongruentnost teh signalov. Naša želja je spodbuditi nadaljnje raziskovanje področja zgodnjega lastniškega financiranja, še posebej z bogatenjem teorije signaliziranja z različnimi kognitivnimi perspektivami. Prav v ta namen izpostavljamo aktualne trende in vrzeli v literaturi. Poleg tega izpostavljamo omejitve naše raziskave, ki zahtevajo nadaljnje raziskovalno delo.

Ključne besede: signaliziranje, odločanje, tvegan kapital, angelsko vlagateljstvo, osebnostne značilnosti

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INTRODUCTION

Angel investors and venture capitalists are considered to be the most important sources of external equity financing, representing over 90% of the total early-stage investment market (EBAN, 2019). Recognizing that the inability to secure external investment is one of the biggest obstacles to the growth of high-potential new ventures (Lee, 2014), numerous researchers have tried to unpack why some entrepreneurs successfully obtain early-stage investment, whereas most stumble in the process.

Studies examining the differences between deals that successfully secure funding and those that do not have generally focused on identifying the investment criteria of angel investors and venture capitalists (e.g. (MacMillan, Siegel, & Narasimha, 1985; Maxwell, Jeffrey, & Lévesque, 2011; Sudek, 2006)) and empirically assessing the relative importance of these criteria (e.g., (Epure & Guasch, 2020; Hsu, Haynie, Simmons, & McKelvie, 2014; Malmström, Voitkane, Johansson, & Wincent, 2020; Murphy, Kickul, Barbosa, & Titus, 2007)). To date, researchers in the field of early-stage equity investment have found more than 200 unique factors that could influence the likelihood of investment (Ferrati & Muffatto, 2021). Although this large number speaks to the variety of aspects that must be considered (Shepherd, Ettenson, & Crouch, 2000), early-stage equity investment decisions are challenging by nature due to the high information asymmetries (Sohl, 1999); ambiguity and unreliability of available information (Daily, Certo, & Dalton, 2005; Plummer, Allison, & Connelly, 2016); unpredictability of the venture's direction (Plummer et al., 2016); and high market uncertainty (Baron, 1998; Huang & Pearce, 2015). On top of that, the outcomes of early-stage investment decisions are difficult to predict, even through extensive analysis (Sadler-Smith & Shefy, 2004). That being said, the selection of ventures with high growth potential is one of the main activities that angel investors and venture capitalists need to perform (Brander, Amit, & Antweiler, 2002), despite the challenges described above.

While previous literature has contributed significantly to our understanding of the broadness and complexity of early-stage investors' decision-making (Ferrati & Muffatto, 2021), there is still limited understanding of how early-stage equity investors process the information available about the ventures and entrepreneurs and integrate that information to arrive at an investment decision. With this research, we seek to clarify: (1) Which characteristics of the entrepreneur and the business opportunity do early-stage equity investors (angel investors and venture capitalists) consider in their investment decisions? (2) How do early-stage equity investors use information about the entrepreneur and the business opportunity to make investment decisions? (3) Why do early-stage equity investors use information about the entrepreneur and the business opportunity

in this particular manner? (4) To what extent do investors differ in their investment policies based on their preference for post-investment involvement?

We tackled these research questions by conducting three separate studies. To start, we conducted a systematic literature review, focusing on studies assessing signals in the context of early-stage equity investment. This choice was done for two reasons. First, research on early-stage equity investors' decision-making dates back to the 1980s (with Tyebjee and Bruno's (1984) seminal paper). Since then, more then 890 studies have been conducted on this topic (Ferrati & Muffatto, 2021) – too many to enable an in-depth content analysis. Second, within this body of research, a prominent and ever-increasing subset of studies have relied on signaling theory (Spence, 1973) to explain the behavior of both entrepreneurs (signal senders) and investors (signal receivers and decision-makers). Signaling theory specifically accounts for the high information asymmetries and ambiguities characteristic of early-stage equity investment and recognizes the role of investors' beliefs about the informativeness of individual signals (Gulati & Higgins, 2003). Studies leaning on signaling theory have been primarily driven by the question of what aspects of the business opportunity and the entrepreneurial team entrepreneurs should display to prospective investors. A systematic literature review was needed in order to gain in-depth insight into the current state of knowledge and to guide our subsequent research efforts in a manner that would ensure significant contribution to the existing body of knowledge (Frank & Hatak, 2014; Linnenluecke, Marrone, & Singh, 2020; Snyder, 2019).

Early-stage equity investors invest in ventures that have an unproven business concept and a very limited track record (De Clercq, Fried, Lehtonen, & Sapienza, 2006). Consequently, they must rely heavily on their assessment of the entrepreneur proposing the deal (Kaplan, Sensoy, & Strömberg, 2009). Although researchers have recognized the weight of the entrepreneur in early-stage equity investors' decisions, research has not advanced much beyond uncovering the numerous factors related to the entrepreneur that increase a venture's probability of obtaining early-stage funding. Moreover, the investors' assessment of the entrepreneur is largely the result of their subjective perception based on the signals that entrepreneurs convey to prospective investors (Maxwell et al., 2011). Previous research has demonstrated that early-stage investors often misinterpret signals about entrepreneurs (Lucas, Kerrick, Haugen, & Crider, 2016), yet they are usually very confident in their assessments (Zacharakis & Shepherd, 2001). We were interested in how early-stage equity investors use the available information (signals) about entrepreneurs to form impressions about the entrepreneurs. Drawing on the research on social perception and evaluation (Abele & Wojciszke, 2007, 2014), we suggest that the primary dimension on which investors judge entrepreneurs is competence, while the secondary dimension is cooperativeness. Using a conjoint experiment, we tested how investors use different information about

entrepreneurs' competence and cooperativeness in making funding decisions and inspected the between- and within-investor differences in considering these two dimensions.

However, research also suggests that entrepreneurs who meet all of the investors' investment criteria may still be unable to obtain early-stage funding (Cox, Lortie, & Gramm, 2017). This indicates that early-stage investors' decision-making is not an exercise in weighting and scoring all possible investment criteria (Maxwell et al., 2011). Therefore, in order to understand the financing decisions of early-stage investors, it is necessary to know not only what information investors consider, but also how they use the available information in their investment decisions. Following the grounded theory approach, we conducted semi-structured interviews with early-stage equity investors that helped to deepen our understanding of how they use scarce information about the entrepreneur and the business opportunity, and why they approach decision-making in a holistic manner. We interpreted the findings using research on holistic and analytic thinking styles (Nisbett et al., 2001), which helped us to explain how investors integrate information about business opportunities and entrepreneurs to make sense of investment opportunities.

We believe that this research advances the growing literature on early-stage financing in several ways. In the main, our research contributes to the literature on signaling to early-stage equity investors, early-stage equity investors' decision-making policies, and investors' information processing style. We contribute to the literature on signaling in the context of early-stage equity investment by thoroughly integrating the existing knowledge in the field. In addition, to address the fragmentation and under-theorization in this stream of literature, we provide a thorough elaboration of signaling theory in the context of early-stage equity investment and provide the most comprehensive classification of signals to date. In the hope of stimulating future research on signaling to early-stage investors, we have identified eight previously under-researched but promising avenues for future research on early-stage equity investment. Our empirical research contributes to the emerging stream of research on information (signal) interaction effects (Nagy, Pollack, Rutherford, & Lohrke, 2012; Plummer et al., 2016; Warnick, Murnieks, McMullen, & Brooks, 2018). To the best of our knowledge, our study is the first to investigate both the complementary and compensatory effects of different information about the entrepreneur on investors' decision-making. In addition, we introduce the literature on evaluative perceptions and judgments (Abele et al., 2021) to research on the effects of signaling on early-stage equity investors' decision-making. In doing so, we acknowledge the importance of investors' attention to and interpretation of ambiguous information available about the investment opportunity (Connelly, Certo, Ireland, & Reutzel, 2011). We also examine how and why investors integrate different information in their investment decisions. We develop previous work on investors' decision-making behavior that has highlighted that investors do not evaluate a large number of

investment criteria in isolation when making investment decisions, as most research in this area suggests (Maxwell et al., 2011). Accordingly, we show that investors need to integrate a variety of information to make sense of an investment opportunity. We emphasize that investors understand the entrepreneurs and the business opportunity as entwined attributes of the investment opportunity. They, therefore, approach investment opportunities in a manner consistent with the thinking style referred to in psychology as holistic thinking (Nisbett et al., 2001). This holistic approach to information processing is thought to be particularly adaptive in processing information under conditions of uncertainty and ambiguity (Isomura & Kobayashi, 2020). To the best of our knowledge, we are the first to discuss holistic thinking in the context of early-stage investment, and thus contribute to theoretical developments in the literature on investors' decision-making behavior.

We also make an important contribution to practice. In their decision-making process, investors rely heavily on the information provided by entrepreneurs (Bollazzi, Risalvato, & Venezia, 2019; Glücksman, 2020). However, research has shown that entrepreneurs' signaling efforts are often unsuccessful because they do not understand what investors are really looking for (Polzin, Sanders, & Stavlöt, 2018). In our research, we first examined the key investment criteria considered by angel investors and venture capitalists. Based on this, we investigated how the different criteria interact to inform investment decisions. In particular, our research addresses how entrepreneurs can combine different information to increase the likelihood of obtaining early-stage funding. In addition, we show how entrepreneurs can compensate for certain weaknesses, such as a lack of industry experience, through signaling efforts. Our research also suggests that investors evaluate an entrepreneur's strength in the context of the proposed business opportunity. Therefore, entrepreneurs need to convince investors that they are uniquely positioned to exploit the business opportunity. On the flipside, investors should be mindful that much of the information on which they base their investment decisions is ambiguous and easy to manipulate (Momtaz, 2021). Consequently, investors may benefit from screening for different information that pertains to a single investment criterion. Moreover, our results suggest that investors should consider how the various pieces of information about the entrepreneur and the opportunity fit together when making early-stage investment decisions.

This dissertation is organized as follows. In Chapter 1, we discuss the importance of studying early-stage equity investor decision-making. In Chapter 2, we review the literature on signaling in the context of early-stage investing. This chapter highlights numerous research opportunities arising from the current state of knowledge and lays the groundwork for the empirical research presented in the subsequent chapters. In Chapter 3, we introduce the two underlying dimensions of social perception and judgment: perceived competence (agency) and cooperativeness (communion). We then explore how signals of an entrepreneur's competence and

cooperativeness affect early-stage investors' funding decisions, both individually and in combination. We also consider differences in investors' post-investment activities and how these shape investors' preferences. In Chapter 4, we delve into how investors integrate different information about early-stage investment opportunities. Specifically, we explore how and why investors use information about the entrepreneur in relation to the proposed business opportunity. We conclude with a discussion of the main findings and avenues for future research.

1 THE IMPORTANCE OF STUDYING THE DETERMINANTS OF EARLY-STAGE EQUITY INVESTOR DECISION-MAKING

1.1 The early-stage equity financing landscape

The study of early-stage equity investing is primarily the study of angel investment, venture capital, and corporate venture capital. In addition, equity crowdfunding and equity financing through incubators and accelerators fall under the umbrella of early-stage equity financing. These two sources of startup financing, however, are still in their nascent form with very few studies conducted to date (Drover, Busenitz, et al., 2017).

The focus of this manuscript is on the two most significant sources of financing for high growth potential new ventures – angel investors and venture capitalists. Together, these two sources of funding represent more than 90% of the equity capital to early-stage companies (EBAN, 2019). These investments are characterized by extreme risk on the one hand and potential for an extraordinary return on the other hand. To illustrate, a study conducted by Mason and Harrison (2002) reported that 34% of new ventures supported by angel investors resulted in a total loss of investment and 13% in a partial loss or break-even. On the upside, 10% of new ventures generated a return rate for investors of 100% or more. The data is similar for venture capital investments (Goldfarb, Hoberg, Kirsch, & Triantis, 2009; Goldfarb, Hoberg, Kirsch, & Triantis, 2013). In fact, angel investors and venture capitalists expect that they will lose their investment on the majority of deals they make (Huang & Pearce, 2015).

Early-stage equity investing is not about minimizing losses, but about maximizing returns. It is a business of selecting the best early-stage high growth potential ventures (from the perspective of the strength of the business opportunity and entrepreneurial team) and supporting them in their growth. Therefore, research dealing with early-stage equity investing is mainly concerned with how angel investors and venture capitalists select deals for investment (Evans & Hudson, 2005; Fried & Hisrich, 1994; Maxwell et al., 2011; Woike, Hoffrage, & Petty, 2015), how they support the portfolio ventures (Cumming, Fleming, & Suchard, 2005; De Clercq & Manigart, 2007b; Lange, Bygrave, Nishimoto, Roedel, & Stock, 2001), and the relation and relative importance of the two activities for investment and/or venture performance (Baum & Silverman, 2004; Brander et al., 2002; Croce, Martí, & Murtinu, 2013; Knockaert & Vanacker, 2013).

1.2 Angel investors versus venture capitalists

Angel investors and venture capitalists make private equity investments in early-stage ventures that exhibit high potential for growth. This makes these two groups of equity investors a natural comparison group (Wiltbank, 2005). They both focus their investments mostly on knowledge-intensive industries such as biotech and healthcare, information and communications, and financial technology and insurance (EBAN, 2021; InvestEurope, 2021), which have proven to be conducive to fast growth (Audretsch, 2012). When selecting deals to invest in, both groups of investors have been shown to use fairly similar investment processes (Paul, Whittam, & Wyper, 2007) and policies (Hsu et al., 2014). In addition, both types of investors are recognized for providing not only financial, but also non-financial resources (such as mentoring and strategizing internally and legitimacy and outreach externally) (Large & Muegge, 2008; Politis, 2008). In fact, many have referred to angel investors as "informal venture capitalists" (Avdeitchikova, 2008; Lumme, Mason, & Suomi, 2013; Mason & Harrison, 2000, 2002; Paul, Whittam, & Johnston, 2003) and suggested that venture capital investing serves as a role model for angel investing (Wiltbank, 2005).

However, there are also notable differences between these two types of equity investors (see Table 1 for a comparison). The key distinction between venture capital and angel investing relates to the source of investment funds. While venture capitalists invest the funds of outside limited partners, angel investors invest their own funds. As a consequence, angel investors face stricter limitations with respect to the size of investment and thus gravitate more toward seed and startup stage companies. By contrast, venture capitalists more often support expansion stage companies (De Clercq et al., 2006; Wiltbank, 2005). At the same time, venture capitalists face more restrictions when it comes to their objectives. Because venture capital funds rely on the funds provided by limited partners with the expectation of substantial investment returns, venture capitalists pursue purely financial goals. Angel investments, meanwhile, are in many cases driven by non-financial goals (such as supporting the entrepreneurial community) (Capizzi, Croce, & Tenca, 2021; Morrissette, 2007) and prioritize long-term value creation over preparing portfolio companies for early exit (Harrison, Botelho, & Mason, 2016). It is also well recognized that venture capitalists use elaborate contracts to control and monitor their investments, whereas angel investors rely to a greater degree on the relationship between them and the entrepreneurs as a means of control (Strätling, Wijbenga, & Dietz, 2012). Relational governance is not only used to partially compensate for less comprehensive contracting, it is also conducive to the exchange of non-financial resources and provides a range of the non-financial benefits many angel investors seek (Huang & Knight, 2017).

Table 1: Comparison of angel investors and venture capitalists

	Angel investors	**Venture capitalists**
Definition	Private persons (usually experienced entrepreneurs) who invest their own money in new ventures to which they have no family connection	Professional investors who invest in high growth potential new ventures on behalf of limited partners (corporate investors, governance agencies, etc.)
Stage of investment	Seed to early stage	Seed/early to expansion stage
Objective	Help new generation of entrepreneurs prevent failure and grow new ventures	Facilitate new venture growth and achieve high venture valuation
Size of financial investment	Medium (avg. $200K per company; avg. $20K–35K per angel investor)	Large (avg. $1M–2M per company in Europe, more than $5M per company in Canada and the USA)
Non-financial investment	Mentoring, providing access to networks, management assistance, strategy co-development	Incentivizing, providing specialized skills, management assistance, strategy co-development
Motivation	Financial and non-financial returns	Financial returns
Nature of relationship	Informal	Formal
Degree of involvement	Works closely with funded entrepreneur(s)	Works closely with funded entrepreneur(s)
Governance	Relational	Contractual
Duration of involvement	May be ongoing	Usually up to 15 years

Note. Based on Bessière, Stéphany and Wirtz (2020), Drover, Busenitz, et al. (2017), Cohen (2013), EBAN (2019), Huang et al. (2017) and OECD (2017).

That being said, the differences between angel investing and venture capital investing have become smaller with the advent of angel groups (Mason, Botelho, & Harrison, 2016, 2019). Most importantly, angel groups have enabled individual angel investors to pool their resources to participate in deals comparable in size to those financed by venture capitalists (Mason et al., 2019).

In addition, angel groups follow established and professionally managed deal origination, screening, and evaluation procedures that closely resemble those of venture capital funds (Carpentier & Suret, 2015; Croce, Tenca, & Ughetto, 2017). As a result, angel investments are increasingly recognized not as a step toward venture capital (Harrison & Mason, 2000), but as an alternative to venture capital (Hellmann, Schure, & Vo, 2021). In fact, companies backed by angel investors are unlikely to seek subsequent venture capital funding because they are likely to opt for follow-on financing from angel groups (Mason et al., 2016). The reasons for this are not entirely clear. However, it has been hypothesized that due to the nature of the relationship between the entrepreneur and the early-stage investor, a bond is formed that contributes to a mutual commitment between the two (Devigne, Manigart, & Wright, 2016; Mason et al., 2019). It has also been suggested that the two types of investors might in fact serve slightly but importantly different types of ventures (Hellmann et al., 2021). Given the mix of similarities and differences, it seems appropriate and beneficial for studies on early-stage equity investing to examine these two types of investors together, while remaining observant of the differences between the two groups.

1.3 High growth potential ventures

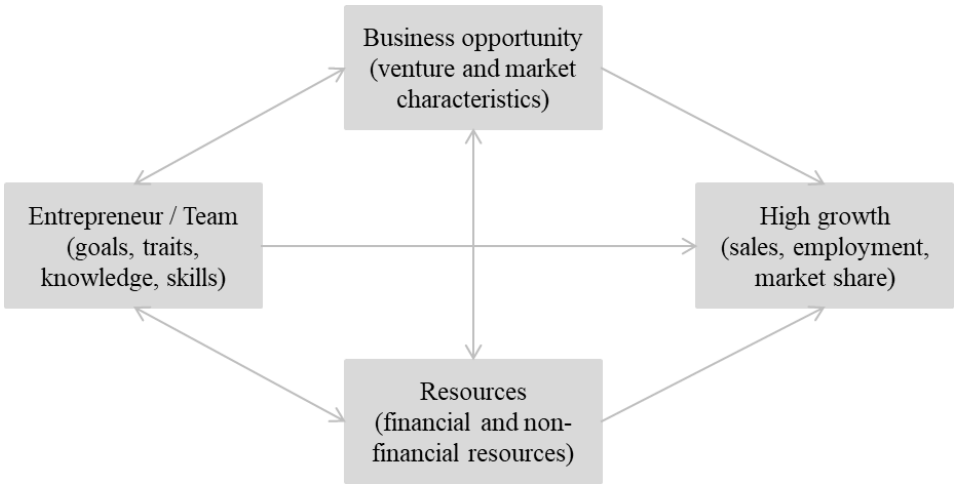
As both angel investors and venture capitalists invest in high growth potential ventures, it is important to understand what makes a venture a high growth potential one. Growth is typically captured in one of three ways: revenue growth, employment growth, or market share growth. In the entrepreneurship literature, the typical measure of interest is percentage revenue growth (Achtenhagen, Naldi, & Melin, 2010), although it is by no means used exclusively (Delmar, Davidsson, & Gartner, 2003).

Several factors determine the growth potential of the venture (see Figure 1). The first factor is related to the venture and market characteristics of the business opportunity. Researchers have found that the size and age of the venture determine its growth potential, in particular in interaction with the industry (Audretsch, 2012). Venture characteristics such as availability of advanced technology, advantageous partnerships with supply chain members, and operational efficiency have been linked to the venture's ability for fast growth (Pearce & Pearce, 2020). These elements are supported by industry characteristics, such as knowledge intensiveness, level of competition, and growth rate of the industry (Audretsch, 2012; Baum, Locke, & Smith, 2001; Gilbert, McDougall, & Audretsch, 2006). However, the extent to which a venture might grow (in a particular industry) largely depends on its business strategies (Baum et al., 2001; Demir, Wennberg, & McKelvie, 2017).

The second factor is related to the characteristics of the entrepreneur or entrepreneurial team. Venture growth is, ultimately, a choice. Therefore, the founder's growth aspirations play a major

role in the venture's effective growth (Cassar, 2007; Hermans et al., 2015; Wiklund, Davidsson, & Delmar, 2003). Other entrepreneur characteristics, such as personality traits, skills, knowledge, and credentials have also been directly linked to venture growth (Baum & Locke, 2004). It is particularly well established in the literature that a founder's human capital in the form of prior industry or entrepreneurial experience has a direct effect on the growth of a new venture (Baum et al., 2001; Gilbert et al., 2006; Siegel, Siegel, & Macmillan, 1993).

Figure 1: Factors contributing to the high growth of a venture



Note. Adapted from Hechavarria, Bullough, Brush and Edelman (2019).

Finally, the third factor is related to access to and employment of available resources. It is well recognized that venture capital and angel investments support high growth of young ventures. In fact, angel investors and venture capitalists aim to select investment opportunities that are represented by strong entrepreneurial teams and strong business opportunities (Huang & Pearce, 2015; Mitteness, Baucus, & Sudek, 2012). However, the influence of these two sources of funding on the growth of young firms is not simply due to the ability of investors to select firms with high growth potential (Bertoni, Colombo, & Grilli, 2011; Croce et al., 2013). To illustrate, Peneder (2010) found that Austrian venture-backed firms grew 70% faster than comparable firms that had not received backing. This effect was not only due to the provision of financial resources, but also in part due to non-financial value-adding activities that increased the new venture's productivity (Croce et al., 2013). Compared to venture capital backed firms, angel-backed firms are more likely to fund growth from sales revenue and have a longer path to exit (Gregson, Bock, & Harrison, 2017). Different growth strategies lead to different growth outcomes. Firms that finance growth through sales revenue grow significantly slower than firms that use equity capital to grow (151% versus 366% average growth rate), but achieve higher overall returns for investors or profits for the entrepreneur (Wiltbank, Dew, & Read, 2015).

1.4 The importance of studying the determinants of angel investor and venture capitalist decision-making

Early-stage equity financing has been shown to increase the chances of new firm survival and facilitate new venture growth (Kerr, Lerner, & Schoar, 2010). High growth potential firms targeted by angel investors and venture capitalists are typically characterized by high levels of innovation (Hirukawa & Ueda, 2011; Peneder, 2010). These outside equity investors enable and support the growth of these ventures, which is why these investors are considered to be the engine of innovation (Drover, Busenitz, et al., 2017). Growing, innovative companies contribute significantly to economic development (Andersson, Braunerhjelm, & Thulin, 2012; Pradhan et al., 2017; Samila & Sorenson, 2011; Szabo & Herman, 2012), long-term employment growth (Acs & Mueller, 2008; Van Stel & Storey, 2004), growth of high-quality employment (Dolan & Metcalfe, 2012), and national well-being (Svetek & Drnovšek, 2022). In addition, availability of early-stage equity financing has been shown to increase the levels of early-stage entrepreneurial activity in economies (Samila & Sorenson, 2011).

Angel investors and venture capitalists support high growth potential ventures that, due to their high-risk profile, are unable to secure the necessary (debt) capital for their business development. Therefore, these types of investors play a crucial role in bridging the so-called "equity gap" (Balboa, Martí, & Tresierra-Tanaka, 2017; Lichti & Sandner, 2019) between private investments by entrepreneurs and their friends and public capital or private corporate acquisitions. A study by Gornall and Strebulaev (2021) clearly demonstrated the impact of venture capital on economies. They reported that venture-backed companies account for 20% of market capitalization and 44% of research and development spending of publicly traded companies in the United States. Considering only companies founded after 1974, 42% of U.S. publicly traded companies have been venture-backed, accounting for 63% of market capitalization and 85% of research and development activity.

Angel investors and venture capitalists shape markets through their selection and value-adding activities. These early-stage equity investors show clear preferences for entrepreneurs and business opportunities with certain characteristics they believe constitute a good investment opportunity (Baum & Silverman, 2004). Understanding how early-stage equity investors make decisions is important to understand why only a fraction (up to 4%) of candidates access early-stage equity funding (Evans & Hudson, 2005; Mason, Botelho, & Zygmunt, 2017) and thus the financial and non-financial resources that may determine the winners in the economy.

2 DETERMINANTS OF EARLY-STAGE EQUITY INVESTOR DECISION-MAKING: A REVIEW

2.1 Introduction

When pursuing ventures with high growth potential, entrepreneurs search for early equity financing to help fuel their endeavors. Angel investors and venture capitalists are considered to be the most important sources of external equity financing, representing over 90% of the total early-stage investment market (EBAN, 2019). These two groups offer financial and non-financial resources, such as advice (Amornsiripanitch, Gompers, & Xuan, 2019), in an effort to maximize the performance of new ventures. As such, they are pivotal to the early-stage financing of growing ventures (Bellavitis, Filatotchev, Kamuriwo, & Vanacker, 2016; Harrison et al., 2016). Numerous researchers have tried to unpack how entrepreneurs successfully obtain early-stage equity investment, recognizing that the inability to secure external investment is one of the biggest obstacles to the growth of high-potential new ventures (Lee, 2014).

Signaling theory has shown great potential in explicating early-stage equity investor investment decisions (Bernstein, Korteweg, & Laws, 2017; Payne, Davis, Moore, & Bell, 2009). Signaling theory (Spence, 1973) aims to explain how the signal senders' attributes and actions influence the signal receivers' decisions under conditions of information asymmetry (Connelly et al., 2011; Spence, 2002). Therefore, this theory is very well suited to explain early-stage investor decisions, which are typically made under conditions of scarcity of reliable information about a venture (Plummer et al., 2016) and high market uncertainty (Kollmann & Kuckertz, 2010).

While there has been an increase in the number of studies using signaling theory to explain success in obtaining early-stage equity financing, research remains concentrated on only a few types of signals and offers limited insight into signal receivers (Ciuchta, Letwin, Stevenson, McMahon, & Huvaj, 2018; Drover, Wood, & Corbett, 2018). Much of this research has focused primarily on investigating the empirical magnitude of signal effectiveness, while only loosely applying signaling theory. This approach has resulted in little theoretical development. Moreover, the signaling literature in entrepreneurship has become increasingly fragmented with the lack of an all-encompassing, coherent conceptual framework of signaling to early-stage equity investors (Drover et al., 2018). As a result, signaling theory remains underutilized, even though it is an appropriate theoretical framework for explaining investor decisions and the success of entrepreneurs in raising early external financing. Greater clarity on how signaling theory can be employed in research on early-stage equity investing can aid further discovery and possibly prevent stagnation in the entrepreneurship literature using signaling theory.

In this review, we focus on signaling to the two most important sources of external early-stage financing for high growth potential ventures: angel investors and venture capitalists (De Clercq et al., 2006). Although these two types of investors differ in terms of the source of investment funds, both provide financial and non-financial investments and work closely with entrepreneurs to maximize the venture's growth prospects (Bessière et al. (2020), Drover, Busenitz, et al. (2017), Cohen (2013)). With the advent of angel groups, the decision-making process, investment size, and stage of the ventures in which angel investors invest have become increasingly similar to those of venture capitalists (Mason et al., 2019). It is also common that angel investors and venture capitalists cooperate via referrals or co-investment throughout different financing stages (Harrison & Mason, 2000). Because of the many similarities and interrelatedness between these two groups of investors, they have often been analyzed as a homogeneous group of outside equity investors in empirical research (e.g., (Epure & Guasch, 2020; Meuleman & De Maeseneire, 2012; Söderblom, Samuelsson, Wiklund, & Sandberg, 2015), despite the reported differences in the average size of investment, stage of investment, style of governance and range of investment motives and goals (e.g., (Baty & Sommer, 2002; Bellavitis et al., 2016; De Clercq & Sapienza, 2006; Johnson & Sohl, 2012). This mix of similarities and differences (see Table 1) suggests that it is reasonable for studies on early-stage equity investing to examine these two types of investors together, while remaining observant of the differences between the two groups (Hsu et al., 2014; Wiltbank, 2005).

In light of the above, the purpose of this study is to systematically review and synthesize the research on signaling to angel investors and venture capitalists. Our goal is to describe the core ideas of signaling theory and how they have been applied in the context of early-stage equity financing. We provide a holistic overview of the current state of knowledge and identify arising and unexplored questions in the literature. A unique viewpoint of this review is that we build it around the key elements of signaling theory, rather than around investor groups. Theory is an especially useful foundation for organizing and consolidating empirical research that is fragmented, dispersed or diverse (Colquitt & Zapata-Phelan, 2007), such as the research on signaling in the context of entrepreneurial financing. This perspective is valuable, as a solid theoretical foundation and guidance facilitate research that not only builds on theory, but also expands on it to effectively inform practice (Wang, Gibson, & Zander, 2020). We bring attention to some elements of the initial version of signaling theory (Spence, 1973) and its further developments (Spence, 2002, 2007) that have not received sufficient attention in entrepreneurship research to date, but could enrich future investigations of early-stage equity financing.

This study contributes to the advancement of the early-stage external financing literature in several ways. First, it clarifies key elements of signaling theory in a way that facilitates application

of the theory to the context of early-stage equity investing. Second, it highlights the current state of research and identifies emerging research directions. Third, it identifies lines of inquiry that would benefit from the theoretical foundations of signaling theory.

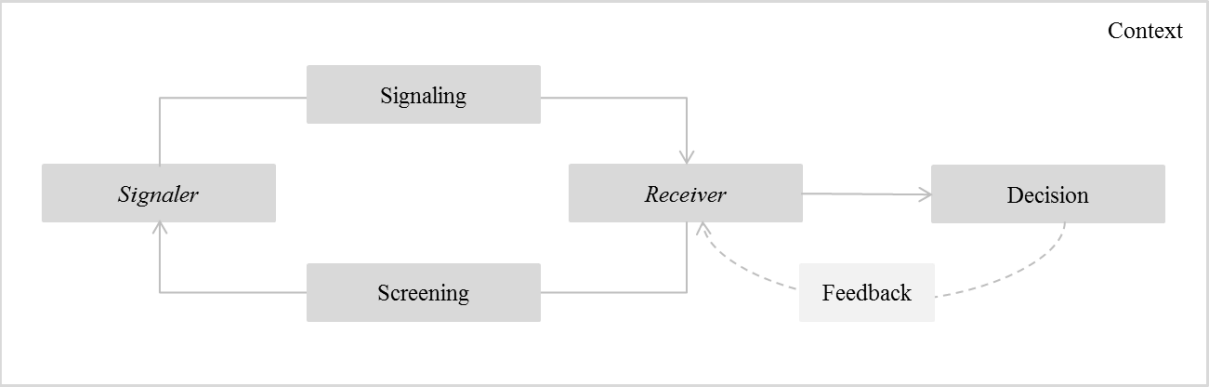
2.1.1 Signaling theory and entrepreneurial finance

Signaling theory (Spence, 1973; Spence, 2002) aims to explain signal senders' behaviors and signal receivers' decisions under conditions of information asymmetry. Although the theory was originally developed in the context of the labor market (Spence, 1973), it has proven applicable to a wide range of organizational contexts characterized by information asymmetries (Connelly et al., 2011). While the party with an information advantage (signaler) engages in signaling, the party with an information disadvantage (receiver) engages in screening (Stiglitz, 1975). The function of signaling and screening is to reduce the information asymmetry around the signaler's unobservable but relevant characteristics and thereby to improve the signal receiver's decision-making.

An important characteristic of signaling theory is the recognition of the function of the signal receiver's beliefs about the relationship between signals and performance. These beliefs not only influence the signalers' signaling decisions, but also drive their self-selection into or out of a particular market (Spence, 1973). Signalers can only benefit from signaling if they produce signals to which signal receivers pay attention based on perceived relevance (Drover et al., 2018; Gulati & Higgins, 2003). As most signals can be altered and used selectively to influence the receiver's decisions, signal receivers place more value on signals that are not only informative but also costly (in terms of money, time, and/or effort), as this means that they are less likely to be subject to manipulation by the signal sender (Spence, 1973). However, if signalers do send misleading signals, signal receivers learn over time to ignore them. This is because signal receivers' beliefs are updated via market information feedback mechanisms. In this context, some previously informative signals may be deemed uninformative due to their lack of relationship to performance or their inability to discriminate between high-quality and low-quality signalers (Spence, 1973). The relationships between the main elements of signaling theory are shown in Figure 2.

In early-stage equity investing, entrepreneurs or firms (signalers) convey information about underlying, unobservable qualities and intentions through signals sent to investors (receivers), who in turn interpret and use the information in their decision-making process. In new venture investing, signals provide information about the potential (non-)performance of the new venture (quality signals) and potential hazards resulting from the entrepreneur's behavior (intent signals).

Figure 2: Elements of signaling theory



The biggest risk faced by both investors and high-quality prospects is the risk of signal manipulation by low-quality prospects (Akerlof, 1970). This risk is exacerbated in early-stage financing because many of the signals on which investors must rely are ambiguous, relatively inexpensive, and easy to imitate (Momtaz, 2021). To minimize this risk, investors in the preinvestment phase exercise screening efforts and may even pool the resources relevant for evaluating investment opportunities (Bellavitis, Kamuriwo, & Hommel, 2019; Zacharakis & Shepherd, 2007). Investors' screening efforts encourage signaling, which can separate high-quality prospects from their poor-quality counterparts (Bellavitis et al., 2019). This is because higher quality ventures can afford to send more informative and reliable signals to investors that are difficult to mimic by lower quality ventures (Valliere, 2011).

Investors' screening criteria change as entrepreneurs move through the investment process, which may involve business plans, pitches, meetings, and negotiations (Fried & Hisrich, 1994; Paul et al., 2007). Moreover, they are influenced by contextual factors such as investor networks, syndicates, and platforms (Bernstein et al., 2017; Carpentier & Suret, 2015; Gregson, Mann, & Harrison, 2013), as well as the institutional environment and market characteristics (Bellavitis et al., 2019; Bertoni, D'Adda, & Grilli, 2016).

Signaling theory has proven to be widely applicable in the field of entrepreneurial financing. In addition to scholars who have sought to understand the effectiveness of different types of signals in securing investment from angel investors and venture capitalists, signaling theory has been applied to study other forms of early-stage equity financing, most notably *equity crowdfunding* (Mochkabadi & Volkmann, 2020). This stream of literature has examined a wide range of different signals, such as the quality of the founder or management team (Ahlers, Cumming, Guenther, & Schweizer, 2015; Barbi & Mattioli, 2019; Piva & Rossi-Lamastra, 2018), the founder's psychological capital (Anglin et al., 2018), product certificates, investor and customer endorsements (Bapna, 2019), and retained equity stake (Ahlers et al., 2015). Just recently,

Mochkabadi and Volkmann (2020) reviewed the existing literature on signaling in equity crowdfunding settings.

Table 2: Signaling theory overview

Idea in brief	Signaling theory explains the behavior of two parties under conditions of information asymmetry. It concerns how the party with an information advantage can effectively communicate relevant but unobservable information about itself through signals, which reduces the counterparty's uncertainty about its own future behavior.
Key elements	Signal sender, signal receiver, signal (signaling), screening, decision, feedback
Signal sender	Party with an information advantage that produces signals to communicate information and thereby influence signal receivers' decisions
Signal receiver	Party with an information disadvantage that observes signals to inform its decisions
Signaling	Transmission of information about unobservable qualities from signal sender to signal receiver
Screening	Solicitation of information about the signal sender deemed relevant for decision-making by the signal receiver
Context	Various environmental factors facilitating or constraining signaling and screening behaviors and their effectiveness
Feedback	Information about the true relationship between signal and performance, used to update signal receivers' beliefs and improve screening
Characteristics of effective signals	Observability, informativeness (validity), cost (reliability), discriminability
Unit of analysis	Signal between signal sender and signal receiver
Key assumptions	Self-interest, bounded rationality, risk aversion, partial goal conflict between signal sender and signal receiver, information asymmetry between signal sender and signal receiver, market efficiency

Furthermore, a great deal of entrepreneurship research using signaling theory has focused on *initial public offering* (IPO) investors. This research has focused mostly on the effectiveness of objective firm-level quality signals, such as board composition (Pollock, Chen, Jackson, & Hambrick, 2010; Wang & Song, 2016), prestigious affiliations (Colombo, Meoli, & Vismara,

2019), and the impact of VC backing and underwriter reputation (Fitza & Dean, 2016; Pollock et al., 2010; Ragozzino & Blevins, 2016). The focus on firm-level signals is to be expected given that the founder's influence on a venture typically diminishes as it matures (Boeker & Karichalil, 2002) and more information about the venture is available, which can be used to make judgments about the quality of the business opportunity.

Because signaling strongly depends on the specific equity investment context (Colombo, 2021), in this research we limit ourselves to review and discussion of signaling to angel investors and venture capitalists. These two types of investors represent alternative sources of equity financing for early-stage companies (Hellmann et al., 2021). Most importantly, they face similar challenges in terms of information asymmetries, not only because they both invest in early-stage companies, but also because they follow similar decision-making process that consists of multiple decision-making phases (Colombo, 2021).

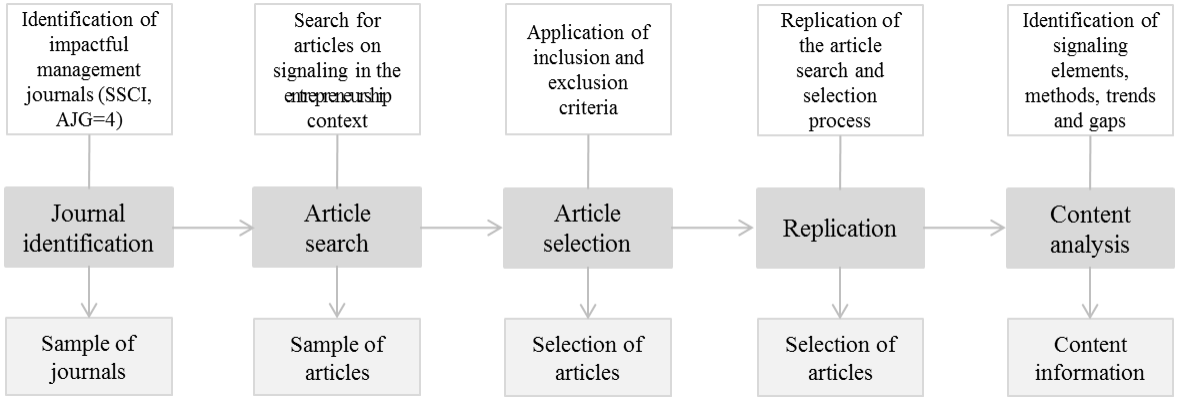
2.2 Methodology

2.2.1 Systematic literature review procedure

To generate the initial pool of research to be analyzed, we followed the recommendations of Kunisch, Menz, Bartunek, Cardinal and Denyer (2018) for conducting rigorous literature reviews. To identify impactful entrepreneurship literature drawing on signaling theory, we searched Web of Science, which allows access to leading journals in the field of social sciences. To ensure that our search covered a broad range of literature using signaling theory, we searched for the term "*signal**" in the article's title, abstract, author keywords, or keywords plus of the leading entrepreneurship journals (Entrepreneurship Theory and Practice, Journal of Business Venturing, Strategic Entrepreneurship Journal, Venture Capital), and the term "*signal**" together with the term "*entrepreneur**" or "*founder*" or "*start$up*" in the leading management and finance journals (Academy of Management Journal, Academy of Management Review, Administrative Science Quarterly, Journal of Management, Strategic Management Journal, Journal of Finance, Journal of Financial Economics, Review of Financial Studies, Research Policy, Academy of Management Annals, British Journal of Management, Business Ethics Quarterly, Journal of Management Studies, Journal of Product Innovation Management). We searched articles published between 2001 and 2020 (see Table 3). The search returned 123 results, of which 73 represented articles published in the four entrepreneurship journals and 50 represented articles published in the 14 finance and management journals over the span of 20 years.

Next, we defined our article exclusion criteria. We excluded articles that did not pertain to the field of entrepreneurship (e.g., trading), did not focus on equity investing (e.g., loan financing), or focused on later stage equity investing (IPO investing, mergers and acquisitions) or crowdfunding. In case of doubt, we read the methodology section of the article to determine whether the article fit our inclusion criteria. The process was repeated twice in the span of six months; κ=0.87 indicates high replicability of the article search and selection process. This process yielded a total of 34 articles, which were read in detail to conduct a content analysis. During this process, we identified additional articles that used signaling theory to explain early-stage funding through equity investments. In Table 8, the seven additional articles are marked with an asterisk. The literature review procedure is summarized in Figure 3.

Figure 3: Literature review procedure



2.2.2 Sample characteristics

As can be seen in Table 4, our final dataset included 41 articles covering the period from 2001 to 2020. We noted an increase in the number of published research over the last 20 years. In fact, more than half (58% or 23 articles) of all the reviewed research papers were published in the last five years. In the last 20 years, the most articles (10) on this topic were published in Research Policy, followed by the Entrepreneurship Theory and Practice (8) and Journal of Business Venturing (7). Slightly more than half of the studies were published in four entrepreneurship journals (ETP, JBV, SEJ, VC), while the rest were published in four management (AMJ, AMR, RP, JMS) and two finance journals (JF, RFS). The articles were authored by more than 60 different researchers. The most influential study was published in Research Policy in 2007 (Hsu, 2007) and was cited 266 times (WoS Core count), followed by Hallen and Eisenhardt (2012), Busenitz, Fiet and Moesel (2005), Elitzur and Gavious (2003), Fischer and Reuber (2007), and Meuleman and De Maeseneire (2012), all of which were cited more than 100 times (WoS Core count). In terms of methodology, 26 of the articles were quantitative studies, 5 were qualitative, 4 were mixed methods studies, and 6 were conceptual papers.

Table 3: Article search strategy

Database	Web of Science
Journals	Academy of Management Journal, Academy of Management Review, Administrative Science Quarterly, Entrepreneurship Theory and Practice, Journal of Business Venturing, Journal of Finance, Journal of Financial Economics, Journal of Management, Research Policy, Review of Financial Studies, Strategic Entrepreneurship Journal, Strategic Management Journal, Venture Capital, Academy of Management Annals, British Journal of Management, Business Ethics Quarterly, Journal of Management Studies, Journal of Product Innovation Management
Keyword	Signal*, (signal*) AND (entrepreneur* OR founder OR start$up)
Timeline	2001-2020
Source type	Article
Language	English

2.3 Results

2.3.1 Signal senders

Signal senders are insiders with access to information that is unavailable to outsiders (Connelly et al., 2011; Taj, 2016). In the entrepreneurship financing literature, signal senders are considered to be the new venture, the (lead) entrepreneur, or the entrepreneurial team. These insiders possess superior knowledge about their intentions, their abilities and the quality of the venture that is of interest to outsiders, usually investors or other external stakeholders.

Signaler characteristics are relevant to the signaling process, because they influence signaling outcomes (Vasudeva, Nachum, & Say, 2018). While signal senders can select and modify signals they send, this does not apply to indices. These unalterable characteristics of a signaler may influence signal receiver's expectations and result in different outcomes for signalers that send the same signals (Spence, 1973) as a result of differences in signaler's perceived credibility (Gomulya & Mishina, 2017; Vasudeva et al., 2018). Recently, researchers have begun exploring how gender of a founder influences signaling outcomes (Alsos & Ljunggren, 2017; Guzman & Kacperczyk, 2019; Yang, Kher, & Newbert, 2020). A slim but potentially fruitful stream of research has also

considered the role of the founder's status (Ebbers & Wijnberg, 2012). Exploration of indices are in no way exclusive to founders as signalers. New venture characteristics such as size, age and industry may alter how signals are received (Edelman, Manolova, Brush, & Chow, 2021).

Table 4: Journals by year and number of articles on signaling to early-stage equity investors

	RP	ETP	JBV	AMJ	VC	SEJ	JF	RFS	AMR	JMS	**Total**
2020			2	2	1	1					**6**
2019	2										**2**
2018		1	3							1	**5**
2017	1	2			1		1		1		**6**
2016	1			1	1			1			**4**
2015	2										**2**
2014		1			1						**2**
2013		1									**1**
2012	2	1	1	1							**5**
2011										1	**1**
2010	1										**1**
2009											**0**
2008											**0**
2007	1	1	1								**3**
2006											**1**
2005		1									**1**
2004											**0**
2003			1								**1**
2002											**0**
2001					1						**1**
Total	**10**	**8**	**8**	**4**	**5**	**1**	**1**	**1**	**1**	**2**	**41**

Note. AMJ = Academy of Management Journal, AMR = Academy of Management Review; ETP = Entrepreneurship Theory and Practice, JBV = Journal of Business Venturing, JF = Journal of Finance, JMS = Journal of Management Studies, RFS = Review of Financial Studies, SEJ = Strategic Entrepreneurship Journal, VC = Venture Capital.

Venture. Angel investors and venture capitalists seek to invest in ventures with growth potential and potential for high returns through exit (De Clercq & Sapienza, 2006; Wallmeroth, Wirtz, & Groh, 2018). Many prospective early-stage equity investors expect some form of business plan as a first step in deciding whether or not an opportunity should advance to the next investment phase (Mason & Stark, 2004a). Half of the empirical research examining signaling to early-stage

equity investors has treated the firm as a signaler. These research studies have predominantly focused on the value of endorsement relationships and affiliations with governments, research and business development organizations (Doblinger, Surana, & Anadon, 2019; Hoenig & Henkel, 2015; Plummer et al., 2016), patents (Audretsch, Bönte, & Mahagaonkar, 2012; Guzman & Kacperczyk, 2019; Hoenig & Henkel, 2015), prior equity and debt financing (Epure & Guasch, 2020), and government subsidies (Islam, Fremeth, & Marcus, 2018; Meuleman & De Maeseneire, 2012; Söderblom et al., 2015; Stevenson, Kier, & Taylor, 2020). Recent research in this area has also provided insights into the impact of the firm's growth orientation on VC valuations (Guzman & Kacperczyk, 2019), demonstrating that it may be fruitful to study the signaling effects of strategic orientation and organizational culture in addition to the venture's financial structure, affiliations, and product characteristics. One study (Hallen & Eisenhardt, 2012) examined signal timing and the effects of signaling quality and scarcity, showing that researchers should consider signal timing in addition to signal type.

Founder. Founders are considered to be of the utmost importance to early-stage equity investors (Bernstein et al., 2017; Harrison & Mason, 2017). Founder characteristics are often considered to be a proxy of venture quality (Kaplan et al., 2009). Consequently, approximately one third of the studies on signaling to early-stage equity investors have treated founders as signal senders. These studies have commonly focused on the signaling effects of the founder's human (Bernstein et al., 2017; Busenitz et al., 2005; Gimmon & Levie, 2010; Hsu, 2007; Ko & McKelvie, 2018) and social capital (Hsu, 2007; Ko & McKelvie, 2018). Some researchers have also considered how founders can signal their personal qualities. These researchers have looked into the effects of displayed entrepreneurial passion (Mitteness, Sudek, & Cardon, 2012; Murnieks, Cardon, Sudek, White, & Brooks, 2016; Warnick et al., 2018) and coachability (Ciuchta et al., 2018; Warnick et al., 2018). A slim but potentially fruitful stream of research has also considered the signal receiver's perceptions of the founder's reputation (Ebbers & Wijnberg, 2012) and trustworthiness (Maxwell & Lévesque, 2014). More recently, researchers have also turned their attention to examining fixed signals (indices) such as the founder's gender (Alsos & Ljunggren, 2017; Guzman & Kacperczyk, 2019; Yang et al., 2020).

Founding team. It is well recognized in the entrepreneurship literature that most new ventures with high growth potential are the result of teamwork (Cooney, 2005; Harper, 2008). Some have even reported that investors refuse to invest in solo entrepreneurs (Pauwels, Clarysse, Wright, & Van Hove, 2016). Despite this, research on founding team signaling remains relatively rare. Busenitz et al. (2005) and Huynh (2016) are examples of the studies that have investigated the effects of founding team signaling on investor decisions. While Busenitz et al. (2005) considered the signaling value of the founding team's total retained equity, total personal investments, average industry, and entrepreneurial experience, Huynh (2016) adopted a very broad definition

of the founding team's capabilities, including the founding team's strategic orientation, organizational processes, and product characteristics in addition to its human capital. Several studies have considered the founding team's education and experience simply as an indicator of a firm's stock of human capital (e.g., (Hoenig & Henkel, 2015; Hsu & Ziedonis, 2013). None of the studies in our sample considered the founding team to be composed of individuals with potentially diverse human and social capital and psychological characteristics.

2.3.2 Signals

Signals are bits of private information sent to outsiders (Connelly et al., 2011; Taj, 2016). Usually (but not exclusively), signalers communicate the information intentionally in an effort to influence receivers' decisions in their favor (Connelly et al., 2011).

Research on signaling in the context of early-stage financing has studied a much broader range of signals compared to the economics and finance literature. While traditional signaling theory assumes that signals are credible because they are costly and therefore difficult to imitate by inferior prospects (Spence, 1973), entrepreneurship researchers understand signals to be any information that reflects the signaler's underlying characteristics (Clough, Fang, Vissa, & Wu, 2019). In the entrepreneurship financing literature, entrepreneurs can signal their quality and intentions using two main types of signals (Huang & Knight, 2017):

- *Informational signals* that provide insight into the quality of the entrepreneur or venture, and
- *Interpersonal signals* that provide insight into how the entrepreneur or venture might interact with others and available non-financial resources.

While traditional signals such as credentials, affiliations, prior investments, and different certifications have been studied in this context, research has also investigated how entrepreneurs signal their underlying qualities through self-presentation. It has been argued that such rhetorical signals are effective because the environment in which early-stage entrepreneurs signal is noisy and such signals help to reinforce traditional signals (Plummer et al., 2016; Steigenberger & Wilhelm, 2018). Table 5 provides example of pairs of objective and subjective informational and interpersonal signals.

However, signals are rarely perfectly aligned with particular unobservable qualities (Connelly et al., 2011), and many signals can have both informational and interpersonal implications. For example, entrepreneurs who display high levels of entrepreneurial passion may be perceived as both persistent (informational signal) and uncooperative (interpersonal signal) (Warnick et al.,

2018). Researchers have increasingly recognized that many signals are ambiguous (Ciuchta et al., 2018), dependent on the interpretation of the receiver (Drover et al., 2018) and contextual cues (Schepker, Oh, & Patel, 2018). Moreover, signals differ in many characteristics, as summarized in Table 6.

1.3.2.1 Venture-level signals

Public funding. Several studies (Hulsink & Scholten, 2017; Islam et al., 2018; Söderblom et al., 2015; Stevenson et al., 2020) have shown that new ventures that obtain government subsidies have better chances of raising future equity investments, possibly due to the decreased liability of newness (Söderblom et al., 2015) and increased perception of venture quality (Feldman & Kelley, 2006; Meuleman & De Maeseneire, 2012). Accordingly, prestigious grants may be especially beneficial to new ventures that have no or few patents (Islam et al., 2018). Islam et al. (2018) found that signal timing is important because the signal is effective only in the first six months post grant reception. Even though companies that have recently received government subsidies have better chances of obtaining additional external equity funding, research (Stevenson et al., 2020) has shown that those firms grow less than similar firms that do not obtain such grants.

Private funding. An entrepreneur's personal investment in the new venture is considered to be a signal of the venture's value and the entrepreneur's commitment to the venture (Busenitz et al., 2005; Prasad, Bruton, & Vozikis, 2000). Although entrepreneurs can rely on bootstrapping to finance their ventures (Grichnik, Brinckmann, Singh, & Manigart, 2014), those who incur personal and/or business debt signal commitment and lower downside risk. This results in better chances of obtaining external equity funding (Epure & Guasch, 2020). That being said, Busenitz et al. (2005) failed to find evidence that new venture team investment and retained equity predict venture outcomes. In addition to the funder's own investment in the new venture, research has looked into the signaling effect of prior investor backing.

Follow-on investors are susceptible to information about earlier investors, especially if these were high-profile investors (Bernstein et al., 2017; Capizzi et al., 2021; Drover, Wood, & Zacharakis, 2017; Ko & McKelvie, 2018) or investors with a central position within an investment group (Butticè, Croce, & Ughetto, 2021). Relatively inexperienced investors rely more on information about prior funding of the venture (Bernstein et al., 2017). It has been argued that prior investments certify venture quality in the minds of investors (Croce et al., 2017; Drover, Wood, et al., 2017). While prior equity investments by angel investors or venture capitalists signal a venture's financial viability, successful crowdfunding campaigns signal market viability

Table 5: Overview of research by the main elements of signaling theory

	(Stevenson et al., 2020)	(Vanacker et al., 2020)	(Shafi et al., 2020)	(Milosevic et al., 2020)	(Epure & Guasch, 2020)	(Guzman & Kacperczyk, 2019)	(Doblinger et al., 2019)	(Ciuchta et al., 2018)	(Ko & McKelvie, 2018)	(Islam et al., 2018)	(Warnick et al., 2018)	(Roma et al., 2017)	(Alsos & Ljunggren, 2017)	(Bernstein et al., 2017)	(Hulsink & Scholten, 2017)	(Drover et al., 2017)	(Miozzo & DiVito, 2016)	(Huynh, 2016)	(Plummer et al., 2016)	(Söderblom et al., 2015)	(Hoenig & Henkel, 2015)	(Hsu et al., 2014)	(Maxwell & Lévesque, 2014)	(Hsu & Ziedonis, 2013)	(Audretsch et al., 2012)	(Ebbers & Wijnberg, 2012)	(Meuleman & De Maeseneire, 2012)	(Hallen & Eisenhardt, 2012)	(Nagy et al., 2012)	(Clarke, 2011)	(Gimmon & Levie, 2010)	(Balboa & Marti, 2007)	(Hsu, 2007)	(Busenitz et al., 2005)	**SUM**
Signal senders																																		
Venture	•	•	•	•	•	•	•			•		•	(•)	•	•	•	•		•	•	•	•		•	•		•	(•)						20
Founder					(•)	•		•	•		•		•									•	•			•		•	•	•	•	•	•	13
Founding team														(•)				•			(•)			(•)									•	•	3
Signals																																		
Public funding	•									•					•					•							•							5
Private funding			•	•	•							•																					•	5
Equity funding			•	•												•																		3
Debt funding					•																													1
Crowdfunding												•		(•)		•																		2
Affiliations and alliances				•			•		•					•					•		•	•		•								•		9
With organizations							•														•	•											•		4
With investors				•					•															•											3
Patents and prototypes						•				•		•							•		•			•	•										7
Education and experience									•					•				•	•		•	•							•			•	•	•	11
Relationships and networks												•					•	•											•				•		5
Displayed personal traits								•			•											•	•												4
Performance and traction		•												•												•							•		4
Various/Other													•				•	•				•						•	•	•					7
Indices																																		
Gender						•							•																						2
Signal receivers																																		
Angel investors											•			•								•	•												4
Venture capitalists			•	•		•				•	•	•	•			•	•				•	•		•				•					•	•	15
Mixed/Not specified	•	•			•		•	•	•						•			•	•	•					•	•	•		•	•	•	•			17

(Drover, Wood, et al., 2017; Roma, Petruzzelli, & Perrone, 2017), providing complementary signals of a venture's quality (Roma, Vasi, & Kolympiris, 2021). Moreover, signaling a new venture's attractiveness to multiple equity investors can facilitate investors' commitment (Hallen & Eisenhardt, 2012). On the other hand, withdrawal of early investors can hurt a new venture through the decreased likelihood of obtaining follow-on equity funding and the negative impact on its valuation (Shafi, Mohammadi, & Johan, 2020).

Affiliations and alliances. Much research has focused on the role of public financing of new ventures, but few studies have examined how interactions between ventures and governments, research organizations, non-profit organizations, and venture development organizations help new ventures to raise future equity financing. These organizations provide a variety of non-financial resources to support innovation and commercialization (Doblinger et al., 2019). Researchers have argued that such alliances serve as signals of quality and connectedness to early-stage equity investors (Doblinger et al., 2019; Stuart, 2000). Hoenig and Henkel (2015) reported that venture capitalists place a higher value on research alliances than on patents, even though patents are costly objective informational signals. This suggests that the value of alliances is greater than just indicating technological quality. For example, Plummer et al. (2016) demonstrated that affiliations with venture development organizations increase the effectiveness of other signals, such as product development stage and patents. Affiliations increase the perceived legitimacy of new ventures (Plummer et al., 2016), especially when the new venture does not have a strong reputation, but is affiliated with an organization that does (Colombo et al., 2019). This is because new ventures must pass these organizations' screening processes to gain access to their partners. Moreover, new ventures gain continued access to the resources needed to survive and compete in the business environment.

Patents and prototypes. Several studies have examined the relevance of patents and prototypes for accessing external equity financing. Audretsch et al. (2012) claimed that patents signal the ability to appropriate the returns of the innovation and prototypes signal the feasibility of the project. Hsu and Ziedonis (2013) suggested that patents could signal both technological quality and commercial orientation. The findings of research investigating the value of patents to early-stage equity investors have been inconclusive. Engel and Keilbach (2007) found that patent applications increase the likelihood of funding from venture capitalists. Furthermore, patents are more important for the less experienced founders in the early round of financing (Hsu & Ziedonis, 2013). By contrast, Audretsch et al. (2012) found that patents are only effective when combined with prototypes. Early-stage new ventures that signal their quality through prototypes and patents simultaneously have a higher probability of obtaining early-stage equity funding (Audretsch et al., 2012). Since the track record of new ventures is very limited, their progress can serve as a proxy for the quality of the new venture (Hallen & Eisenhardt, 2012). Plummer et al.

(2016) found that ventures with a market-ready product are more likely to receive equity financing than ventures without market-ready products – an effect that is more pronounced if the venture is affiliated with a venture development organization.

Table 6: Signal characteristics

Objectivity	Objective signals represent factual information used to communicate underlying quality or intent, while subjective signals represent self-presentation in an attempt to influence others' perceptions of the underlying quality or intent.
Valence	Positive signals can convey positive information about the signal sender, while negative signals convey negative information about the signal sender.
Function	Complementary signals provide greater value to the signal receiver when signaled together than when signaled alone, while substitutive signals provide less value when signaled together compared to when signaled in isolation.
Cost	Signals differ in their absolute cost and relative cost to the signaler. Costly signals require significant investment on the part of signal senders, while costless signals do not. Early proponents of signaling theory (Spence, 1973) assumed that the effectiveness of signals was a function of signal cost, a proposition that has been challenged by the "cheap talk" notion (Crawford & Sobel, 1982).
Pliability	The majority of signals are pliable, that is, they can be adjusted by signal senders through effort or acquisition. By contrast, fixed signals, also called indices, cannot be altered by the signaler (e.g., gender, age, and race).

1.3.2.2 Founder-level and team-level signals

Education and experience. A founder's human capital in the form of education and experience has been by far the most well-studied founder-level and team-level signal in the early-stage equity financing literature. These signals usually fall into the category of costly objective informational signals; however, investors' perceptions of the founder's market knowledge and entrepreneurial ability could serve as similar costless and subjective signals. It has been argued that when venture performance data are not yet available, the founder's human capital is a signal of venture viability (Ko & McKelvie, 2018). While a venture's track record is often unavailable in the early stage of new ventures, the founder's track record may be. Entrepreneurs with a track record of success and background of accomplishments are more likely to receive early-stage investment (Ebbers & Wijnberg, 2012; Hallen & Eisenhardt, 2012). In their field experiment, Bernstein et al. (2017)

observed that experienced angel investors make investment decisions solely based on the founding team's education and experience, whereas inexperienced investors rely more on the new venture's traction data. The founding team's human capital is related to the ability to raise early-stage funding (Huynh, 2016), but this effect is more pronounced in the first round of financing. Ko and McKelvie (2018) found that the founder's education, industry, and entrepreneurial experience have significant effects on first-round financing. The effect of experience diminishes in subsequent rounds of financing, while the effect of education persists. The importance of a founder's education on fundraising has also been shown, even though the founder's experience has an impact on the firm's survival whereas academic status does not (Gimmon & Levie, 2010).

Personal relationships and networks. A firm's social capital in the form of the venture's affiliations with different organizations has been well studied, but so has the founder's relational social capital, which is generated through interpersonal relationships (Still, Huhtamäki, & Russell, 2013). Relational social capital provides access to necessary resources, including human capital (Hsu, 2007), thereby increasing the venture's viability (Newbert & Tornikoski, 2013). In his study, Huynh (2016) found that the founding team's social capital (measured as relationships between the team and its advisors) only indirectly influences the probability of obtaining early-stage equity financing through its impact on the founding team's capabilities. This supports the assumed relationship between social and human capital, but undermines the signaling value of social capital to early-stage equity investors. That being said, a founder's direct ties with investors increase the likelihood of venture funding and positively impact venture valuation (Hsu, 2007; Zhang, 2011), as does previously receiving investment from a prominent investor (Ko & McKelvie, 2018), especially in the case of inexperienced follow-on investors (Bernstein et al., 2017). Endorsements signal new venture legitimacy (Fisher, Kuratko, Bloodgood, & Hornsby, 2017; Plummer et al., 2016), thereby increasing the odds of receiving further funding.

Displayed personal traits. Personality traits such as perseverance, commitment, entrepreneurial passion, trustworthiness, likability, and coachability appear repeatedly on the investment criteria lists of angel investors and venture capitalists (MacMillan et al., 1985; Sudek, 2006; Van Osnabrugge, 1998). Personality traits can be signaled through accomplishments, verbal or non-verbal language, and affiliations. Researchers have suggested that displayed entrepreneurial passion signals that the entrepreneur will persevere in the face of challenges (Warnick et al., 2018). Perceived entrepreneurial passion increases the entrepreneur's likelihood of obtaining early-stage equity funding (Mitteness, Sudek, et al., 2012), especially when combined with coachability (Warnick et al., 2018). Coachability signals the potential for collaborative relationships with the investor (Ciuchta et al., 2018). In research conducted by Ciuchta et al. (2018), coachability emerged as one of the predictors of investors' willingness to invest, along with perceived entrepreneur competence and preparedness. The effect was more pronounced in those investors

who had experience with active mentoring. One study (Maxwell & Lévesque, 2014) also considered the signaling value of trust-building behaviors to angel investors. Trust-violating behaviors, especially those related to incompetence, rigidity, and inaccuracies in pitches were found to be more predictive of investment decisions than trust-building behaviors.

Table 7: Typology of signals about an entrepreneur with examples

	Informational signals	**Interpersonal signals**
Subjective signals	Knowledge of the industry Confidence Persuasiveness	Trustworthiness Coachability Reputation
Objective signals	Track record Industry experience Educational background	Affiliations Memberships Acquaintances

Gender. Guzman and Kacperczyk (2019) explained that female founders are 63% less likely to obtain VC funding, of which 65% can be attributed to the observation that female entrepreneurs are less likely to signal growth potential to external investors and 35% can be attributed to investors' preference for male-founded ventures. Research considering how signal strength depends on the signaler's gender has shown that investors assign different values to the founder's human capital based on the gender of the founder (Alsos & Ljunggren, 2017). More specifically, signals that are congruent with the signaler's gender are more effective. Signaling prior equity investment is more effective for male founders, whereas signaling prior philanthropic investment is more effective for female founders when trying to acquire additional funding (Yang et al., 2020).

2.3.3 Signal receivers

Signal receivers are the outsiders who require insider information to guide their decisions. Signals are only effective when receivers look for them (Connelly et al., 2011). Signal receivers benefit from signals that accurately reflect the signaler's underlying characteristics. However, because the interests of signalers and receivers often diverge, signalers have an incentive to misrepresent themselves to their advantage (Crawford & Sobel, 1982). Therefore, signal receivers need to judge "signal honesty" (Durcikova & Gray, 2009). In entrepreneurship financing, the signal receivers are usually existing or potential investors. In the early-stage signaling literature, these were usually considered to be venture capitalists, but, from 2012, research on signaling to angel investors specifically began to appear as well. Studies exploring signaling to accelerators remain rare (exception: (Yang et al., 2020). Several studies we analyzed did not specifically define the investor

type, but rather treated various investors as a homogeneous group of external equity investors (e.g., (Gimmon & Levie, 2010; Söderblom et al., 2015).

Differences between investors. Only one study in our sample directly compared the effectiveness of signals based on the target investor type (Hsu et al., 2014) and one study controlled for the investor type (Warnick et al., 2018). Hsu et al. (2014) provided preliminary evidence that angel investors and venture capitalists have slightly different investment policies. While these investor groups do not differ in terms of the value they assign to the founder's entrepreneurial experience, venture capitalists assign more value to the economic potential of the firm, whereas angel investors assign more value to entrepreneur's commitment and social network (Hsu et al., 2014). These findings are in line with Fiet (1995) argument that venture capitalists view market risk as more important than agency risk, while the opposite holds true for angel investors. Other studies that included mixed samples of angel investors and venture capitalists (Audretsch et al., 2012; Ko & McKelvie, 2018; Plummer et al., 2016; Stevenson et al., 2020) did not differentiate between the capital obtained from the two groups.

Differences within investors. Prominent angel investors and venture capitalists who are more embedded in investment networks are more sensitive to signals of a founder's human capital (education and experience) than less prominent investors (Ko & McKelvie, 2018). Similarly, Bernstein et al. (2017) reported that experienced angel investors make investment decisions based only on information about the founding team's education and experience, while inexperienced investors follow traction and investment data to help guide their investment decisions. More experienced angel investors also place greater emphasis on an entrepreneur's personal traits, such as passion and coachability, than less experienced investors (Warnick et al., 2018). However, not all research has identified differences within investor groups. For example, Hoenig and Henkel (2015) found no differences in the use of quality signals in the form of patents, research alliances, and founding team experience based on venture capitalists' experience or educational background. These results, though limited, suggest that investors of the same type differ more in terms of their preference regarding founder than venture characteristics. That being said, more experienced and specialized early-stage investors have been found to make better investment decisions due to better screening (Gompers, Kovner, & Lerner, 2009; Wiltbank, Read, Dew, & Sarasvathy, 2009), a finding consistent with the predictions of signaling theory (Spence, 1973). More recently, researchers have also turned to examining interpersonal differences within groups of investors. Several studies (Ciuchta et al., 2018; Mitteness, Sudek, et al., 2012) have found that angel investors place different value on entrepreneur-level signals depending on their willingness to mentor and interpersonal differences. Investors with coaching experience place greater emphasis on an entrepreneur's coachability (Ciuchta et al., 2018), while more open angel

investors who are willing to mentor put more weight on entrepreneurial passion (Mitteness, Sudek, et al., 2012).

2.4 Future research directions

Indices. Research on early-stage equity investing has examined only the moderating role of gender in access to early-stage equity funding (Alsos & Ljunggren, 2017; Guzman & Kacperczyk, 2019). The role of other founder-level indices (observable unalterable characteristics) such as age and race has remained unexplored. Exploring the effects of these indices is necessary to uncover investor biases and inequalities in access to external equity investment. Understanding how signals and indices interact is important for developing effective signaling strategies to overcome such biases. In addition to studying the moderating effects of founder-level indices, research could also explore investor-level indices (Ewens & Townsend, 2020) and firm-level indices such as a firm's industry group, age, and size (Downes & Heinkel, 1982).

Signal interactions. Although researchers have begun to examine interaction effects between different signals, this research primarily seeks to uncover complementary signals (Cardon, Mitteness, & Sudek, 2017; Plummer et al., 2016; Warnick et al., 2018). Plummer et al. (2016), for example, proposed that objective signals of new venture legitimacy increase the signaling impact of other signals that may otherwise go unnoticed. Related research (Ozmel, Reuer, & Gulati, 2013) suggests that similar signals of venture quality (e.g., affiliation with prominent venture capitalists and the venture's prominent position in alliance networks), when combined, attenuate each other's effectiveness and thus may not represent an efficient signaling strategy (considering their cost). Steigenberger and Wilhelm (2018) theorized that in a high-noise signaling environment, subjective, costless signals complement objective, costly signals. Only one study in our sample (Nagy et al., 2012) tested the interaction effect of costly objective and costless subjective signals of founder quality, but found no support for the proposition. On the contrary, it found that entrepreneurs who lacked credentials but engaged in impression management (exemplification, ingratiation, and self-promotion) had the same likelihood of receiving venture capital as entrepreneurs with credentials who did not engage in such activities, suggesting a compensatory effect. In addition, the latest research (Edelman et al., 2021) suggests that different signal configurations can lead to the same outcome. The premise of this research is that early-stage equity investors consider signals in tandem rather than in isolation. To understand how different signals work together, we suggest that researchers examine the complementary, compensatory and substitutive effects of signals that differ in type (e.g., objective and subjective) and content (e.g.,

Table 8: Article content analysis

Study	Signaler	Signal	Receiver	Method	Key findings
(Stevenson et al., 2020)	Firm	Government subsidies	VCs, AIs	Secondary data analysis (quantitative case study)	Affiliation signals such as grant affiliations provide new venture certification and therefore reduce uncertainty of early-stage equity investors; government grants do increase a firm's chances to obtain external funding but do not predict its revenue growth, especially for larger new ventures.
(Vanacker, Forbes, Knockaert, & Manigart, 2020)	Firm (PE)	Unrealized performance, realized performance	Investors (various)	Secondary data analysis	There is no difference between weak (unrealized) and strong (realized) signals in raising follow-on funds; media attention strengthens the relationship between weak signals and fund raising performance.
(Shafi et al., 2020)	Firm	VC withdrawal	VCs	Secondary data analysis	VC withdrawal sends negative signals about venture quality to prospective investors, decreasing venture valuation and chances in obtaining equity funding.
(Milosevic, Le Pendeven, & Fendt, 2020)	Firm	VC firm-level human capital and firmographics	VCs	Secondary data analysis, multiple qualitative case study	Ventures backed by larger VCs and VCs with higher level of human capital are more likely to receive follow-on investment from outside VCs.
(Epure & Guasch, 2020)	Firm, (founder)	Business debt; personal debt	Investors (various)	Survey (secondary data analysis)	Personal debt signals commitment, while business debt signals lower downside risk; Debt is positively related to receiving equity investment - debt signaling is especially effective when business and personal debt are combined.

(*table continues*)

(*continued*)

(Guzman & Kacperczyk, 2019)	Firm, founder	Founder's/ Manager's gender; firm's growth orientation (trademark, patents, technology, etc.)	VCs	Secondary data analysis	Female-led new ventures are underfinanced, but two-thirds of this gap can be explained by observable growth orientation and one-third by discrimination; this gap diminishes when stronger signals of growth are available.
(Doblinger et al., 2019)	Firm	Alliances with governments, research organizations, non-profit organizations, and firms	Investors (various)	Secondary data analysis	Alliances have an impact on the patenting activity of new ventures; alliances signal quality to private investors and thus facilitate equity investments; Licensing alliances with government partners are the strongest predictor of subsequent financing.
(Ciuchta et al., 2018)	Founder	Coachability	Investors (various)	Experiment	Perceived coachability leads to higher willingness to invest; this relationship is strengthened if investors have prior coaching experience.
(Ko & McKelvie, 2018)	Founder	Founder's human capital; affiliation with prominent investor	VCs, AIs	Secondary data analysis	A founder's human capital (education, experience) is an important signal in the first round of financing; the prominence of early investors is an important signal in the second round of financing; this effect is more prominent for founders with high human capital.
(Drover et al., 2018)	Firm	Signal valence, signal congruence	Investors and other stakeholders	Conceptual research	Suggests that individuals who use top-down versus bottom-up attention control are more attentive to organizational signals and low-observability signals; signal congruence and valence are important for decision-making; when there is incongruence, decision-making can be aborted.

(*table continues*)

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(Islam et al., 2018)	Firm (tech)	Prestigious government research grants	VCs	Secondary data analysis	Firms that have won prestigious research grants are more successful in obtaining financing; this effect is greater for firms with fewer patents.
(Warnick et al., 2018)*	Founder	Entrepreneurial passion, product passion, openness to feedback	VCs, AIs	Experiment, qualitative multiple case study	Investors prefer experienced, passionate, and coachable entrepreneurs; the effect of passion is greater if the entrepreneur is coachable; there is no difference between AIs and VCs in the emphasis on passion or coachability, but AIs lay more importance on the combination of both.
(Roma et al., 2017)	Firm (tech)	Crowdfunding campaign success, amount pledged, patents, network ties	VCs	Secondary data analysis	Firms that pledge higher amounts in crowdfunding campaigns have been more successful in attracting follow-on funding from VCs, but that is only the case if the firm has patents or its founder has a large social network.
(Alsos & Ljunggren, 2017)	Founder	Founder's human capital; affiliations; founder's gender	VCs	Qualitative case study	Entrepreneurs signal their own competence and competence of board members (education and experience), a quality of the venture, by claiming other investors' interest, obtained investments, and won grants; investors interpret competence signals, consider industry, competition, and growth potential; alliances were not the investors' focus.
(Bernstein et al., 2017)	Firm (team)	Founders' human capital (education, experience); traction (users, revenues); investor backing	AIs	Experiment	Signals about team characteristics are on average more important to investors than traction or existing investors.

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(Hulsink & Scholten, 2017)	Firm (biotech)	Government-backed funding	VCs	Qualitative case study	Equity investors are likely more willing to invest in ventures that have already obtained investment in equipment.
(Huang & Knight, 2017)*	Founder	Informational and interpersonal signals	VCs, AIs	Conceptual research	Informational signals are important in forming the instrumental dimension of a relationship; interpersonal signals are important in forming the affective dimension of a relationship; interpersonal signals are more important for AIs and informational signals are more important for VCs; the entrepreneur's signaling affects relationship formation.
(Drover, Wood, et al., 2017)*	Firm	AI prominence, number of crowdfund investors and platform characteristics	VCs	Experiment	Firms that have previously received funding from reputable AIs or investors from a highly regarded crowdfunding platform are more likely to proceed to VC due diligence stage.
(Khanna & Mathews, 2016)	Firm, investor	Firm's prospects	Third parties	Analytical modeling	VCs are incentivized to make high valuations in later financing rounds to signal the firm's strength to third parties.
(Miozzo & DiVito, 2016)	Firm (biotech)	Technological development (patents, announcements of partnerships, success in clinical trials, etc.)	VCs	Qualitative multiple case study	Various manifestations of technological development help to attract external funding; firms that build relationships to gain access to key resources develop quickly.
(Huynh, 2016)	Founding team	Founding team's capabilities and social network	Investors (various)	Survey	The founding team's capabilities increase early-stage fundraising ability; networks have indirect effects on the ability to raise funds through their effect on capabilities.

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(Plummer et al., 2016)	Firm	Venture development organization (VDO) affiliation	VCs, AIs	Secondary data analysis	VDO affiliation increases the likelihood of obtaining external equity investment; VDO affiliation increases the effectiveness of other signals (experience, market introduction, commercial property).
(Söderblom et al., 2015)	Firm	Government subsidies	Investors (various)	Secondary data analysis (quantitative case study), qualitative multiple case study	Subsidized new ventures have an advantage in attracting financing, possibly due to a decreased liability of newness.
(Hoenig & Henkel, 2015)	Firm (team)	Patents, research alliances, team experience	VCs	Experiment	VCs interpret research alliances and team experience as signals of technological quality, which is not the case with patents; All three types of signals help in attracting early-stage equity fudning, the strongest being sales alliance, followed by granted patent and 10-year entrepreneurial experience.
(Hsu et al., 2014)*	Founder, firm	Economic potential (time to breakeven), entrepreneurial experience, network, passion (commitment)	VCs, AIs	Experiment	VCs put greater importance on economic potential, while AIs emphasize more the entrepreneur's passion and industry ties.
(Maxwell & Lévesque, 2014)*	Founder	Trustworthiness	AIs	Qualitative case study	Number of trust-building behaviors increases the likelihood of obtaining investment; trust-violating behaviors are especially damaging to the success of obtaining funding.

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(Hsu & Ziedonis, 2013)	Firm, founding team	Founder IPO experience, patents	VCs	Secondary data analysis	Patents significantly increase the chances of getting investment from prominent VCs; the effect is more pronounced if the founding team has no prior IPO experience; patents are more effective in early funding rounds.
(Audretsch et al., 2012)	Firm	Patents, prototypes	VCs, AIs	Survey	Prototypes signal the feasibility of the business idea and the likelihood of obtaining equity financing; prototypes and patents together increase this likelihood, while patents on their own do not.
(Ebbers & Wijnberg, 2012)	Founder (film industry)	Track record (reputation)	Investors (broadcaster, distributer, fund)	Secondary data analysis	Different types of investors pay attention to different types of reputation signals.
(Meuleman & De Maeseneire, 2012)	Firm	Government subsidies	Investors (various, including share-holders), banks	Secondary data analysis (quantitative case study)	Government grants can provide a quality signal that helps firms raise future capital; results were robust only for raising long-term debt but not for equity financing or short-term debt capital.
(Hallen & Eisenhardt, 2012)	Firm, founder	Quality signals (e.g., track record), scarcity signals (e.g., available alternative investors)	VCs	Secondary data analysis, qualitative multiple case study	Networks determine potential investment partners, while signals of quality and scarcity facilitate the relationship formation process.

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(Nagy et al., 2012)*	Founder	Credentials (entrepreneurial experience, affiliation with university, volunteer work); impression management (integration, self-promotion, exemplification)	Investors (various)	Experiment	Credentials and impression management both contribute to the perception of legitimacy; impression management can substitute for low credentials and appear to be somewhat more effective than high credentials without impression management.
(Clarke, 2011)	Founder	Visual signals (setting, props, dress and expressiveness)	Investors	Qualitative multiple case study	Entrepreneurs use a combination of verbal and non-verbal (visual) cues to influence investors.
(Gimmon & Levie, 2010)	Founder	Management expertise, academic status, technical expertise	Investors (various)	Secondary data analysis (quantitative multiple case study)	Management expertise and academic status (PhD or title of professor) increase the chances of external funding; technical expertise does not, although it increases the firm's chances of survival.
(Balboa & Martí, 2007)	Founder-manager (P)	Experience, investment activity, reputation	Investors	Secondary data analysis	Membership in the PE association and PE size are positively related, while the number of firms per fund manager is negatively related to the annual volume of funds raised.
(Hsu, 2007)	Founding team (tech)	Founder's experience, education, social capital	VCs	Survey	The founder's experience, education (PhD), and social network, which enable founders to recruit executives without VC help, increase the chances of funding and valuation.
(Fischer & Reuber, 2007)	Firm	Signal valence, consistency, and credibility of reputational signals	Investors and other stakeholders	Conceptual research	Signal coherence, consistency, and credibility are important in building consensus around firm characteristics; this also depends on the motivation of each stakeholder (which determines the amount of attention paid).

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(Busenitz et al., 2005)	Founding team	Retained equity, founder own investment, entrepreneurial experience, industry experience	VCs	Survey	Neither the retained equity nor the amount of money invested by the founders predicts the performance of the company.
(Elitzur & Gavious, 2003)	Founder	Prior AI investment	VCs	Analytical modeling	Both entrepreneurs and VCs behave opportunistically; an entrepreneur's affiliation with AIs reduces moral hazard and signals the founder's effort.
(Shepherd & Zacharakis, 2001)*	Founder	Trustworthiness	VCs, AIs	Conceptual research	Entrepreneurs build trust by signaling commitment and consistency, fairness and justice, seeking a fit with the investor, and communicating openly and frequently.

Note. AIs – angel investors, VCs – venture capitalists; Conceptual research represent theoretical analysis; Analytical modeling involves mathematical modeling or computer simulation; Qualitative case study is an empirical investigation based on interviews or observations in a particular context; Quantitative case study includes quantitative data analysis in a specific context; Secondary data analysis uses records or secondary data; Survey describes literature that uses the survey method; Experiment describes research that uses laboratory, field, or quasi-experimental methods.

interpersonal and informational), as the interaction effects of signals appear to depend on their particularities (Steigenberger & Wilhelm, 2018).

Interpersonal signals. Entrepreneurs use information and interpersonal signals to convey information about quality and intent to investors (Huang & Knight, 2017). Informational signals provide information about the return investors can expect on financial resources, while interpersonal signals communicate information about the potential return on non-financial resources as well (Ciuchta et al., 2018). Venture capitalists and angel investors seek to add value through their active involvement in addition to injecting financial capital (Sudek, 2006; Van Osnabrugge & Robinson, 2000). Baron and Markman (2000) explained that interpersonal skills are important for building social capital and therefore gaining access to needed resources. Since early-stage equity investors form long-term relationships with entrepreneurs once they have invested, investors pay attention to the entrepreneur's ability to work with others. They are prepared to reject competent entrepreneurs if they are unable to build rapport (Huang, 2018; Huang & Pearce, 2015; Mason et al., 2017). So far, researchers have explored mainly how entrepreneurs signal quality using informational signals, but, with a few exceptions (Ciuchta et al., 2018; Warnick et al., 2018), they have overlooked the value of interpersonal signals in investor decision-making.

Negative signals. The literature on investor decision-making suggests that investors rely on an elimination-by-aspects heuristic in the screening phase rather than engaging in fully compensatory decision-making, which would involve weighing all relevant investment criteria (Maxwell et al., 2011). Maxwell and Lévesque (2014) showed that negative (trust-damaging behaviors) signals predict investment decisions better than positive (trust-building behaviors) signals. Moreover, as many signals are ambiguous, contextual cues determine whether a certain signal is interpreted negatively or positively (Schepker et al., 2018). This suggests that signalers should attempt to control the receivers' interpretation by purposefully combining signals that reinforce positive interpretations. Research in the field of early-stage equity financing has only scratched the surface when it comes to understanding negative signals. Questions related to the variety and ambiguity of negative signals, their effects, and approaches to mitigate negative impact on the ability to secure equity financing appear to be fruitful research directions.

Incongruent signals. It has been argued that in complex environments, some degree of signal incongruence in terms of valence (positive and negative) is to be expected (Drover et al., 2018). None of the studies in our sample tested the effects of signal incongruence on financing outcomes. However, related research in this area (Vergne, Wernicke, & Brenner, 2018; Zhang, Zhang, & Yang, 2020) has found that signal incongruence leads to more negative attitudes toward signal senders. These negative reactions occur not only when the signals are related to the same

content dimension (e.g., a venture's integrity), but also when incongruent signals are related to different content dimensions (e.g., a venture's integrity and capability) (Paruchuri, Han, & Prakash, 2021), which can be perceived as potentially reinforcing each other's negative effects. Conflicting signals about the venture or its founder may sabotage early-stage equity financing efforts, as inconsistency can undermine investors' trust (Fischer & Reuber, 2007; Shepherd & Zacharakis, 2001). However, the implications in the context of early-stage equity financing remain unexplored.

Signal honesty. In contexts where signals are inexpensive to manipulate and difficult to verify, it is particularly important for signal receivers to be able to distinguish dishonest (inaccurate) signals from honest (accurate) ones (Momtaz, 2021). A staggering number of entrepreneurs send dishonest signals in the preinvestment phase to attract investors (Cottle & Anderson, 2020). This raises the risk of adverse selection for early-stage equity investors, who have been shown to rely on information provided by entrepreneurs in making investment decisions (Adomdza, Åstebro, & Yong, 2016; Clark, 2008). That being said, according to signaling theory (Spence, 1973; Spence, 2002), as signal receivers accumulate more information over time, they are able to recognize dishonest signals. Although dishonest signaling may increase a new venture's ability to obtain early-stage funding (Cottle & Anderson, 2020; Rutherford, Buller, & Stebbins, 2009), the costs of such behavior for entrepreneurs (when detected) have yet to be adequately explored. Related research (Gomulya, Jin, Lee, & Pollock, 2019) suggests that such behavior can harm the signaler's reputation and future prospects if signal receivers learn that the signals were inaccurate. Therefore, we encourage future early-stage financing research to examine the consequences of dishonest signaling and explore factors that enhance or mitigate damage to the signaler.

Investor type. Surprisingly few studies have directly compared the effectiveness of signals based on the type of target investor, although there is preliminary evidence that angel investors and venture capitalists have different investment policies (Hsu et al., 2014). There are many reasons to suspect that different groups of early-stage equity investors pay attention to different signals. First and foremost, the two types of investors differ in the sources of funding provided. Angel investors are private persons (usually experienced entrepreneurs) who invest their own money in new ventures to which they have no family connection. By contrast, venture capitalists are professional investors who invest in new ventures on behalf of the limited partners. While both types of investors invest primarily for financial reasons (Croce, Ughetto, & Cowling, 2020), many angel investors invest for reasons beyond financial returns (Harrison et al., 2016; Morrissette, 2007). Due to higher resource constraints (Ibrahim, 2008), angel investors are more likely to invest in the earlier stages compared to venture capitalists. Venture capitalists as well as angel groups have more sophisticated and formalized investment decision-making processes compared to individual angel investors (Cumming & Zhang, 2019; Mason et al., 2019). The two types of investors also

differ in their style of governance, with angel investors placing greater emphasis on the entrepreneur–investor relationship as a form of oversight and venture capitalists relying more on contractual governance (Bessière et al., 2020). As these differences between investors may result in different investment policies, future research could investigate the systematic differences between various types of early-stage equity investors in terms of their susceptibility to different signals of quality and intent.

Matching. Many early-stage investors play an active role in the new ventures (Large & Muegge, 2008; Politis, 2008) in order to maximize their financial and non-financial returns. Conflicts that may arise between entrepreneurs and early-stage investors can be detrimental for the venture (Collewaert, 2012). Therefore, it makes sense for early-stage equity investors to consider compatibility with the entrepreneur who is presenting the investment opportunity. Research considering how entrepreneurs and investors match has shown that venture capitalists prefer entrepreneurs with similar decision-making styles (Murnieks, Haynie, Wiltbank, & Harting, 2011). Furthermore, venture capitalists prefer entrepreneurs with similar educational and professional backgrounds (Ebbers & Wijnberg, 2012; Franke, Gruber, Harhoff, & Henkel, 2006). angel investors with entrepreneurial experience place greater emphasis on entrepreneurial passion than other investors (Warnick et al., 2018). These findings suggest a similarity bias in equity investing. Hallen and Eisenhardt (2012) observed that even when ventures successfully signal their quality, they have troubles getting investors to commit to the venture. The entrepreneurial financing literature could lean on signaling theory to identify signals that facilitate match-making between entrepreneurs and investors.

*Investment process***.** Future studies could also investigate signaling at different stages of the investment process. These stages are characterized by different goals (De Clercq et al., 2006), which makes it very likely that investors pay attention to different signals at different points in the investment cycle. Mitteness, Baucus, et al. (2012), for example, found that founder characteristics play an important role in the pre-due-diligence stage, whereas venture characteristics are more important when it comes to the actual investment decision. Hallen and Eisenhardt (2012) suggested that the sequencing of different signals is important to increase the chance of obtaining equity funding. Therefore, the question should be not only what to signal, but also when to send signals to increase the chances of obtaining early-stage financing.

Investor signaling. Shifting the research lens toward signal receivers (investors) and away from signal senders (entrepreneurs) may make important contributions to signaling theory in entrepreneurship financing. Researchers could even consider how investors signal their quality and intent to the entrepreneurs presenting investment opportunities. Early-stage financing markets are not perfect (Wright & Mike, 1998). Most early-stage financing markets are thin, and

most high growth potential new ventures do not seek VC funding, which significantly impacts the quality of the venture pool venture capitalists can choose from (Bertoni et al., 2016). Moreover, the concerns have been raised that public sources of venture capital may crowd out private venture capitalists (Cumming & MacIntosh, 2006; Leleux & Surlemont, 2003). Investors differ in the financial and non-financial capital they can provide to the investee, including reputational benefits, which can significantly influence a new venture's prospects (Ko & McKelvie, 2018; Pollock et al., 2010). Although research has considered how private equity firms, including VC funds, signal to their prospective investors (Balboa & Martí, 2007; Vanacker et al., 2020), research has not yet explored how investors can signal to attract high-quality new ventures.

2.5 Conclusion

Signaling theory provides a useful framework for understanding why certain entrepreneurs are successful in obtaining early-stage equity investments, whereas others are not. While the number of studies using signaling theory to explain success in obtaining early-stage equity financing is increasing, signaling theory remains underutilized despite its suitability for this particular research question. This is evidenced by the relatively small number of studies making explicit reference to signaling theory. We summarize the main strengths and weaknesses of the current state of the literature below.

In this literature review, we have shown that researchers employing signaling theory in the context of early-stage equity investing have focused mostly on identifying the empirical magnitude of signaling effects. They have explored the effects of various venture and founder-level signals, particularly the signaling role of endorsement relationships and affiliations, prior equity and debt financing, founder's human capital, and patents. Research remains inconclusive regarding the signaling effectiveness of patents, suggesting a possible moderating effect of the signaling environment and/or the characteristics of signalers and signal receivers. Signaling theory has been applied to explain the investment decisions of both angel investors and venture capitalists, and research has uncovered the role of investors' professional background in investment decisions. New research has also started to deal with the moderating role of indices (Alsos & Ljunggren, 2017; Yang et al., 2020), providing some insight into discrimination in early-stage equity investing. Moreover, over the years, the scope of signaling research has broadened from objective signals (e.g., credentials and technology) to include signals that are subjective in nature and can be conveyed through verbal and non-verbal strategies (Anglin et al., 2018). This expansion of scope has provided valuable insights and challenged the assumption that the effectiveness of signals depends on their cost (Nagy et al., 2012). Importantly, due to the ambiguity of these signals (Ciuchta et al., 2018), research dealing with subjective signals needs to identify both signaling

behaviors (e.g., the entrepreneur agreeing with the investor) and signal interpretation (e.g., the investor's perception of the entrepreneur's coachability) to make a meaningful contribution to signaling theory. In addition to signal types, future studies might also consider signal characteristics and configurations. Given that the interests of entrepreneurs and early-stage equity investors do not always align (Harrison and Mason 2017), research could delve into the trustworthiness and suspiciousness of different signals by investigating signal characteristics, such as honesty, consistency and congruence. Moreover, much of the existing literature on signaling to early-stage equity investors does not bring to the fore the environment (context) in which signaling occurs. Environmental factors may include industry, investment phase, investor syndication, investment platforms, investor density (i.e., availability of investors in the market), and geographic region. The second major shortcoming of the literature reviewed is that research has not yet examined founding team signaling by taking into consideration team composition, although entrepreneurial teams have been acknowledged as one of the most important considerations for venture investors (Higashide & Birley, 2002).

We observe that an opportunity exists in enriching signaling theory with perspectives on human cognition. Cognitive theories can help researchers circumvent key limitations of signaling theory, which views signal receivers and signal senders as rational agents (Bergh, Connelly, Ketchen Jr, & Shannon, 2014) and signals as information that is transmitted and received in a uniform manner (Vanacker & Forbes, 2016). Insights into cognitive mechanisms, such as how and why signal receivers pay attention to some signals and not others, how they interpret signals, and how they use signals in their decision-making, are particularly important for research dealing with subjective signals. Cognitive theories may also help detangle how investors deal with sets of signals, that may include different signal combinations or incongruent signals (Drover et al., 2018) and how investors assess trustworthiness and suspiciousness of different signals given that the interests of entrepreneurs and early-stage equity investors do not always align (Harrison & Mason, 2017). Cognitive perspectives can also be used to investigate between-investor differences, which result in differences in attention to and interpretation of signals.

This brings us to the limitations of this study. First, our literature review included only studies published in the leading entrepreneurship, management, and finance journals, which may have biased our research findings (Kunisch et al., 2018). However, this approach enabled us to conduct a more thorough review with a potentially greater contribution to the advancement of the field (Post, Sarala, Gatrell, & Prescott, 2020). Although we paid particular attention to the replicability of our search and selection process (Aguinis & Solarino, 2019), subjectivity cannot be completely eliminated. We acknowledge that the categories we identified for each element of signaling theory may change in future investigations of the state of knowledge. Importantly, our findings are not generalizable to other forms of equity financing such as crowdfunding, government subsidies, or

later stage private equity investments, as signaling is strongly influenced by the type of investor and the stage of the venture (Colombo, 2021; Ko & McKelvie, 2018).

With this review, we have sought to integrate the existing research and motivate future research to fill the gaps and expand the knowledge of early-stage venture financing. This review has been the foundation for our further research in the field of early-stage equity investing, which we present in the following two chapters. In particular, we focused on investigating how investors deal with combinations of signals (about the entrepreneur or/and the business opportunity). In doing so, we have drawn on cognitive theories, which, as suggested, are necessary to circumvent the main limitations of signaling theory and provide a more nuanced understanding of early-stage equity investors' decision-making. That being said, there are numerous opportunities for further research identified in this review that remain to other researchers to explore.

3 DETERMINANTS OF EARLY-STAGE EQUITY INVESTOR DECISION-MAKING: A CONJOINT ANALYSIS

3.1 Introduction

The ability to obtain equity financing in the early stages of innovative new ventures is crucial for realizing their performance potential (Ber & Yafeh, 2007; Engel & Keilbach, 2007). The existing literature has extensively investigated factors that increase the probability of obtaining early-stage equity investment by examining investors' decision criteria (for a review, see Ferrati and Muffatto (2021)). These criteria can be broadly categorized as relating to the strength of the entrepreneur or entrepreneurial team and relating to the strength of the business opportunity (represented by the combination of market and venture characteristics) (Kaplan & Strömberg, 2004; Mitteness, Baucus, et al., 2012). Although the debate over which of the two factors is more important is ongoing (Harrison & Mason, 2017; Kaplan et al., 2009; Mitteness, Baucus, et al., 2012), recent evidence suggests that early-stage equity investors are more likely to invest in weak business opportunities presented by entrepreneurs who are perceived favorably than in strong business opportunities proposed by entrepreneurs who are perceived unfavorably (Huang & Pearce, 2015). Moreover, the investment opportunities that are formally rejected due to market or venture characteristics are almost always presented by entrepreneurial teams who are inexperienced and therefore possibly (perceived as) lacking entrepreneurial competence (Carpentier & Suret, 2015).

Entrepreneur characteristics are the main consideration of early-stage equity investors also because little reliable information is available about the venture at this stage (Huang & Pearce, 2015; Plummer et al., 2016) and it is difficult to predict market response (Kollmann & Kuckertz, 2010). Therefore, entrepreneur characteristics are frequently considered to be indicative of the strength of a business opportunity (Kaplan et al., 2009). Indeed, research has shown that experienced investors' assessments of the entrepreneur are predictive of venture success (Bernstein et al., 2017; Huang & Pearce, 2015). Experienced early-stage investors pay more attention to various entrepreneur characteristics compared to less experienced investors (Bernstein et al., 2017). They use this information to make sense of how entrepreneurs will interact with stakeholders and whether they can deliver on the venture's potential (Warnick et al., 2018).

Despite the importance of investors' perceptions of entrepreneurs for investor decision-making, research has not advanced much beyond trying to determine which entrepreneur characteristics investors look for and which are predictive of obtaining early-stage financing. Ferrati and Muffatto (2021) reported 71 different decision criteria related to the entrepreneur or

entrepreneurial team that investors use when evaluating investment opportunities (by far the largest and most diverse cluster of early-stage investor decision criteria identified in their review). Some authors (Maxwell et al., 2011) have even argued that most entrepreneur attributes are too challenging to determine or rank in importance to be robust enough for inclusion in scientific research. As there has been limited theorizing on how investors determine "entrepreneur strength" in investment decision-making, research on investment criteria pertaining to the entrepreneur has been fragmented and there is limited understanding of how investors evaluate entrepreneurs.

In this chapter, we seek to advance the understanding of venture capitalist and angel investor decision-making by building on social-psychological insights into social evaluation (Abele et al., 2021; Abele & Wojciszke, 2007, 2014). Given that entrepreneurs' ability to obtain investment depends significantly on investors' social perceptions and evaluations (Mason et al., 2017), research on social evaluation may help us better understand why some entrepreneurs obtain funding and others do not. This stream of literature suggests that two major dimensions (the "big two") underlie judgments about self, others, social groups, nations, cultures, and more (Abele & Wojciszke, 2013). We argue that the primary dimension on which early-stage equity investors judge entrepreneurs is competence, while the secondary dimension is cooperativeness. Using a conjoint experiment, we test the proposition that these two dimensions are used together to inform investors' evaluation of the entrepreneur. Furthermore, we test the suggestion that competence and cooperativeness can be signaled in different ways, implying that entrepreneurs can compensate for potential weaknesses and successfully manage investors' perception through careful signaling. Finally, we consider the differences between types of investors and their individual differences in their involvement in value-adding behavior. We recognize that many early-stage equity investors make non-financial contributions in addition to financial ones (De Clercq & Manigart, 2007a) and that the extent of their expected involvement in portfolio companies may explain differences in the selection criteria they use (Knockaert & Vanacker, 2013). Since heavy involvement also implies frequent interactions with entrepreneurs, we expect that the level of involvement partially explains the importance of competence and cooperativeness for investors.

To our knowledge, this is the first study on early-stage equity investment that builds on the well-established body of knowledge on social perception and judgment. As investors' decisions depend on evaluative interpretations of their perceptions (Connelly et al., 2011), understanding the content dimensions that underlie these social judgments is important from a theoretical and practical standpoint. We explicitly consider the complementary and compensatory effects of different attributes that reflect the two underlying content dimensions, contributing to the emerging literature on the interaction effects of different attributes (Cardon et al., 2017; Plummer

et al., 2016). We also take into account investor heterogeneity in decision-making, contributing to the growing stream of literature on individual differences among investors (Mitteness, Sudek, et al., 2012; Murnieks et al., 2011).

3.2 Theoretical background and hypothesis development

3.2.1 Competence and cooperation in evaluation of early-stage entrepreneurs

People's life outcomes are strongly influenced by other people's impressions and evaluations of them (Leary, Jongman-Sereno, & Diebels, 2015). Social-psychological research has accumulated strong evidence that social perceptions are organized around two fundamental content dimensions (the "big two"): agency (competence) and communion (cooperation) (Abele & Wojciszke, 2007; Dubois & Beauvois, 2005; Fiske, Cuddy, & Glick, 2007; Judd, James-Hawkins, Yzerbyt, & Kashima, 2005). This idea was first introduced to psychology by Bakan (1966), who described agency as the "urge to master" and communion as "non-contractual cooperation" (pp. 14–15). Cuddy, Fiske and Glick (2008) explained why these two content dimensions form the basis of social perception, arguing that it is vital for one's survival to recognize the intentions of others and their ability to pursue these intentions. High communion reflects prosocial, cooperative intentions, while high agency represents the ability to bring about desired events (for an overview of the Dual perspective model see Table 9). However, the entrepreneurial financing literature has yet to explore the role of entrepreneurs' perceived agency (competence) and communion (cooperation) in investor decision-making.

In the early stages of new ventures, when products are not yet proven and markets not yet developed (Cassar, 2004; De Clercq et al., 2006; Plummer et al., 2016) and when entrepreneurs are expected to pivot (Gilbert et al., 2006; McDonald & Gao, 2019), equity investors must rely mostly on their evaluative perceptions of the entrepreneur or entrepreneurial team (Huang & Pearce, 2015). Since competence and cooperativeness are latent constructs, social judgements about the level and quality of these two dimensions are derived from clusters of actions, achievements and attitudes individuals display.

The behaviors and characteristics that are adaptive for "getting ahead" are associated with the dimension of competence. In entrepreneurial setting competence refers to the ability of recognizing and exploiting entrepreneurial opportunities (Lans, Hulsink, Baert, & Mulder, 2008; Lans, Verstegen, & Mulder, 2011). This ability is not only determined by knowledge and skills, but also personality and motivation (Baum & Locke, 2004; Reis, Fleury, & Carvalho, 2020).

Table 9: Dual perspective model of social judgement and behavior

Idea in brief	The dual perspective model (DPM; (Abele & Wojciszke, 2014)) explains how people from perceptions of themselves and others. It draws on 60 years of social-psychological research suggesting that there are two big dimensions underlying social perception and judgement: agency and communion. A social judgement is a result of interaction of perceived agency and communion.
Dimensions	Communion (warmth, non-contractual cooperation, intimacy, femininity), agency (competence, dominance, power, masculinity)
Communion	Communion refers to characteristics that inform the perceiver of the benevolent or malevolent intentions of the other. Communal characteristics are therefore primarily beneficial to other people.
Agency	Agency refers to characteristics that provide information about one's ability to effectively pursue his or her goals. Agency characteristics are primarily beneficial to people who possess them.
Hypotheses	1. Humans are evolutionarily wired to detect social threats, therefore they process information about communion more efficiently then information on agency; 2. Perceivers focus more on communion than they do on agency when evaluating others; 3. Individuals focus more on agency than communion when evaluating themselves; 4. The power of the perceiver and the interdependence between perceiver and actor moderate the relative importance of agency and communion.
Unit of analysis	Perception of self and others; valued traits in self and others.

Entrepreneurship research has discussed a range of attributes investors believe an entrepreneur needs to possess to successfully develop and grow a business. Notably, these include industry experience (Becker-Blease & Sohl, 2015; Franke, Gruber, Harhoff, & Henkel, 2008; Hoenig & Henkel, 2015), entrepreneurial experience (Hsu, 2007; Zhang, 2011), managerial experience (Polzin et al., 2018), attained education (Becker-Blease & Sohl, 2015; Bernstein et al., 2017; Hsu, 2007) and entrepreneur's track record of accomplishments (Ebbers & Wijnberg, 2012; Hallen & Eisenhardt, 2012). In addition investors also pay attention to personal characteristics such as commitment (Cardon et al., 2017; Hsu et al., 2014) and preparedness (Ciuchta et al., 2018; Lu,

2018) when making decisions. These characteristics are believed to attest to the likelihood that an entrepreneur will be able to advance the venture through competent entrepreneurial behavior (Huang & Knight, 2017) and thus represent one of the main concerns of early-stage equity investors (Erikson, 2002).

> *Hypothesis 1*. Early-stage equity investors' likelihood of investment is positively related to their perceptions of the entrepreneur's competence.

The behaviors and traits that investors believe are adaptive for "getting along" are associated with the dimension of cooperativeness. As the interests of entrepreneurs and investors are not always aligned (Van Osnabrugge, 2000), investors are particularly attentive to any signals of barriers to cooperative relationship with an entrepreneur. Perceived untrustworthiness or opportunism are likely to lead to rejection of an investment proposal (Mason et al., 2017; Maxwell & Lévesque, 2014). The majority of early-stage equity investors provide non-financial in addition to financial resources (Large & Muegge, 2008). These investors are not only concerned about potential agency problems (moral hazard and adverse selection), but also to what extent will an entrepreneur be willing to take advantage of non-financial resources offered (Huang & Knight, 2017). Factors like investor linking the entrepreneur (Huang, 2018; Mason et al., 2017; Sudek, 2006), perceived similarity between investor and entrepreneur (Franke et al., 2006; Murnieks et al., 2011), entrepreneur's openness to feedback (Ciuchta et al., 2018), and the entrepreneur's expressed fondness for an investor (Nagy et al., 2012; Westphal & Stern, 2007) have been shown to increase likelihood of investment. These characteristics and behaviors influence the investor's confidence that the entrepreneur will likely go about advancing the venture by taking into account investor's interests and capitalizing on provided non-financial resources (Huang & Knight, 2017). Since relationships, especially in the early stages of a new venture, are a primary source of financial and non-financial resources (Jiang, Liu, Fey, & Jiang, 2018; Zhang, 2010), investors might be also interested in how the entrepreneur interacts with other stakeholders. Due to high resource constraints, lack of organizational legitimacy and high uncertainty, entrepreneurs need to rely on their interpersonal skills to leverage resources embedded in their personal and business network (Baron & Markman, 2000; Leung, Zhang, Wong, & Der Foo, 2006). Hence, the ability and willingness to establish and maintain mutually beneficial relationships with key stakeholders seems to be important for entrepreneurial success and is as such also recognized by early-stage equity investors (Hoenig & Henkel, 2015; Hsu et al., 2014).

> *Hypothesis 2*. Early-stage equity investors' likelihood of investment is positively related to their perceptions of the entrepreneur's cooperativeness.

3.2.2 Primacy of competence in evaluation of early-stage entrepreneurs

Researchers in the field of social psychology have proposed that perceptions of others are primarily guided by the communal dimension (Abele & Wojciszke, 2007). Considerable evidence supports this proposition (Abele & Bruckmüller, 2011; Cottrell, Neuberg, & Li, 2007; Wojciszke & Abele, 2008; Ybarra, Chan, & Park, 2001). Perceptions of another person's intentions as good or bad determine whether people seek or avoid interaction with that person (Peeters, 2002) and therefore precede evaluations of that person's competence (ability to realize intentions) (Fiske et al., 2007). However, when agency is crucial for the perceiver's goals, the primacy of communion over agency will be reduced if not reversed. In fact, researchers have found that individuals in positions of power or in situations of high interdependence value agency as much as or more than communion (Abele & Brack, 2013; Cislak, 2013; Wojciszke & Abele, 2008). Entrepreneur–investor relationships are built around business ambitions. Ultimately, investors' return on investment depends on the entrepreneur's ability to take advantage of the business opportunity (MacMillan et al., 1985). Entrepreneurial competence (i.e., the ability to identify and exploit business opportunities) is a key consideration for early-stage equity investors (Brush, Edelman, & Manolova, 2012; Landström, 1998). The majority of entrepreneur-level investment criteria (Ferrati & Muffatto, 2019; MacMillan et al., 1985; Sudek, 2006) fall under the broad dimension of competence (e.g., education, experience, expertise, track record, market knowledge, preparedness) and competence-enhancing personality traits (e.g., persistence, commitment, resilience), while the minority fall under the broad dimension of potential for cooperation (e.g., coachability, likability, trustworthiness). This suggests that investors are more sensitive to information about the entrepreneur's competence than to information about the entrepreneur's cooperativeness. MacMillan et al. (1985) found high agreement among venture capitalists in terms of the importance of the entrepreneur's ability to take advantage of the opportunity at hand, with most being much less concerned about whether the entrepreneur has a compatible personality. Lu (2018) and Cardon et al. (2017) found that investors do appreciate displays of positive emotions, but are only willing to consider the investment when these are combined with signals of competence. Lack of entrepreneurial competence and lack of management knowledge were cited as criteria for rejecting investment opportunities (Feeney, Haines Jr, & Riding, 1999; Mason et al., 2017). This is even more pronounced in knowledge-intensive industries, such as biotechnology, where there is a high risk of product failure (Baeyens, Vanacker, & Manigart, 2006; Gompers, Gornall, Kaplan, & Strebulaev, 2020). This suggests the primacy of competence in investors' judgments of entrepreneurs who are seeking early-stage funding. The primacy of competence does not invalidate the importance of cooperation. Due to long-term relationships with entrepreneurs, investors attach great importance to their personal rapport with the entrepreneur and the potential for long-term cooperation (Huang, 2018; Mason et al., 2017;

Polzin et al., 2018). However, due to the nature of the relationship, which is characterized by the investor's high dependence on the entrepreneur's abilities to exploit the business opportunity, we suggest that the entrepreneur's competence is of primary importance to early-stage equity investors, while cooperation is of secondary importance.

> *Hypothesis 3.* Early-stage equity investors place greater importance on the perceptions of an entrepreneur's competence than on perceptions of the entrepreneur's cooperativeness.

3.2.3 Complementary nature of competence and cooperativeness

Negative social evaluations of others are clearly associated with both perceived low communion and low agency (Imhoff & Koch, 2017; Wojciszke, Bazinska, & Jaworski, 1998). It has been argued that communion and agency need to be integrated in order to mitigate the negative effects and enhance the positive effects of both (Frimer, Walker, Dunlop, Lee, & Riches, 2011). Psychological research suggests that communal information (perceived cooperativeness) influences the valence of impression, while agentic information (perceived competence) influences the intensity of (positive or negative) impression (Wojciszke et al., 1998). Therefore, at least moderate levels of both agency and communion are desired in others. Importantly, very high levels of agency combined with very low levels of communion elicit the most negative social expectations, as these individuals are perceived as being capable of and inclined to engage in harmful behavior (Radkiewicz, Skarżyńska, & Hamer, 2013). This indicates that although agency and communion consistently emerge as two distinct dimensions bearing different information about an individual (Abele et al., 2021; Abele et al., 2016), they are used together in making social judgements about people. They do not simply complement each other by providing different relevant information, therefore a more complete set of information for decision-makers (attribute-based complementarity; Steigenberger and Wilhelm (2018)), but each dimension shapes interpretation of the other dimension (elaboration-based complementarity; Steigenberger and Wilhelm (2018)).

In the early-stage equity investment context, entrepreneurs' lack of cooperativeness is directly related to agency risk (entrepreneurs' opportunistic behavior at the expense of the investor; Fiet (1995)), while lack of competence increases execution risk (i.e., the inability to realize business opportunity; Carpentier and Suret (2015)). Both the perceived lack of competence and poor potential for cooperation (i.e., due to inflexibility or lack of personal rapport) have been separately identified as reasons why investors did not back up early-stage entrepreneurs (Mason et al., 2017). This suggests that entrepreneurs need to demonstrate above-threshold levels of both competence and cooperativeness to be attractive to investors. Different combinations of the two dimensions may also lend themselves to different interpretations. For example, investors might perceive

entrepreneurs who appear highly cooperative but not very competent as potentially overly dependent. On the other side, entrepreneurs with low cooperativeness and high competence might be perceived as too arrogant and difficult to control and manage. It is therefore to be expected that investors will not only pay attention to both dimensions separately, but also require a balanced combination of cooperativeness and competence in entrepreneurs.

> *Hypothesis 4.* Early-stage equity investors' likelihood of investment is higher when they perceive the entrepreneur as both competent and cooperative.

3.2.4 Compensatory effect of different demonstrations of competence and cooperativeness

Evaluations of the two dimensions can be inferred from multiple different actions, achievements and attitudes that correspond to each dimension (Abele & Wojciszke, 2014). Overall entrepreneurship research indicates that investors rely on multitudinous bits of information to judge a new venture's investment potential (Cox et al., 2017; Huang & Pearce, 2015). As multiple pieces of information for each dimension are usually available to early stage equity investors, it is particularly important to understand how investors respond to available information when they point to the same or opposite direction (Drover et al., 2018). Certainly, the complementary versus compensatory role of the different information entrepreneurs use to communicate the strength of the investment opportunity is one of the most interesting questions in the entrepreneurship financing literature (Colombo, 2021) because of its importance for understanding how resource-constrained entrepreneurs can increase the investment potential of their ventures. However, studies on the interaction effects of different information pertaining to the same content dimension have been very limited.

The literature on social perception and judgment gives no clear guidance on how information about the same content dimension might interact, if at all. The reason for suggesting that information about the same content dimension would reinforce each other is that more information about the dimension increases the perceiver's confidence in judging that dimension (elaboration-based complementarity), especially when the information is congruent (Drover et al., 2018; Paruchuri et al., 2021). On the other hand, multiple pieces of information that pertain to the same content dimension could be considered redundant, leading to one piece of information being perceived as superior and diminishing the value of other pieces of similar information (attribute-based substitution) (Bapna, 2019; Ozmel et al., 2013). Finally, different bits of information pertaining to the same dimension may not interact with each other but add to one another. This also suggests that the presence of a particular attribute could compensate for the absence or low expression of another attribute belonging to the same dimension (attribute

compensation). Importantly, this effect is only to be expected in case of attributes of approximately similar importance to investor decision-making.

Preliminary evidence from the entrepreneurial finance literature suggests that investors respond positively to multiple signals that relate to the same content dimension. For example, Warnick et al. (2018) found that investors were more likely to invest in entrepreneurs who displayed both entrepreneurial and product passion, but the effect was additive and not interactive. They also found that investors similarly rated the funding potential of profiles with one but not the other form of passion, regardless of which passion was displayed. This suggests that one type of passion could compensate for another type of passion. In another study, Nagy et al. (2012) showed that entrepreneurs could successfully compensate for lacking credentials by engaging in impression management (e.g., self-promotion). Again, no interaction effect between entrepreneur's credentials and impression management was found. However, the researchers observed that impression management increased the perceived legitimacy of ventures only when entrepreneurs had low credentials, but had no such effect when the entrepreneurs had high credentials. These results were attributed to a diminishing marginal utility, in that, once a threshold level of perceived competence is reached, additional impression management has a very limited effect on investors decision-making.

Drawing on the available evidence, early-stage investors are more likely to invest when they are exposed to multiple positive signals about an entrepreneur's competence or cooperativeness. For example, investors are expected to be more likely to invest in entrepreneurs who have substantial industry experience and demonstrate their industry knowledge through market research. In comparison, investors are expected to be less likely to invest in entrepreneurs who prepared detailed market research but have no experience, or those who have experience but have conducted only cursory market research. The reason for this is that investors assume that entrepreneurs who have both experience and thorough market research are more competent than those who lack in one of these areas, and therefore offer a better investment opportunity. Assuming industry experience and market research bear similar weight in investor decision-making, these two pieces of information can be used interchangeably. Consequently, an entrepreneur who lacks in one of these two areas, can compensate for this shortcoming by demonstrating competence in the other.

> *Hypothesis 5.* Early-stage equity investors use different pieces of information interchangeably when they pertain to the same content dimension.

3.2.5 Investors' degree of invovlement

Investors are a diverse group (MacMillan, Kulow, & Khoylian, 1989; Sørheim & Landström, 2001). Although the literature habitually portrays early-stage investors as active, not all early-stage investors are active investors, willing to offer connections and mentorship, or participate in strategic decisions (Sørheim & Landström, 2001). Researchers have found that one in two angel investors is actually passive (Mitteness, Sudek, et al., 2012; Sørheim & Landström, 2001). On the other side of the spectrum, angel investors sometimes take on the role of co-founder or become part-time or full-time employees in the venture, working with the entrepreneur (or entrepreneurial team) on a daily basis (Festel & De Cleyn, 2013; Van Osnabrugge & Robinson, 2000). Significant differences in involvement have also been observed among venture capitalists, with one third of these investors undertaking a passive role (MacMillan et al., 1989). This speaks to the diversity of relationships between entrepreneurs and early-stage equity investors.

Early-stage investors who offer non-financial resources in addition to financial ones pay attention to entrepreneurs' potential to capitalize on non-financial resources (Huang & Knight, 2017). Previous research (Ciuchta et al., 2018) has shown that early-stage investors who actively engage in coaching entrepreneurs also place greater value on entrepreneurs' coachability compared to investors who do not engage in coaching their investees. Therefore, more heavily involved investors can be expected to place greater emphasis on the entrepreneur's cooperativeness. Gaps in competence can be bridged by providing mentorship and access to the investor's network or even the investor's own skillset (Colombo & Grilli, 2010). On the other hand, investors may have trouble convincing entrepreneurs who do not see value in their involvement to accept their active role in the company. By contrast, investors who are not interested in being actively involved in the new venture may base their investment decisions primarily on the entrepreneur's perceived competence (Knockaert & Vanacker, 2013), as they will rely on the entrepreneur to unearth the business opportunity and maximize the return on investment. Therefore, we suggest that early-stage equity investors who expect to be more involved in their portfolio ventures will pay more attention to the entrepreneur's cooperativeness, whereas investors who do not expect to be heavily involved in their portfolio ventures will place more emphasis on the entrepreneur's competence.

> *Hypothesis 6a.* Early-stage equity investors who are more actively involved in their portfolio ventures will be more likely to invest when they perceive the entrepreneur as cooperative.

> *Hypothesis 6b.* Early-stage equity investors who are less actively involved in their portfolio ventures will be more likely to invest when they perceive the entrepreneur as competent.

3.3 Methodology

3.3.1 Conjoint experiment

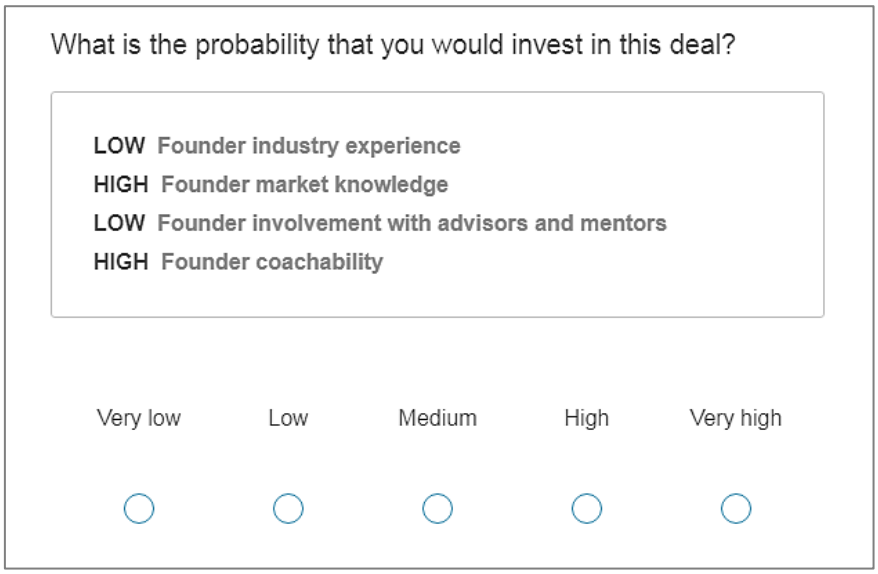
Although much previous research has relied on survey and interview data to identify investors' decision criteria (Ferrati & Muffatto, 2021), it is difficult for investors to isolate the investment criteria they use, rank them in order of importance, and identify relationships between those criteria (Zacharakis & Meyer, 1998). This can be attributed, at least in part, to the fact that investors use heuristics rather than a fully compensatory decision model in their investment decisions (Maxwell et al., 2011). Consequently, decision-makers are often inaccurate when describing their heuristics retrospectively (Keats, 1991). In this study, we avoid problems related to biases in recall and reporting (Morewedge, Gilbert, & Wilson, 2005) by studying investor decisions using a real-time method: conjoint experiment. Conjoint experiments have been shown to be appropriate for examining early-stage investors' decision policies, assessing the predictive validity of individual investment criteria, and exploring their dependence on individual demographics and psychographics (Riquelme & Rickards, 1992; Shepherd & Zacharakis, 2018).

In a conjoint experiment, respondents are asked to evaluate a set of profiles that differ systematically in the levels of predefined attributes. Based on evaluations of the different combinations of attributes, a researcher can statistically deduce attribute-level utility and importance, and predict the overall desirability of any profile of the selected attributes. Ecological validity is the most frequent concern regarding the usage of conjoint experiment because of the use of hypothetical profiles and absence of consequences for the decision-makers (respondents) in the research (Lohrke, Holloway, & Woolley, 2010). However, conjoint experiments have been shown to be ecologically valid when the profiles used are realistic (Green & Srinivasan, 1990). Therefore, researchers using conjoint experiment need to have a good understanding of the critical decision-making attributes.

In our study, we employed a full-profile conjoint analysis (also called conjoint value analysis). Our respondents were presented with one profile at a time (see Figure 1). Each profile included four two-level attributes (see Table 2). The decision to use the full-profile conjoint analysis was made after we interviewed ten investors (to validate attributes and their respective levels), who assured us that they assess investment opportunities individually and not comparatively. Because we were interested in interaction effects, we used a full factorial design. Therefore, the total number of distinct profiles was $2^4 = 16$. Including three randomly selected practice profiles, each respondent had to rate only 19 profiles using a 5-point Likert scale.

To minimize response error, we presented participants with attribute definitions, instructions and practice profiles. We also employed a generic reference scenario from Hoenig and Henkel (2015) to bring participants on common ground and to emphasize that the investment opportunities presented do not differ in anything other than the entrepreneurial profile. To offset the order biases in conjoint analysis (Chrzan, 1994), profile order and attribute order were randomized across respondents. In addition to completing the conjoint task, respondents completed a questionnaire that included questions about their demographics and career.

Figure 4: Profile example



3.3.2 Sample characteristics

Eighty-six venture capitalists and angel investors from 24 European countries (Austria, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Latvia, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, and United Kingdom) participated in our study. Previous studies (Murnieks et al., 2011; Warnick et al., 2018) found that this sample size is sufficient to obtain reliable decision data from early-stage equity investors and is in line with the recommendation of Shepherd and Zacharakis (1999). We contacted the potential respondents twice, two weeks apart, via email or LinkedIn. The first email included an invitation and a link to the online survey, and the second email included a thank you note and a reminder with a link to the online survey where they could participate in the research.

Table 10: Sample characteristics by investor type

	Angel investor	**Venture capitalist**	**Total**	**χ^2/t**
Age (*M*)	45.9 (9.8)	43.0 (11.2)	44.6 (10.5)	$t(82)=1.64$ $p=0.106$
Gender (%)				
Male	81.8	80.0	81.0	$\chi^2(1)=0.05$
Female	18.2	20.0	19.0	$p=0.832$
Education (%)				
High school	9.1	2.5	6.0	$\chi^2(3)=3.54$
Bachelor's	27.3	17.5	22.6	$p=0.316$
Master's	52.3	70.0	60.7	
Doctoral	11.4	10.0	10.7	
Investment experience (*M*)	7.6 (5.4)	8.7 (5.9)	8.1 (5.6)	$t(82)=-1.15$ $p=0.253$
Stage (%)				
Seed	45.5	32.5	39.3	$\chi^2(2)=1.82$
Start-up/Early	47.7	51.2	51.2	$p=0.402$
Expansion	6.8	12.5	9.5	
# of current investments (*f*)	8.7 (8.6)	26.7 (27.4)	17.3 (21.7)	$t(82)=-4.14$ $p<0.001$
# of industries covered (*f*)	2.4 (1.2)	2.1 (1.5)	2.2 (1.4)	$t(82)=1.80$ $p=0.077$

Out of 86 investors who participated, 84 completed all 16 tasks in the conjoint experiment with minimum reliability of $R^2>0.60$ and were included in further analyses. This resulted in a final sample size of 1,344 decisions. Of the participants, 44 (52.4%) were angel investors and 40 (47.6%) were venture capitalists. Sixty-three (75.0%) respondents had made their last investment within the previous six months. The respondents' investment experience ranged from 2 years to 24 years, with the mean being 8.1 years (SD=5.6). Most of our respondents invested predominantly in seed (39.3%) or early-stage (51.2%); only 9.5% invested in the expansion stage. Sixty-eight (81.0%) were male and the average respondent's age was 44.5 years (min=24 years, max=65 years, SD = 10.5). Most had attained a master's degree (61.7%), followed by bachelor's (21.6%) and doctoral degree (10.7%). The majority had attained a degree in social sciences, business, or law (63.1%), followed by engineering, manufacturing, or construction (29.8%), natural sciences (8.3%), and health and medicine (7.1%). Demographics by investor type are presented in Table 10.

3.3.3 Measures

Dependent variable. To measure the probability of investing in a presented opportunity based on the lead entrepreneur's characteristics, investors were asked "What is the probability that you would invest in this deal?" The response was measured on a 5-point Likert scale, ranging from "Very low" (corresponding to a value of 1) to "Very high" (corresponding to a value of 5).

Table 11: Attributes with definitions of low and high levels

Attribute	**Low**	**High**
Industry experience	Entrepreneur has no industry experience.	Entrepreneur has 5 years of industry experience.
Market knowledge	Entrepreneur has presented incomplete market research.	Entrepreneur has prepared thorough market research.
Involvement with advisors and mentors	Entrepreneur is not currently working with an advisor or mentor on the venture.	Entrepreneur is currently working with an advisor or mentor on the venture.
Coachability	The entrepreneur is sometimes receptive to the investors' feedback, but does not seek it.	The entrepreneur actively seeks the investors' feedback and takes it carefully into account.

Decision attributes. Independent variables in our study were attributes that comprise the decision profiles used in this study. Two of the four decision attributes represented entrepreneur's competence and two entrepreneur's cooperativeness. Each of the four attributes had two levels, high or low, as presented in Table 2. The levels of attributes defined as "low" represented a baseline level of the attribute and not necessarily the absence of the attribute (as in case of coachability and market knowledge). The relevance of the chosen attributes has been demonstrated in several preceding studies and is elaborated in the following paragraphs. In addition, the attributes were pretested with five angel investors and five venture capitalists to ensure that the attributes were truly relevant, clearly described, and realistic. These investors were recruited from a separate interview-based study that we ran at the time. With these investors we pretested a set of conjoint tasks and asked the investors to think out loud when making decisions based on the profiles presented. Investors were encouraged to discuss what each attribute signaled to them and to comment on the entrepreneur's overall profile based on the set of presented attributes. This led to a gradual refinement of the attribute content and levels as described in our research.

The two attributes that correspond to a dimension of competence were industry experience and market knowledge. The experience of the entrepreneur (or entrepreneurial team) is considered to be the most important competence signal for investors (Bernstein et al., 2017; Mitchelmore & Rowley, 2010), especially if the venture's track record is not available (Ko & McKelvie, 2018). Industry experience suggests that an entrepreneur has industry-relevant insights, knowledge and networks that can be applied to develop the venture. In fact, entrepreneur's familiarity with the market plays a beneficial role in recognition and exploitation of opportunities (Cassar, 2014; Chatterji, 2009). This is of particular importance in early-stages of a new venture when product-market fit is yet unproven (Cassar, 2004; De Clercq et al., 2006; Plummer et al., 2016). Market knowledge and relevant connections can also be generated through thorough market research. Investors in particular pay attention to the degree of substance and realism in market projections (Feeney et al., 1999; Mason & Stark, 2004b). Well prepared entrepreneurs are perceived as more credible and better positioned to execute the business idea (Ciuchta et al., 2018; Lu, 2018). Previous studies have shown that preparedness and skillful presentation of findings significantly influence the decisions of early-stage equity investors (Clark, 2008; Singh, Kang, & Ramani, 2016). Therefore, industry experience and market knowledge appear to be relevant signals of an entrepreneur's competence in relation to the proposed investment opportunity.

The two attributes that correspond to a dimension of cooperativeness were coachability and founder's involvement with advisors and mentors. Coachability has been found to be attractive to early-stage equity investors (Ciuchta et al., 2018; Warnick et al., 2018), as these expressions indicate how the entrepreneur will interact with the investor going forward (Huang & Knight, 2017). In entrepreneur-investor relationship, coachable entrepreneurs seek investor feedback that can be used to improve venture's performance (Ciuchta et al., 2018). This display of openness to feedback in turn strengthens their relationships with investors, increasing their willingness to provide financial and non-financial resources (Ciuchta et al., 2018; Huang & Knight, 2017). Entrepreneur's eagerness to take into consideration advice is also demonstrated through involvement with formal or informal advisors (Sudek, 2006). These can significantly contribute to the new venture's readiness for funding and improve the experience of the negotiation phase (Lahti, 2014; Lehtonen & Lahti, 2009). Entrepreneur involved with advisors and mentors demonstrate readiness to seek and cultivate relationships that can endow them with information and resources needed to advance venture. Accordingly, coachability and involvement with advisors and mentors both signal that an entrepreneur is willing to form a relationship that is not only centered on transfer of financial resources but also voluntary information exchange and cooperation beyond formal contracts (Carson, Madhok, & Wu, 2006; Huang & Knight, 2017).

Moderating variable. Investors' involvement in the venture was measured by six items that describe investor value-adding activities (see Table 13). The comprehensive yet concise list of

value-adding activities was based on a review of the literature (Knockaert & Vanacker, 2013; Large & Muegge, 2008). On a scale ranging from "Never" (corresponding to a value of 1) to "Always" (corresponding to a value of 5), respondents indicated how frequently they performed the listed activities as an investor in a new venture. Items were moderately highly correlated (min r=0.43, max r=0.72) and one component structure was found to be appropriate (λ=3.88, R^2=0.65). The degree of investors' involvement in the new venture was indicated by a summated scale.

Control variables. Control variables were type of investor, as well as investor's age, gender, education level, investment experience in years and stage of investment.

3.3.4 Data analysis

We analyzed the data from the conjoint experiment using hierarchical linear modeling (HLM) (Hofmann, Griffin, & Gavin, 2000). Investor decisions (level 1) are nested within individual investors (level 2), who were either angel investors or venture capitalists. HLM is able to account for variance at the decision level (level 1 or within individuals) and at the individual level (level 2 or between individuals), therefore accounting for decision-making differences among investors. Individual attributes (such as age, gender, educational level, etc., including investor's involvement in a venture) were modeled as static, while within-individual manipulations could vary across individuals.

To enable the analysis, the results from the full-profile conjoint analysis were organized by conjoint task for each respondent. The attributes were dummy-coded, with 1 reflecting a high level of an attribute and 0 reflecting a low level of an attribute. Main-effect regression coefficients therefore represented the preference for a high level of an attribute, whereas interaction-effect regression coefficients represented the preference for high levels of two attributes simultaneously. Cross-level interactions were also inspected, representing the preference for a high level of the task attribute when the investor is highly involved in portfolio ventures. All regression predictor variables were centered prior to analysis. The full factorial conjoint design ensures zero correlation between the independent variables, so testing and reporting the main-effects and the full model is neither necessary nor appropriate (Hsu et al., 2014; Murnieks et al., 2011; Priem, 1994). Therefore, we report the full model with main and interaction effects together. In order to gain deeper insights into the potential compensatory effects of different attributes, we estimated marginal means for all first-level interactions between attributes and conducted post-hoc contrasts using Holm correction.

3.4 Results

Descriptive statistics and correlations among outcomes, predictors, and control variables are presented in Table 12. As expected, older investors were also more experienced (r=0.46, p<0.001). Investors who attained higher level of education were more involved in their portfolio companies (r=0.44, p<0.001), as were those with more investment experience (r=0.22, p=0.046). More experienced investors on average reported a lower probability of investment than less experienced investors (r=−0.05, p=0.048). Investors who invested in the later stages of a venture's lifecycle were less actively involved (r=−0.28, p=0.011). Investors who took the role of a lead investor more often, reported higher involvement in portfolio ventures (r=0.32, p=0.003). Venture capitalists in our sample more frequently undertook the role of a lead investor compared to angel investors (t(82)=−4.65, p<0.001), although both groups of investors reported that they make majority of investments as a part of a syndicate (t(82)=0.49, p=0.625). Venture capitalists were more involved than angel investors (t(82)=−3.74, p<0.001), and male investors were more involved than female investors in our sample (t(82)=2.09, p = 0.040). Almost all investors (95.2%) reported that they monitored a venture's performance, but few were actually involved in the day-to-day activities of their portfolio companies (13.3%), mostly taking on an advising and mentoring role. The descriptives for particular activities that reflect investors' active involvement in the venture are summarized in Table 13.

The mean internal consistency of respondents was R^2=0.83 (min=0.62, max=0.95), indicating that investors' evaluations of 16 conjoint profiles were consistent. The four attributes (experience, knowledge, advisors, and coachability) explained 84% of the variance (conditional R^2), which is consistent with the results reported in similar conjoint studies (Hsu et al., 2014; Murnieks et al., 2011). The intraclass correlation coefficient of 0.19, suggests the appropriateness of the HLM.

Table 15 shows the results of the HLM analysis of investor decisions. The main effects of all four attributes were positive and significant (p<0.001), indicating that the four attributes positively and importantly influenced investors' decisions and were the primary drivers of investment decisions captured by the dependent variable (likelihood of investment). Of the four attributes, industry experience had the highest impact on the investors' investment decision (b=1.17, p<0.001), followed closely by market knowledge (b=1.15, p<0.001), then coachability (b=1.05, p<0.001), and involvement with advisors and mentors (b=0.56, p<0.001). These regression weights reflect the relative importance of the attributes.

Table 12: Investor-level descriptive statistics and correlations (n = 84 investors)

	Variable	*M*	Min	Max	*SD*	1	2	3	4	5	6	7
1	Likelihood of investment	2.7	1.0	5.0	1.2							
2	Age	44.6	24.0	65.0	10.6	-0.03						
3	Gender (1 = female)	0.2	0.0	1.0	0.4	-0.01	-.16					
4	Education level	4.7	2.0	6.0	0.9	-0.01	.15	-.08				
5	Experience (years)	8.1	2.0	24.0	5.7	-0.06*	.46***	-.17	.27*			
6	Investor type (1 = VC)	0.5	0.0	1.0	0.5	-0.01	-.14	.02	.16	.10		
7	Investment stage	1.7	1.0	4.0	0.6	0.02	.05	.09	-.07	-.01	.15	
8	Level of involvement	21.5	6.0	30.0	5.6	0.00	.12	-.23*	.44***	.22*	.38***	-.28**

Table 13: Descriptive statistics for level of involvement

Item	*M*	*SD*	Never or rarely (%)	Often or always (%)
I am involved in strategy development.	3.79	1.13	14.3	66.7
I use my personal networks to open doors.	3.89	1.18	14.3	75.0
I am involved in hiring key employees.	2.86	1.18	38.1	27.4
I interface with investor groups to raise additional funds.	3.39	1.26	26.2	53.6
I provide moral support and encouragement to the investee.	3.95	1.09	10.7	75.0
I help the investee develop his/her business competences.	3.58	1.17	16.7	57.1

We found statistically significant differences in the scores of attribute importance, $\chi^2(3) = 87.19$, $p<0.001$. The post-hoc comparisons showed that involvement with advisors and mentors was significantly less important to the early-stage investors in our sample than the other attributes, while the other three attributes did not significantly differ in their importance to the early-stage investors (see Table 14). Given the combination of the selected four attributes, the importance of perceived competence (indicated by industry experience and market knowledge) was 59.1%, while the importance of perceived cooperativeness (as indicated by coachability and involvement with advisors and mentors) was 40.9%. These results suggest that competence (experience and knowledge) was the primary decision factor for the early-stage equity investors in our sample, while cooperativeness (coachability and involvement with advisors/mentors) was of secondary importance to the investors.

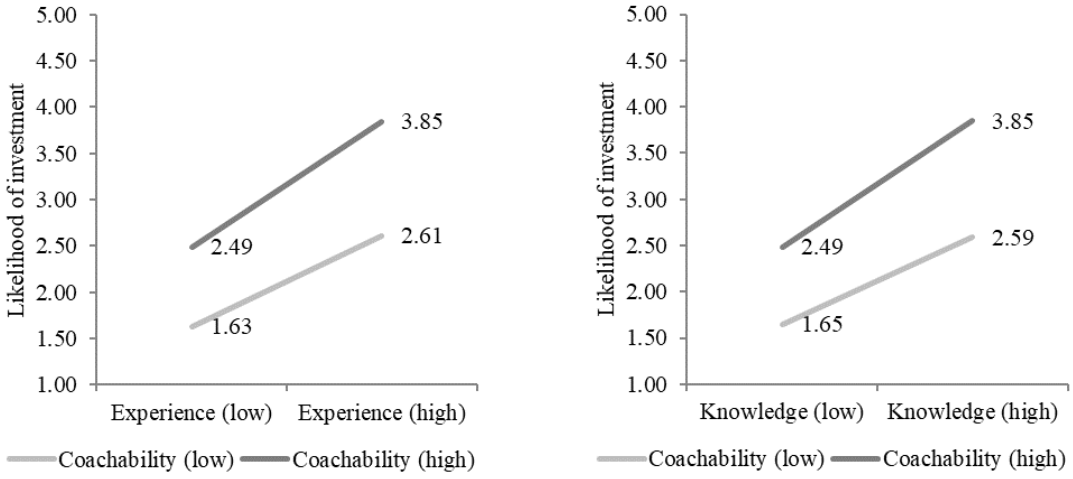
Table 14: Post-hoc comparisons of attribute importances

Attribute 1	Attribute 2	Difference in importance (*M*)	*t*	*df*	*p*	*Sig.*
Experience	Knowledge	1.06	0.60	83	0.552	
Experience	Advisors	15.47	9.08	83	< 0.001	***
Knowledge	Advisors	14.40	8.99	83	< 0.001	***
Experience	Coachability	4.05	1.82	83	0.072	†
Knowledge	Coachability	2.99	1.39	83	0.168	
Advisors	Coachability	-11.41	-7.99	83	< 0.001	***

For the more important of the two signals of cooperativeness – coachability – the analyses showed a clear positive interaction effect between the entrepreneur's industry experience and coachability (b=0.38, p<0.001) and market knowledge and coachability (b=0.43, p<0.001), indicating that investors are more likely to invest in entrepreneurs when they signal their coachability in addition to their competence. Interestingly, in post-hoc comparisons of the combinations of all levels of the selected attributes, we found that there was no difference in the reported likelihood of investment for the profiles that were high on experience and low on coachability, or for the profiles that were high on coachability and low on experience (t(82)=1.32, p_{Holm}=0.190). This finding repeated for the profiles that were high on knowledge and low on coachability, and those that were high on coachability and low on knowledge (t(82)=1.08, p_{Holm}=0.285). These results indicate not only that competence and cooperativeness, as indicated by coachability, are complements, but also that a lower level of experience or knowledge can be compensated for by a high level of coachability. On the other hand, we found no evidence for an interaction effect between industry experience or market knowledge and involvement with advisors and mentors (b=0.05, p=0.546 and b=0.018, p=0.869, respectively). This suggests that early-stage equity investors use these attributes separately rather than together when making investment decisions.

Furthermore, we found that the interaction effect between industry experience and market knowledge was positive and significant (b=0.12, p=0.025), indicating that industry experience has a stronger effect on the investment probability of early-stage investors when combined with signals of high market knowledge. At the same time, the two attributes reflecting competence can be used to compensate for each other, as investors did not differ in their investment probability when confronted with profiles characterized by high industry experience and low market knowledge or by high market knowledge and low industry experience (t(82)=0.33, p_{Holm}=0.75). This finding suggests that inexperienced entrepreneurs can compensate for their inexperience by demonstrating high market knowledge. No complementary or compensatory effects were found for coachability and involvement of advisors and mentors (b=−0.02, p=0.701).

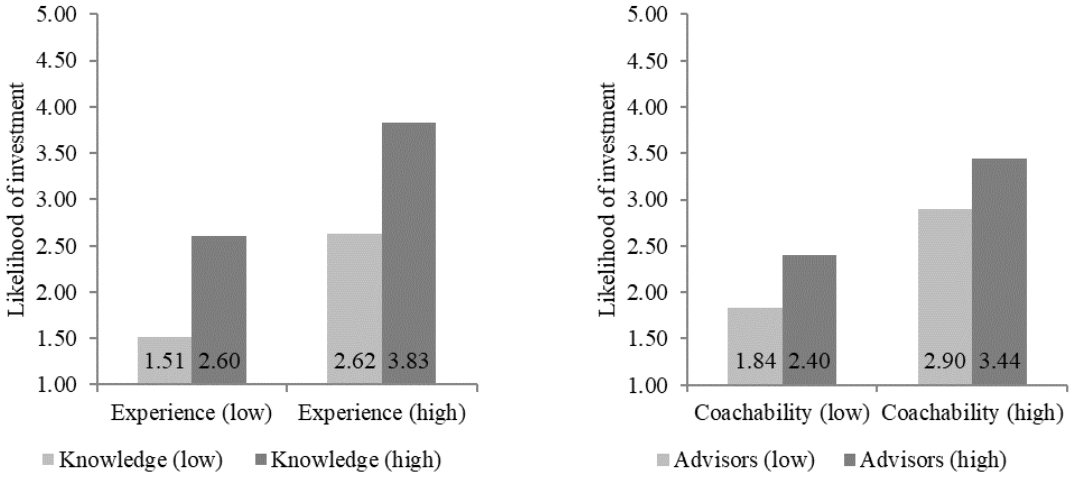
Figure 5: Interaction effects between signals of competence and coachability



a. Experience ✻ Coachability

b. Knowledge ✻ Coachability

Figure 6: *Interaction effects between signals of competence and signals of cooperativeness*



a. Experience ✻ Knowledge

b. Coachability ✻ Advisors

Finally, we expected that more involved investors would place greater emphasis on the entrepreneur's cooperativeness and less emphasis on the entrepreneur's competence compared to less involved investors. We found no evidence that more involved investors placed less importance on industry experience (b=0.01, p=0.436) or market knowledge (b=−0.01, p=0.470) compared to less involved investors. Furthermore, although the coefficient for the interaction effect between investor's level of involvement and entrepreneur's coachability was positive, it was just marginally significant (b=0.02, p=0.084), and not significant for the interaction effect between investor's

level of involvement and entrepreneur's involvement with advisors and mentors (b=−0.01, p=0.372). This indicates that investors with different levels of involvement assign similar weights to signals of competence and cooperativeness; however, those who are more involved may favor coachability slightly more.

Table 15: Hierarchical linear model of investors' likelihood to invest (n = 1,344 decisions)

	b	***SE***	***t***	***p***	***Sig.***
Intercept	2.66	0.04	90.82	<0.001	***
Investor characteristics					
Age	0.00	0.00	-0.67	0.508	
Gender	-0.06	0.08	-0.83	0.411	
Education level	0.01	0.04	0.24	0.810	
Investment experience	-0.01	0.01	-1.84	0.070	†
Investor type	-0.07	0.07	-1.03	0.306	
Investment stage	0.07	0.05	1.35	0.182	
Level of involvement	0.01	0.01	0.76	0.448	
Task (entrepreneur) attributes					
Industry experience	1.17	0.05	22.53	<0.001	***
Market knowledge	1.15	0.06	20.84	<0.001	***
Involvement with advisors	0.56	0.04	15.70	<0.001	***
Coachability	1.05	0.06	17.19	<0.001	***
Level 1 interaction effects					
Experience ✻ Knowledge	0.12	0.05	2.25	0.025	*
Experience ✻ Advisors	0.03	0.05	0.60	0.546	
Knowledge ✻ Advisors	0.01	0.05	0.16	0.869	
Experience ✻ Coachability	0.38	0.05	6.97	<.001	***
Knowledge ✻ Coachability	0.43	0.05	7.85	<.001	***
Advisors ✻ Coachability	-0.02	0.05	-0.38	0.701	
Level 2 interaction effects					
Experience ✻ Level of involvement	0.01	0.01	0.78	0.436	
Knowledge ✻ Level of involvement	-0.01	0.01	-0.73	0.470	
Advisors ✻ Level of involvement	-0.01	0.01	-0.90	0.372	
Coachability ✻ Level of involvement	0.02	0.01	1.75	0.084	†

Note. Level-1 variables were group mean-centered; level-2 variables were grand-mean centered.

Although not hypothesized, we also explored cross-level interaction with one of the control variables: investor type. It has been previously suggested that angel investors may have a slightly different investment policy compared to venture capitalists (Fiet, 1995; Hsu et al., 2014). Angel

investors placed more importance on advisors compared to venture capitalists (b=−0.16, p=0.024). The results also indicated that venture capitalists may place slightly more weight on experience compared to angel investors (b=0.18, p=0.082), indicating that different types of investors do have slightly different investment policies.

In addition, we tested for potential between country differences in investor decision-making that could be due to cultural differences. It has been suggested that individualism, uncertainty avoidance, and power distance significantly influence entrepreneurial activity (Hayton, George, & Zahra, 2002; Krueger, Linan, & Nabi, 2017). We classified European countries into four clusters based on the level of the above mentioned cultural dimensions[1] to perform a MANOVA. We found no statistically significant difference between the four groups in terms of the importance investors placed on each entrepreneur-level attribute or the level of investor post-investment involvement (V=0.212, F(15, 234)=1.19, p=0.281).

To further explore any differences that might arise from differences between countries, we classified investors into four groups according to the development level of financial markets following Farkas (2011) and the characteristics of the legal environment following Farkas (2019). Financial market development and legal environment have been shown to influence early-stage investment activities across countries (Lerner & Tåg, 2013). Again, we found no statistically significant difference in the importance investors attach to each entrepreneur-level attribute or the level of investor involvement between the four groups of countries based on the development of the financial market (V=0.260, F(15, 234)=1.48, p=0.114) or the characteristics of the legal environment (V=0.220, F(15, 234)=1.24, p=0.246).

3.5 Discussion

In this research, we leveraged social-psychological insights into social perception and evaluation (Abele et al., 2021; Abele & Wojciszke, 2007, 2014) as the basis for developing hypotheses about how angel investors and venture capitalists evaluate the strength of the entrepreneur or entrepreneurial team, which has been shown to be a crucial consideration of early-stage equity investors (Bernstein et al., 2017; Huang & Pearce, 2015). Forty-four European angel investors and 40 European venture capitalists participated in our conjoint experiment, which we analyzed using HLM to account for the nested structure of the data.

[1] The four clusters that emerged were: Culster 1 (high IND, low UA, low PD) with Denmark, Norway, Sweden, United Kingdom, and Austria; Culster 2 (high IND, high UA, high PD) with France, Czech Republic, Poland, Spain, Hungary and Italy; Culster 3 (high IND, high UA, low PD) with Finland, Germany, Netherlands, Switzerland, Latvia and Estonia; Cluster 4 (low IND, high UA, low PD) with Portugal, Cyprus, Croatia, Slovenia, Slovakia, Romania and Bulgaria.

The results showed that signals of competence (industry experience and market knowledge) accounted for almost 60% of the investors' final decision, while signals of cooperativeness (coachability and involvement with advisors and mentors) accounted for the rest. These results provide preliminary evidence for the hypothesis that early-stage equity investors prioritize an entrepreneur's competence over cooperativeness. This finding was expected due to the highly interdependent nature of the relationship between investors and entrepreneurs. In situations of high mutual dependence, people's concerns about the other party's level of competence increase (Abele & Brack, 2013). In this particular case, the results suggest that early-stage investors are more concerned about whether the entrepreneur will be able to pursue his or her business goals than about the closeness of their relationship. Nonetheless, as indicated in previous studies (Ciuchta et al., 2018; Sudek, 2006), signals of the entrepreneur's cooperativeness, especially coachability, are important to investors. One attribute related to cooperativeness (involvement of advisors and mentors) exerted notably less influence on early-stage investors' decision-making than the others. Although the entrepreneur's involvement with advisors and mentors is indicative of his or her openness to advice, it does not necessarily reflect the entrepreneur's attitude toward a specific investor's feedback. People are generally more concerned about others' intentions toward themselves than toward others (Abele et al., 2021; Cuddy et al., 2008), especially when dealing with competent individuals (Wojciszke et al., 1998). This dynamic offers an explanation as to why investors prefer the combination of competence and coachability in entrepreneurs compared to competence and involvement with external advisors and mentors.

As hypothesized, we found that investors considered the entrepreneur's competence and coachability together and were more likely to invest in entrepreneurs they perceived as both competent and coachable. This is possibly because this combination indicates that the entrepreneur is both able and willing to capitalize on the provided (financial and non-financial) resources (Allen, 2004) and more responsive to the relational governance mechanisms investors use to curb the entrepreneur's opportunism (Carson et al., 2006). Although entrepreneurs who are perceived as both highly competent and coachable have an advantage in obtaining early-stage financing, our results revealed also that entrepreneurs can compensate for their lack of industry experience or market knowledge by presenting themselves as coachable, possibly because early-stage investors expect coachable entrepreneurs to be able to close this perceived competence gap by carefully considering and acting on the feedback they receive. This suggests that in entrepreneurship "getting along" might be essential for "getting ahead".

Not surprisingly, more positive attributes pertaining to the same content dimension, increase likelihood of investment. However, the results regarding interplay of attributes pertaining to the same content revealed a more complex picture. While our results showed that entrepreneurs could compensate for the lack of experience by demonstrating thorough market knowledge, this

compensatory effect was not found in the case of cooperativeness. This likely reflects high difference in importance and lower content similarity between coachability and involvement with advisors and mentors. While it is not surprising that inferior (less important) attribute cannot compensate for the superior attribute (Bapna, 2019), these results could also imply that due to the variability in content of attributes pertaining to the same overarching dimension a more nuanced theorizing is required.

Finally, the results showed that those who were more involved had a slight preference for coachable entrepreneurs, a finding consistent with that of Ciuchta et al. (2018). However, we found no difference in the importance of the entrepreneur's competence for investors with different levels of involvement, suggesting that there is high agreement across different investors about the importance of an entrepreneur's competence; the preference for coachability, meanwhile, is more dependent on individual investor characteristics (MacMillan et al., 1985).

Although not formally hypothesized, we expected that angel investors would place more importance on attributes associated with dimension of cooperativeness. The reason being that angel investors are typically portrayed as more involved in portfolio ventures compared to venture capitalists (Morrissette, 2007). This is attributed to non-financial motivations of angel investors (Huang & Knight, 2017; Morrissette, 2007) and a greater reliance on relational governance (Mason & Stark, 2004b). However, in our sample, venture capitalists reported, on average, higher post-investment involvement compared to angel investors. This may be due in part to the finding that more venture capitalists than angel investors in our sample undertake the role of lead investor, while both groups of investors are equally likely to syndicate investments. In particular, the increasing syndication of angel investors has transformed the angel investment market in a way that in many ways resembles venture capital (Mason, Botelho, & Harrison, 2013; Mason et al., 2016). These developments have increased deal flow and improved the due diligence process, while reducing the involvement required of many angel investors in the investment and post-investment phase (Mason & Botelho, 2014). We did find that angel investors placed slightly more importance on entrepreneur's current involvement with advisors compared to venture capitalists but no difference was observed in the importance placed on entrepreneur's coachability. Compared to venture capitalists, angel investors have been previously shown to place more importance on entrepreneur's network relevant for venture development (Hsu et al., 2014). Although involvement with advisors and mentors indicates that an entrepreneur actively seeks advice, which is a signal of cooperativeness, advisors are also an important source of legitimacy for a new venture (Becker-Blease & Sohl, 2015). So, on one hand, this result can be seen as angel investors placing more importance on different signals of cooperativeness, while on the other hand, it could indicate greater reliance on signals of new venture legitimacy in face of more limited

due diligence and less sophisticated contract arrangements between them and entrepreneurs (Hsu et al., 2014).

Another interesting finding emerges from our post hoc inspection of the differences between countries. European countries are diverse both culturally (House, Hanges, Javidan, Dorfman, & Gupta, 2004) and in terms of institutional conditions (Farkas, 2011, 2019). Researchers that study the cultural impact on entrepreneurship typically argue that cultural values shape institutions and individuals and therefore impact level and type of entrepreneurial activity in a particular nation, including conditions for high growth potential entrepreneurship (Hayton et al., 2002). However, we did not find differences between clusters of countries differing in Hofstede's cultural dimensions or financial or legal environment. This suggests that investors from different European countries to a large extent share the same investment policy in regards to what they seek in entrepreneurs. This is in alignment with findings that the big two dimensions are used to assess others in a comparable ways across cultures (Abele et al., 2016). Alternatively, these results could be attributed to shared values, beliefs and investment practices across different nations. For example, entrepreneurship researchers report that entrepreneurs across culturally diverse countries share a universal culture of entrepreneurship (Mitchell et al., 2002). The values they hold often deviate from predominant values in a particular national culture (Hofstede et al., 2004; Jaén, Moriano, & Liñán, 2013). The same could indeed hold for early-stage equity investors, many of whom have entrepreneurial experience themselves (Franke et al., 2006; Morrissette, 2007). Moreover, early-stage equity investors are also known for their large international networks (Drover, Busenitz, et al., 2017) and most of them make investments in syndicates (Jääskeläinen, 2012; Mason et al., 2019), which could all contribute to a high degree of shared values and beliefs among early-stage equity investors.

3.5.1 Implications for theory and practice

Early-stage equity investors' perceptions are critical to understanding why some entrepreneurs receive funding whereas others do not (Connelly et al., 2011). Several studies to date investigated how entrepreneurs can increase the likelihood of investment using a range of impression management tactics. The studies that draw on impression management literature greatly contributed to our understanding how self-promotion, exemplification, flattery (Nagy et al., 2012; Parhankangas & Ehrlich, 2014), exaggeration (Cottle & Anderson, 2020) and skillful use of emotions during pitches (Chen, Yao, & Kotha, 2009) can influence investor's evaluations of entrepreneurs. In this study, we focused particularly on investor's evaluative perceptions. We integrated the existing empirical evidence on angel investor and venture capitalist decision-making with well-established models of social judgment and evaluation from social psychology (Abele et

al., 2021). We established competence and cooperativeness as two separate, overarching dimensions that early-stage equity investors consider in their decisions, and tested several hypotheses about the effects of the relationship between the two on early-stage investors' likelihood of investing. While previous studies on investor decision-making have come up with a long list of entrepreneur-related investment criteria (Ferrati & Muffatto, 2021), we suggest that early-stage investors' evaluative judgements of entrepreneurs can be explained with two factors that have been shown to underlay social perception and judgment (Abele et al., 2021), thereby substantially reducing the number of factors needed to explain investor's decisions.

We also considered the complementary and compensatory effects of the different attributes. We believe that this is an important step in the evolution of the literature on investor decision-making. To date most studies examined the importance of attributes in decision-making in isolation (Colombo, 2021). However, the evidence suggests that early-stage equity investors integrate different information (Chen et al., 2009; Plummer et al., 2016; Warnick et al., 2018) to make holistic judgments about the entrepreneurs and proposed opportunities (Huang, 2018; Huang & Pearce, 2015). Instead of weighting all available information, investors rely on shortcuts (Harrison, Mason, & Smith, 2015a; Maxwell et al., 2011), which involve making aggregate assessments about factors of early-stage investor's interest (Jeffrey, Lévesque, & Maxwell, 2016). This opens key question about how early-stage equity investors combine information when assessing investment potential. Preceding studies that explored interaction effects in the context of early-stage equity investment focused on complementary effects, but found mixed results (Cardon et al., 2017; Nagy et al., 2012; Plummer et al., 2016; Warnick et al., 2018). We propose and provide preliminary evidence that attributes representing different content dimensions (competence or cooperativeness) are in essence complementary, while attributes falling under the same underlying dimension can take on a compensatory role. This opens up several avenues for further theorizing and empirical research on the complementary, substitutive, and compensatory nature of different attributes in early-stage investor decision-making.

We also contribute to the emerging stream of literature on entrepreneur–investor fit by taking into consideration investors' expected involvement in portfolio ventures. Previous research has shown that investors prefer entrepreneurs who are similar to them (Franke et al., 2006; Murnieks et al., 2011), which we propose is because people assume that similarity is conducive to cooperation (Toma, Corneille, & Yzerbyt, 2012). Ciuchta et al. (2018) and Mitteness, Sudek, et al. (2012) demonstrated that investors who are willing to mentor put more value on entrepreneur's displayed coachability when making investment decisions. Similarly, we find that more actively involved investors prefer entrepreneurs who are willing to accept their involvement in a venture, indicating that investors consider their compatibility with the entrepreneur. These results suggest that selection and value-adding activities of early-stage equity investors are

interrelated, thereby extending the contribution to the literature on early-stage investor post-investment activities (De Clercq & Manigart, 2007a; Fili & Grünberg, 2016; Knockaert & Vanacker, 2013).

With respect to practical implications, our results are relevant to entrepreneurs who are seeking early-stage financing. We show that there is a benefit for them to demonstrate not only their competence but also their cooperativeness, particularly their openness to the investor's feedback, when interacting with angel investors and venture capitalists. Moreover, the results of our study show that entrepreneurs can bypass some of their weaknesses through purposeful signaling to early-stage equity investors. Although industry experience is considered the most important entrepreneur-level factor in early-stage financing (Bernstein et al., 2017; Ko & McKelvie, 2018), we show that inexperienced entrepreneurs can compensate for their lack of experience by demonstrating thorough market knowledge and coachability. Inexperienced entrepreneurs may also benefit from the involvement of mentors and advisors. While our research suggests that advisor/mentor involvement is the least important factor in assessing an entrepreneur's funding potential, related research has shown that inexperienced entrepreneurs can substantially benefit from the assistance of an advisor or mentor (Lahti, 2014; Lehtonen & Lahti, 2009) in enhancing their venture's investment readiness (Carpentier & Suret, 2015; Mason & Harrison, 2001) and consequently increasing the likelihood of obtaining early-stage financing.

3.5.2 Limitations and future research

The first set of limitations is related to the sample characteristics. Obtaining a good sample of participants is considered to be the most challenging issue in the research on early-stage equity investors (Hsu et al., 2014). The setting of our research was the population of angel investors and venture capitalists situated in Europe. There is a notable degree of heterogeneity between different European countries in terms of national culture (House et al., 2004) and conditions for entrepreneurship and early-stage equity investing (Bruton, Fried, & Manigart, 2005; Hege, Palomino, & Schwienbacher, 2003; Hege, Palomino, & Schwienbacher, 2009; Schwienbacher, 2008). We tested for the differences in importance of attributes between clusters of countries and fund no significant differences between them, suggesting little variation in early-stage investor decision policies in regards to entrepreneur across European countries. Next, even though the demographics of our sample resemble those reported in previous studies on European early-stage investors (EBAN, 2019; Franić & Drnovšek, 2019; Franke et al., 2006; Kollmann & Kuckertz, 2010; Zinecker & Bolf, 2015), non-response bias cannot be excluded. It must be noted that although our sample size meets or exceeds that of comparable conjoint studies (Franke et al., 2006, 2008; Hsu et al., 2014; Murnieks et al., 2011; Warnick et al., 2018), the sample size of 84 investors

may lack sufficient statistical power to detect differences among investors. Therefore, we might have missed some of the differences in investment policies resulting from differences in national contexts, levels of involvement in portfolio ventures, investor type, or other investor characteristics.

The second set of limitations arises from the research method employed. Conjoint experiments are particularly suitable for studying judgments and decision-making, as they bypass threats to validity related to post-hoc rationalization, social desirability, faulty memory, or inability to articulate complex or intuitive decision-making processes. This is why entrepreneurship scholars have advocated for a wider application of conjoint experiments in entrepreneurship research (Lohrke et al., 2010; Shepherd & Zacharakis, 1999, 2018; Wood & Mitchell, 2018). However, these types of studies are not without their limitations. The method requires a priori knowledge of the most critical decision attributes and the levels that affect the respondents' decision-making (Lohrke et al., 2010). The importance of each attribute depends on the particular attribute levels and other attributes in the conjoint experiment (Orme, 2006). The choices of attributes and their levels in our research were guided by the combination of prior theoretical and empirical work. We also pretested these choices during our interviews with early-stage investors. However, a different set of attributes might yield different results. Therefore, we suggest that future studies test the proposed hypotheses using different sets of attributes pertaining to entrepreneurs' competence and cooperativeness.

Angel investors and venture capitalists evaluate investment opportunities in a multiphase process. Often, only entrepreneurs who pass the screening phase have the opportunity to demonstrate personal characteristics such as coachability to investors (Carpentier & Suret, 2015; Harrison & Mason, 2017; Jeffrey et al., 2016; Mitteness, Baucus, et al., 2012). Our research focuses on the evaluation phase of investment-decision making, when perceptions of entrepreneur have particularly high weight in the investor decision-making (May & Simons, 2001). As the limitation of conjoint research design is that it can rarely closely mimic decision-making situation in the evaluation phase of investor decision-making, which includes investors meeting entrepreneurs personally, we suggest that future studies test the role of the "big two" in early-stage investor decision-making in real-world settings.

Finally, certain attributes may not fall neatly into one or the other dimension we proposed (competence and cooperativeness), nor may they be unambiguously perceived as positive or negative. This has been recently demonstrated in the literature on entrepreneurial passion. While, for example, Ciuchta et al. (2018) believed that entrepreneurial passion is reflective of the type of relationship entrepreneurs form with their stakeholders, Hsu et al. (2014) believed that passion is reflective of the commitment involved in pursuing entrepreneurial ambitions. Moreover,

although the majority of scholars have found entrepreneurial passion to be a desirable trait (Mitteness, Sudek, et al., 2012; Murnieks et al., 2016; Taylor, 2019), others have found that passion can signal uncooperativeness (Ho & Pollack, 2014). Different attributes can be ambiguous and difficult to understand in isolation (Plummer et al., 2016). Therefore, we encourage future studies to uncover the similarities between different decision attributes and their organization into broader dimensions. This could also facilitate the study of complementary, substitutive, and compensatory effects of different attributes in early-stage financing (Bapna, 2019). Lastly, this study makes a step toward studying how entrepreneurs can compensate for certain weaknesses they may have. However, as entrepreneurship is a team endeavor (Cooney, 2005; Harper, 2008), future studies could look into how different team members can compensate for each other's weaknesses.

3.6 Conclusions

This research offers a novel perspective on early-stage investor decision-making by integrating socio-psychological insights about social judgments with current understandings of the decision policies of angel investors and venture capitalists. We focused on the entrepreneur as a criterion in investor decision-making and proposed that investors perceive entrepreneurs who are seeking early-stage financing through the lens of competence and cooperativeness. Our empirical findings suggest that both dimensions significantly contribute to the perceived funding potential, with competence being of primary importance to early-stage equity investors. Moreover, the two dimensions are complementary, suggesting that entrepreneurs would benefit from signaling both competence and cooperativeness (coachability in particular). We also find that entrepreneurs can compensate for the lack of entrepreneurial experience by demonstrating good knowledge of the market. Finally, investors who are more involved in their portfolio ventures show slight preference for entrepreneurs who appear coachable. Our research highlights a range of interactions, configurations, and contingent relationships that provide deeper insight into how signals of competence and cooperativeness influence early-stage investors' investment decisions.

This study fills several research gaps that we identified in the previous chapter. It is among the first empirical studies to address the role of interpersonal signals and to examine the assumed differences between the investment policies of angel investors and venture capitalists. More importantly, by drawing on cognitive theories, this study advances our understanding of how different signals interact. The results strongly suggest that investors consider a combination of different signals when making decisions. In the next chapter, we extend the study of how investors combine available information by adding characteristics of the business opportunity into consideration.

4 DETERMINANTS OF EARLY-STAGE EQUITY INVESTOR DECISION-MAKING: A QUALITATIVE INVESTIGATION

4.1 Introduction

> '*I'm not sure which one [of the criteria] is more important because I can't really distinguish. My investment decision-making is always a mix of all the factors not one by one*'. (Venture capitalist, 17 years of investment experience)

> *'Obviously, the market opportunity is very important, but most of the time that goes along with the team - because if they understand the market well and are good in conceptualizing the idea there are good chances that a team is good'.* (Venture capitalist, 4 years of investment experience)

Extant research has focused on identifying investment criteria used by early-stage equity investors (i.e., business angels and venture capitalists) when funding new ventures (Ferrati & Muffatto, 2021). Ever since MacMillan et al. (1985, p. 119) argued that 'irrespective of the horse (product), horse race (market), or odds (financial criteria), it is the jockey (entrepreneur) who fundamentally determines whether the venture capitalist will place a bet at all', much of the research on early-stage equity investing has revolved around the question of whether early-stage equity investors place more importance on the entrepreneur (jockey) or the business opportunity (horse and horse race) (e.g., (Baum & Silverman, 2004; Harrison & Mason, 2017; Kaplan et al., 2009; Mitteness, Baucus, et al., 2012). In addition, a considerable number of studies have attempted to identify which specific investment criteria carry the most weight in early-stage investment decision-making (e.g., (Block, Fisch, Vismara, & Andres, 2019; Feeney et al., 1999; Hall & Hofer, 1993; Khanin, Baum, Mahto, & Heller, 2008).

Despite these research efforts to uncover early-stage investment criteria, anecdotal evidence from the industry points to an investment paradox. This paradox arises when early-stage equity investors favorably evaluate a given investment opportunity based on key attributes related to the entrepreneur and the opportunity independently, but simultaneously rank this same investment opportunity as unfit for early-stage funding (Cox et al., 2017). Furthermore, an evolving perception has emerged in the literature – one that emphasizes the evaluation of an investment opportunity as 'an extremely complex task, highly dependent both on the experience and intuition of the specific investor' (Ferrati & Muffatto, 2021, pp. 157-158).

While researchers have identified important attributes of the entrepreneur and the opportunity, they have not reached a consensus on the relative importance of these two types of investment

criteria (Mitteness, Baucus, et al., 2012), nor have they explained how investors use these criteria when assessing investment opportunities and making funding decisions. In view of the complexity and ambiguity of early-stage investors' decision-making environment (Huang & Pearce, 2015; Plummer et al., 2016), we propose that investors concurrently weigh attributes associated with the entrepreneur and the business opportunity, and that the interplay between these attributes informs investors' thought process in their funding decision. Therefore, it is important to understand the thinking style of early-stage equity investors under conditions of uncertainty.

In this study, we address two main questions: (1) how do early-stage equity investors use available information about the entrepreneur and the business opportunity to make investment decisions, and (2) what are the reasons behind their particular approach to decision-making. Using a qualitative approach, we find that, when making decisions, early-stage equity investors consider the entrepreneur and the business opportunity to be entwined. More specifically, they evaluate the entrepreneur within the context of the opportunity. We observe that the context in which early-stage investment decisions are made impedes analytical and structured approaches to information processing and favors a holistic thinking style. Moreover, investors' beliefs about the factors contributing to the success and failure of early-stage ventures support the simultaneous consideration of the entrepreneur and the business opportunity.

This study makes contributions to both research and practice. Understanding how investors think about different aspects of investment opportunities (in terms of the entrepreneur and the business opportunity) may help to resolve the lack of consensus on the relative importance of the strength of the business opportunity and the strength of the entrepreneur in early-stage investors' decision-making. Moreover, the study contributes to the stream of literature on early-stage investors' decision-making behaviour, in particular, their information processing styles. We draw on psychological research on holistic and analytic thinking styles (Choi, Koo, & Choi, 2007; Nisbett et al., 2001) to develop a conceptual framework with which to better understand how information about the context (in our case, the characteristics of a specific business opportunity) and the agent (entrepreneur characteristics) interacts in making sense of a particular situation (investment opportunity). In doing so, we make a unique contribution to the research on investment decision-making under ambiguous signals (Plummer et al., 2016), addressing the need for more research on the interaction effect of different information in early-stage equity investing (Colombo, 2021). Furthermore, given the significance of early-stage equity financing for the survival and growth of new ventures (Lee, 2014), this study makes a contribution to practice by emphasizing the importance of the thinking processes that guide early-stage equity investors in their funding decisions. It comes as no surprise that investors carefully screen entrepreneurs in the process. However, what has not been emphasized in the existing literature is that investors

consider the characteristics of the entrepreneur in the context of the investment opportunity. This deeper understanding has the potential to increase the odds of startups raising funds, as well as the odds of investors making viable financial decisions.

The chapter continues as follows. First, we review the literature on early-stage investor decision-making, with an emphasis on information processing styles. We then introduce the body of knowledge from psychology on analytic and holistic thinking styles (Choi et al., 2007; Nisbett et al., 2001). We continue with a discussion of the chosen methodology and approach to analyzing the rich data from our semi-structured interviews. We then proceed to introduce the main findings from our qualitative analysis. We discuss several themes and four main topics associated with a holistic thinking style: locus of attention, perception of interrelatedness, perception of unpredictability, and attribution of success and failure. We explain why early-stage equity investors gravitate towards a holistic thinking style when evaluating investment opportunities, which we propose is an important cognitive capacity when making decisions in an uncertain and ambiguous environment. We conclude with a discussion of our main findings and how these can inform future research on investment decision-making by early-stage equity investors.

4.2 Conceptual background

4.2.1 Early-stage equity investors' decision-making

Investments in the early stage (including seed and pre-seed stages) are characteristically challenging. This is due to high information asymmetries (Sohl, 1999), the number and variety of factors to consider (Shepherd et al., 2000), and a high level of uncertainty (Baron, 1998). Early-stage investors make decisions under circumstances in which outcomes are difficult to predict, even through rational means (Sadler-Smith & Shefy, 2004).

To date, a great deal of research on early-stage investor decision-making has focused on identifying the investment criteria of angel investors and venture capitalists (MacMillan et al., 1985; Maxwell et al., 2011; Sudek, 2006). Most of these studies have (implicitly) assumed that early-stage equity investors deliberately and systematically assess investment opportunities based on a predefined set of investment criteria. However, it would be impossible for most humans to process the astonishing number of different investment criteria identified in these studies (Ferrati & Muffatto, 2021) when making decisions. Consequently, some authors have suggested that early-stage equity investors do not use a fully compensatory decision-making process (identifying relevant decision criteria, weighting them in order of importance, evaluating each deal on each of these criteria, and calculating the overall value of each individual deal, see Hauser, Ding and

Gaskin (2009)), but instead seek fatal flaws in the proposed deals (Maxwell et al., 2011). Some authors have suggested that decision-making strategies change throughout the multi-phase investment process. More specifically, investors may resort to elimination-by-aspect heuristics to eliminate weak investment opportunities during the screening phase, but use compensatory decision models and different criteria during the evaluation phase (Maxwell et al., 2011). Additionally, investors differ in their investment policies, placing different weight on various investment criteria (Knockaert & Vanacker, 2013; Mitteness, Sudek, et al., 2012). Harrison, Mason and Smith (2015b) suggested that investors rely on their experience (availability heuristic) and the schema of successful entrepreneur (representativeness heuristic) when making investment decisions. Indeed, researchers have increasingly recognized that early-stage investors use heuristics when making investment decisions, as heuristics enable investors to substantially narrow the array of decision criteria they must consider. However, researchers have still assumed that investors use a well-defined set of so-called "acceptance" and "rejection" criteria (Carpentier & Suret, 2015; Croce et al., 2017; Mason et al., 2017) that they consider one-by-one.

Cox et al. (2017) argued that many investment opportunities that receive almost perfect scores on these investment criteria are not able to secure early-stage funding. A so-called *investment paradox* occurs when early-stage equity investors favorably evaluate an investment opportunity based on key criteria, but still rate the investment potential as poor (Cox et al., 2017). This paradox has sparked researchers' interest in the interaction effects between different investment criteria. In particular, four types of fit have been discussed in the literature: person–entrepreneurship fit (Markman & Baron, 2003), entrepreneur–opportunity fit (Fiet & Patel, 2006), investor–opportunity fit (Croce et al., 2017; Mason & Stark, 2004a), and entrepreneur–investor fit (Collewaert, 2012). There are several reasons why fit criteria are fundamental to the assessment of investment opportunities. Signals about opportunity and entrepreneur strength are ambiguous, and combinations of signals that differ in content facilitate sense-making (Plummer et al., 2016). Moreover, the investor decision-making process may be conjunctive (Hauser et al., 2009), meaning that a *combination* of opportunity and entrepreneur attributes needs to be above a certain threshold for the investment to appear worthwhile (Huang & Pearce, 2015).

Because investors deal with multiple types of information about investment opportunities, much of which is open to interpretation, it has recently been theorized that early-stage equity investors rely more on their 'gut feel' (Huang, 2018) than on rational analysis (Huang & Pearce, 2015). The investor's gut feel has been described as a 'complete summary judgment about the investment opportunity' that 'integrates both emotional and cognitive factors' (Huang, 2018, p. 1824). Similar to research on the importance of fit in investor decision-making, this line of research recognizes that investors integrate diverse information to assess investment opportunities. However, this research assumes that the range of data and information exceeds human capabilities

for fully analytical information processing. Rather, investors form a 'feeling' towards investment opportunities that ultimately guides their investment decisions. To date, it remains unclear how and why investors integrate information about opportunities and, more importantly, whether and how investors use the context in which decisions are made for sense-making.

4.2.2 Holistic and analytic styles of thinking

> '*In entrepreneurship, everything is 100% context dependent. Context determines what is relevant, and more importantly, what is not relevant, what you should say no to today, and whether you should wait until the time is right*'. (Venture capitalist, 10 years of investment experience)

Research on analytic versus holistic thinking has its origins in cultural psychology and observations of between-culture differences in attention to the context versus the object (Norenzayan & Nisbett, 2000). Researchers have found that East Asians pay substantially more attention to context than Westerners, who are more likely to believe that a person is an agent operating independently of the context (Miller, 1984; Shweder & Bourne, 1982). It has been suggested that a particular style of thinking is acquired through socialization in a given culture (Nisbett et al., 2001). However, these differences in thinking styles have also been observed within cultures (Choi et al., 2007; Koo & Choi, 2005), leading researchers to recognize that thinking styles are not culturally fixed but shaped by individual experience, including field of education and line of work (Koo & Choi, 2005). As a result, some individuals become predominantly holistic thinkers, whereas others become predominantly analytic thinkers.

Holistic thinking is described as 'involving an orientation to the context or field as a whole, including attention to relationships between a focal object and the field, and a preference for explaining and predicting events on the basis of such relationships', whereas *analytic thinking* is defined as 'involving a detachment of the object from its context, a tendency to focus on attributes of the object to assign it to categories, and a preference for using rules about the categories to explain and predict the object's behavior' (Nisbett et al., 2001, p. 293). Researchers have identified four areas of difference between holistic and analytic thinkers (Choi et al., 2007; Na et al., 2010): (i) locus of attention; (ii) casual perception, (iii) perception of change, and (iv) tolerance of contradiction (see Table 16). It is important to note that holistic and analytic thinkers do not differ in the weight they assign to the subject, but in their consideration of contextual influences (Choi, Nisbett, & Norenzayan, 1999; Norenzayan, Choi, & Nisbett, 2002). In effect, analytic thinkers believe that behaviors and outcomes are mainly determined by an individual's personality (dispositionist stance), whereas holistic thinkers believe that behaviors and outcomes reflect complex interactions between an individual's personality and situational factors (interactionist

stance) (Norenzayan et al., 2002). In other words, holistic thinking is contextualized, whereas analytic thinking is decontextualized.

Table 16: Analytic versus holistic thinking

	Analytic thinking	**Holistic thinking**
Locus of attention	Attention is focused toward an object itself independent of the context.	Attention is focused on the relationship between objects and/or the context in which they are embedded.
Casual perception	Consideration of a few direct, presumably strong casual links in explaining events.	Consideration of a broad range of direct and indirect casual links in explaining events.
Perception of change	A linear perception of change, which assumes a continuation of a current trend with low likelihood of substantial deviation from it.	A cyclical or fluctuating perception of change, which assumes low likelihood of a phenomenon remaining constant over time.
Tolerance of contradiction	Tendency to resolve contradictions by eliminating one of the two contradictory propositions on the ground that it is false.	Presumption that opposite propositions can be simultaneously true and inclination towards searching for a compromise between opposing propositions.

Note. Based on Choi et al. (2007) and Spencer-Rodgers and Peng (2017).

Holistic and analytic thinking styles generally correspond to dual-process models of information processing (Evans, 2006; Phillips, Fletcher, Marks, & Hine, 2016). System 1 information processing is described as intuitive, automatic, unconscious, holistic and effortless, while System 2 information processing is described as analytical, deliberate, controlled, systematic, conscious and effortful (Kahneman, 2011; Kahneman & Frederick, 2002). Despite the similarity between System 1 and holistic thinking and System 2 and analytic thinking, there are several aspects that suggest that holistic and analytic thinking do not fit into System 1 and System 2 categorization. Most notably, System 1 is an automatic process, whereas evidence suggests that holistic thinking can be deliberative and conscious correction of an automatic decontextualization (Buchtel & Norenzayan, 2009). That said, compared to the analytic thinking style, holistic thinking style has been linked to the greater appreciation and use of intuitive information processing (Buchtel & Norenzayan, 2008). However, for the reasons stated above, holistic and intuitive information processing need to be distinguished. Intuitive information processing is automatic, operating (at

least partially) without one's awareness and results in affective arousal which influences one's decision (Keller, Kreuzmair, Leins-Hess, & Siegrist, 2014). It is thus best contrasted with deliberative information processing. On the other hand, holistic thinking is best described as contextualized and connected thinking (Masuda & Nisbett, 2001) and has been shown to combine several independent information processing styles (Wong, Wyer Jr, Wyer, & Adaval, 2021).

4.3 Methodology

4.3.1 Methodological approach

Numerous scholars have highlighted the need for qualitative research in entrepreneurship (Hlady Rispal & Jouison Laffitte, 2014). Although qualitative research is often considered best suited to studying as yet unexplored and underexplored phenomena (Neergaard, 2014), it is increasingly being recognized as a valuable approach to studying topics that are already established but have been predominantly investigated using quantitative methods (Graebner, Martin, & Roundy, 2012; Murphy, Klotz, & Kreiner, 2017; Shah & Corley, 2006; Van Burg, Cornelissen, Stam, & Jack, 2020). This is because qualitative research can capture certain details and mechanisms that are easily overlooked by quantitative research (Graebner et al., 2012; Murphy et al., 2017). Qualitative research is particularly well suited to examining how individuals make sense of the information they have and how they come to understand the different situations they encounter (Merriam & Tisdell, 2015).

Our approach to this study was exploratory. At the beginning, our research centered on the general question of 'how early-stage equity investors make investment decisions'. We followed the four main principles of grounded theory (Charmaz, 2014; Walsh et al., 2015): emergence, constant comparison, theoretical sampling, and theoretical saturation. We conducted data collection and data analysis iteratively, and updated the semi-structured interview protocol as new insights emerged. When new codes emerged, earlier transcripts were revisited and recoded. Following the twin slate approach (Kreiner, 2015), we consulted the existing literature as new themes emerged to determine how our findings related and contributed to it. This process resulted in a gradual refinement of our initial research question, as is to be expected in qualitative research (Bansal & Corley, 2012). It became clear that the early-stage equity investors we interviewed integrated available information about the entrepreneur and the business opportunity to make sense of the investment opportunity at hand. This important observation motivated us to dig deeper into how they were using the available information to assess the investment potential of the presented deals.

4.3.2 Data collection

We conducted semi-structured interviews with 21 investors who invested directly in early-stage ventures. We applied the following criteria to identify informants who (1) had at least two years of experience in direct investment in early-stage companies, (2) were active as an investor in the previous three years, and (3) were based in Europe and invested in European early-stage companies. These criteria were used to ensure informant relevance to the research question and comparability of the data (Murphy et al., 2017). In addition, we conducted two interviews with investors who worked for funds of funds, making mainly indirect but also sometimes direct investments in early-stage companies. These interviews were conducted to gain further insight into the points raised and provide corroboration (White & Dumay, 2020).

We reached out to the majority of investors through LinkedIn or e-mail, if provided on the venture capital fund's website. A smaller proportion of participants were contacted based on the recommendation of investors who had already participated in our study. None of the venture capitalists worked for the same fund. Our interviewees were geographically located in Bulgaria, Croatia, Czechia, Finland, Hungary, Italy, Netherlands, Poland, Slovakia, and Slovenia. One interviewee (T20) was excluded from the analysis after the interview because he did not fit the criteria related to geographic scope. Geographic scope is an important consideration in early-stage equity investing because contextual factors specific to early-stage financial markets may substantially influence investment behavior (Bruton et al., 2005; Ding, Sun, & Au, 2014; Hege et al., 2003; Hege et al., 2009; Schwienbacher, 2008). The investors had on average 8.91 years of experience in their current role and predominantly described themselves as sector agnostic (generalist) or technology (tech) investors (see Table 17 for additional information about the sample).

We considered each interview as a 'one-time opportunity' to speak with a particular investor (Solarino & Aguinis, 2021), which is why we prepared a detailed but flexible semi-structured interview protocol. The interview protocol was gradually revised as new themes emerged. New questions were added and some removed to ensure that the interviews did not become too lengthy, which was a concern for some of our interviewees when they were invited to participate in the study. The questions in the interview protocol covered information about the interviewees (demographics, work and investment experience, description of investment activities and preferences for investment stages, industries, and post-investment value-adding behaviors); their perceptions of what constituted an attractive investment opportunity; what and how they used as investment criteria; discussion of challenges they faced when making investment decisions; and their experiences with portfolio companies. We encouraged them to provide detailed accounts of their actual investment decisions and experiences by asking open-ended questions, often followed

by why and how questions (Adams, 2015). If necessary, we rephrased the questions to deepen superficial responses (Solarino & Aguinis, 2021). The interviews were conducted via videoconferencing software between March and October 2021. They lasted 25–75 minutes, and were recorded and transcribed verbatim.

Table 17: Interview participants

T#	Gender	Type	Investment experience (years)	Stage	Industry
1	F	VC	2	Seed, Startup	Tech
2	F	AI	7	Startup, Expansion	Generalist
3	M	AI	8	Seed, Startup, Expansion	Generalist
4	M	VC	4	Seed, Startup, Expansion	Impact
5	F	VC	2	Startup, Expansion	B2B Tech
6	M	VC	17	Seed, Startup, Expansion	Tech
7	M	VC	3	Seed, Startup	Tech
8	F	AI	10	Seed, Startup	Generalist
9	M	Institutional	11	Seed, Startup, Expansion	Generalist
10	F	Institutional	4	Seed, Startup, Expansion	Generalist
11	M	VC	10	Seed, Startup	Biotech
12	M	AI	16	Seed	Generalist
13	M	AI	4	Seed, Startup	Generalist
14	M	VC	15	Expansion	Insurance
15	M	VC	5	Seed, Startup, Expansion	Generalist
16	M	VC	7	Seed, Startup	Generalist
17	M	VC	5	Seed, Startup, Expansion	Tech
18	M	AI	8	Seed	Generalist
19	M	VC	18	Expansion	Generalist
21	M	VC	10	Seed, Startup	Tech
22	M	VC	25	Startup, Expansion	B2B Tech
23	F	VC	5	Seed, Startup	Generalist

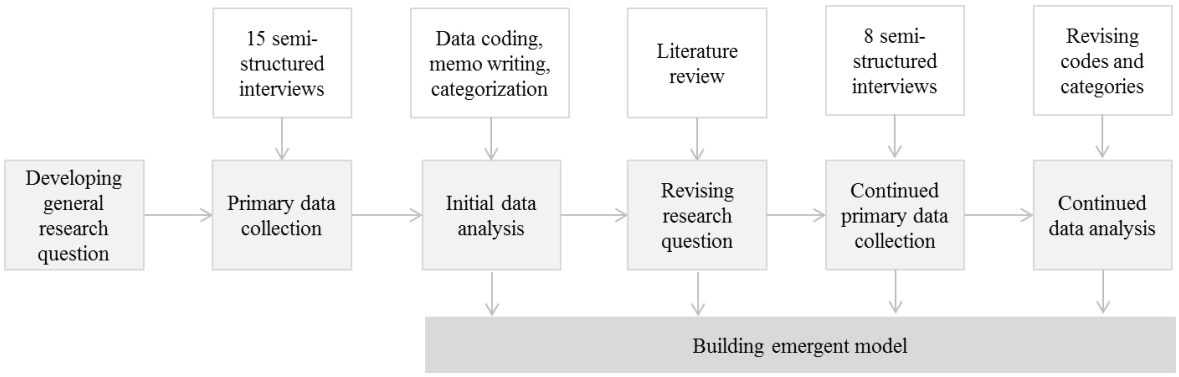
Note. AI – angel investor, VC – venture capitalist; Seed-stage companies have an undeveloped product or unvalidated business plan; startup companies have a market-ready product and partially validated business plan; expansion-stage companies have a validated business plan and are focused on expansion.

4.3.3 Data anaylsis

We followed the twin slate approach (Kreiner, 2015) to qualitative data analysis. The twin slate approach shares many similarities with the Gioia approach (Gioia, Corley, & Hamilton, 2013), but emphasizes the importance of literature review in the analytical process. The twin slate

approach ensures that researchers do not spend time on ideas that are already well covered or develop them in a manner that is disconnected from the literature (Murphy et al., 2017). This makes it an efficient and effective approach to qualitative data analysis (Locke, 2015; Murphy et al., 2017; Van Maanen, Sørensen, & Mitchell, 2007). Our process of data analysis is illustrated in Figure 7.

Figure 7: Data collection and analysis process



We began analyzing the transcripts by open coding (Charmaz, 2014). This involved assigning codes to the text excerpts of the transcripts that best described the informants' thoughts. As new codes emerged during the coding process, the previously coded transcripts were revisited and recoded as needed. Open coding was accompanied by axial coding (Corbin & Strauss, 2014), in which codes were grouped and merged based on their conceptual similarity. The process of coding, building the model, reviewing existing literature on emergent topics, and conducting additional interviews to discuss these topics was highly iterative, as depicted in Figure 7. To ensure the robustness of the results, two researchers coded the transcripts and built the framework separately. When the two frameworks converged, it indicated that a point of theoretical saturation had been reached. Figure 8 shows the first-order concepts grouped into second-order themes, which are linked to aggregate dimensions.

4.4 Results

In the entrepreneurship literature, the business opportunity and the entrepreneur are often depicted as two aspects of an investment opportunity that compete for the attention of early-stage investors when making investment decisions (Ferrati & Muffatto, 2021; Harrison & Mason, 2017; Kaplan et al., 2009; Mitteness, Baucus, et al., 2012). The findings from our qualitative work provide insights into how these two aspects enter into investors' decision-making process. In fact, from the investors' perspective, these two elements are closely entwined and they consider them

in tandem when evaluating an investment opportunity. This decision-making approach was reflected in investors':

1. Locus of attention (focus on the investment opportunity as a whole, rather than on its individual aspects)
2. Perception of interrelatedness (consideration of the interplay between entrepreneur and business opportunity).

Therefore, the results suggest that investors process investment information in a holistic rather than analytic manner when evaluating investment opportunities. We found that investors' perceptions of the business environment and explanations of the portfolio venture's success or failure may explain why they tended to evaluate investment opportunities in a holistic manner. This was reflected in investors':

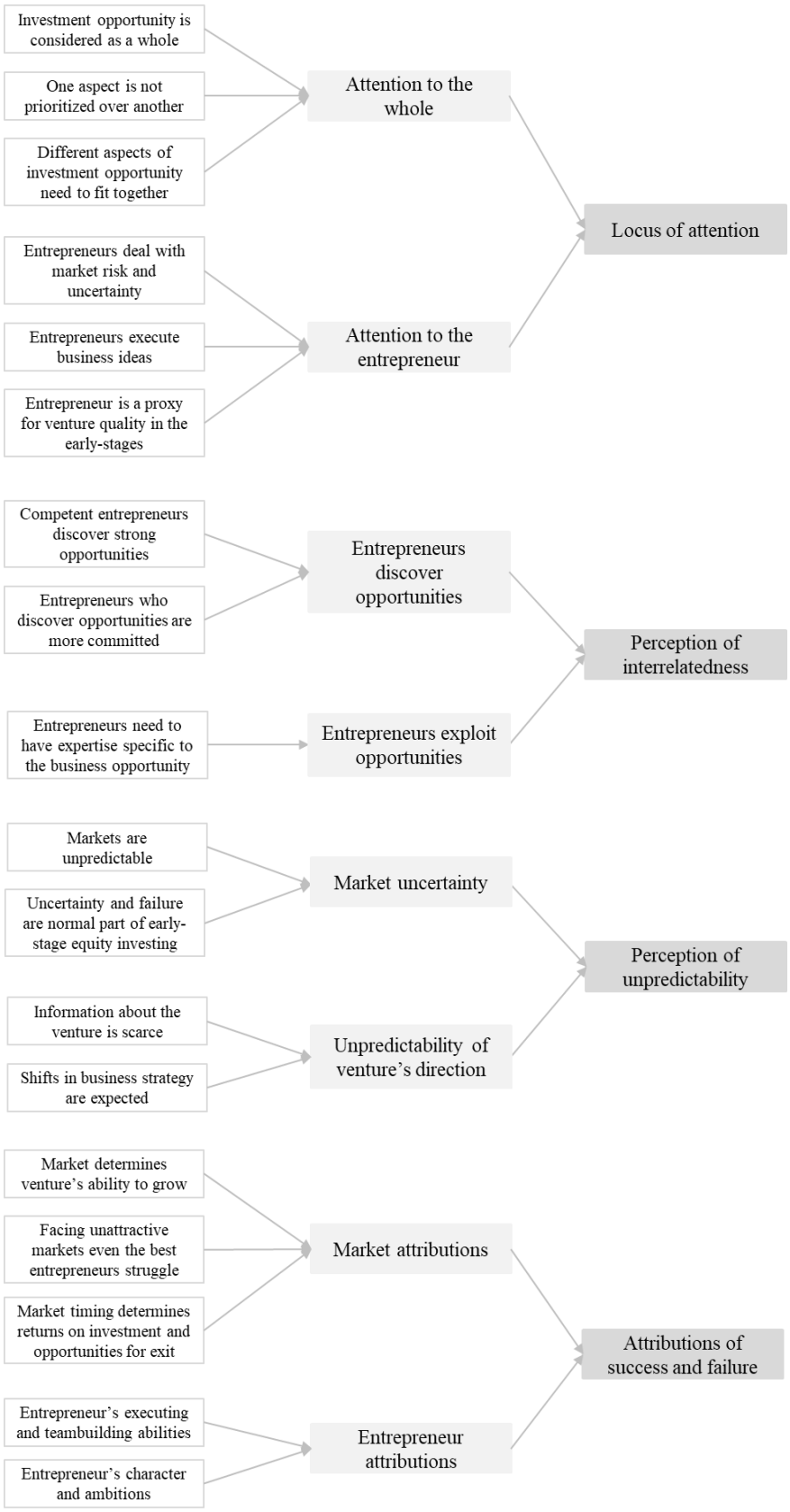
3. Perception of unpredictability (awareness of their limited ability to predict changes in the business environment and a company's mid- and long-term direction)
4. Attributions of success and failure (belief that outcomes depend to a large extent on situational factors rather than solely on the entrepreneur).

In what follows, we present our overall findings in terms of identified concepts, themes and dimensions, which we discuss in detail while providing examples from our interviews. Figure 8 depicts how we categorized first-order concepts into second-order themes and the above-mentioned third-order dimensions. Table 18 provides examples of first-order data from the interviews corresponding to the identified themes and dimensions.

4.4.1 Investors' holistic approach to assessing investment opportunities

We observed that investors tried to understand the investment opportunity as a whole by integrating information and considering how different pieces of information fit together. While we observed that investors differed in the extent to which they used predefined investment criteria to gain better understanding of the investment opportunity, they all emphasized that different aspects of investment opportunity '*have to play together at the end*' (T7). When asked to rank different investment criteria in importance, several interviewees had difficulty doing so: '*I don't know how to rank them because you need to have a mix of all of them*' (T4). This difficulty revealed that they assessed the deal as a whole, not according to separate attributes: '*I'm not sure which one is more important because I can't really distinguish. My investment decision-making is always a mix of all the factors not one by one*' (T6).

Figure 8: Data structure from concepts to themes to aggregate dimensions



Although all of them explicitly discussed aspects related to the business opportunity and aspects related to the entrepreneur (team), many investors could not identify the aspect that led to their decision. Most of them strongly considered the interrelatedness between the strength of entrepreneur and the strength of business opportunity. There were several aspects to this interrelatedness. First, investors believed that the identified '*market opportunity is very important, but most of the time that goes along with the team*' (T4), because '*those at the top of the field find problems that the others do not even see, and they find solutions to those problems that the others are not even aware of*' (T19). Second, investors recalled being introduced to an interesting business idea by a team that they did not perceive could execute the idea. A few of them also mentioned their experiences with good teams who could not succeed in the face of unattractive markets. However, they recognized the importance of entrepreneurs discovering opportunities by themselves, otherwise '*their hearts are not in it, and that usually makes all the difference in the end*' (T19). They suggested that entrepreneurs who pursued business ideas they discovered themselves were usually more committed than those who just worked on a business case that was handed to them. Third, the strength of the entrepreneur was measured against the particular business opportunity: '*I'm obviously evaluating whether I believe that person has sufficient knowledge of the space at which the person is focusing or the firm is focusing*' (T6). In other words, it is not possible to understand the strength of the entrepreneur without considering the characteristics of the business opportunity:

> *There is a term that's been used a lot lately, which is founder–market fit. This team has a security product for a specific group of people who are dealing with security. And the team built the product for themselves because they found that something like that was missing in the market. So they had a very deep knowledge of the market need. Combined with the IT and security trends, we felt like this was a good opportunity. Also, we saw the capability of these people to actually develop the product, motivate others, and build a team around them. So we felt that they would be capable to build a team further*. (T6)

In a sense business opportunity serves as a backdrop to the investment opportunity. First, it is considered when investors pre-screen investment opportunities for investor–opportunity fit (Croce et al., 2017; Fried & Hisrich, 1994), and later when investors evaluate the entrepreneur or entrepreneurial team. Investors especially value industry-specific knowledge and experience:

> *Markets are very closed, if you want to be a disrupter you have to have knowledge at least from a related industry, if not this industry. I'm not saying that without experience you can't succeed, but that it carries a lot more risk. Each market has its nuances, which are difficult to understand without first-hand experience*. (T2)

> *We invested in the company, which is creating a new concept of supermarket with fresh food and is very attentive to the, let's say, healthy diet. The company is producing their own dishes, readymade dishes with the philosophy of healthy nutrition. The entrepreneur who proposed the idea was ex CFO and ex managing director of a big French conglomerate in the supermarket industry. So he knows how to open and run a supermarket and he knows the logic behind it. So you don't even have to check it because he worked his entire life, 25 or 30 years, in a company like that. He surely knows the industry*. (T4)

Not all investors required industry experience, but many recognized that '*experience helps a lot*' (T3; T8). However, two investors emphasized the drawbacks of extensive experience, which could lead the entrepreneur to become overconfident and averse to feedback: '*They act like "Who are you to tell me what to do? I've done this before*!"' (T12). It could also hinder the entrepreneur's ability to disrupt industries:

> *If someone has been in the industry for 20 years, they will usually say that certain things cannot be done differently. This is not to say that entrepreneurial teams should not have industry knowledge, but they should not be molded into the thinking that is prevalent in the industry. That would not help them disrupt the industry*. (T14)

We found that early-stage equity investors perceived the strength of a business opportunity mainly through the lens of market potential and, to a far lesser extent, through the characteristics of a specific venture or product. This is to be expected, as early-stage ventures have a very limited track record, if any at all, and are still in the process of developing their product and/or business concept (De Clercq et al., 2006). Therefore, investors expected the ventures to '*end up in a somewhat different place than where they started at the time of investment*' (T21). This is why investors did not '*overanalyze the business case as such'* (T21), but tried to invest in teams that could '*figure it out*' (T17). In other words, investors based their expectations of the venture and product quality on the strength of the entrepreneur, especially '*the capability to execute*' (T23) and '*deal with the unknown*' (T2). According to the investors, these two characteristics were best demonstrated through the track record of the entrepreneur, especially in terms of previous entrepreneurial experience. As one investor pointed out:

> *We know that a founder who has achieved great success with a startup is an extremely valuable asset /.../ and the best repeat founders are booked like rock stars. /.../ They don't need to bother to show you a product. They don't need to bother to show your market just because they are the ones who did Snowflake or Robinhood before. They will get funding immediately*. (T7)

However, those entrepreneurs who did not have a track record of entrepreneurial or corporate accomplishments needed to demonstrate their execution capabilities through their resourcefulness, entrepreneurialism, and product validation in order to be considered for early-stage funding:

> *I always say to early-stage companies that come for funding: 'you need to have one of the two factors – validation of the founder or validation of the company/product.' The validation of the founder means being serial entrepreneur, the validation of the company means having traction*. (T1)

We also identified a cohort of angel investors who strongly emphasized aspects of the entrepreneur's personality and expressed their willingness to invest in first-time entrepreneurs who presented weaker business opportunities but showed potential. These investors de-emphasized previous experience and focused strongly on the personality of the entrepreneur and the quality of the rapport. We found that these investors were all actively engaged in portfolio ventures. They were willing to accept lower financial returns than those investors who paid more attention to the strength of business opportunity:

> *In fact, I am increasingly looking at the character of an entrepreneur, because the most valuable thing I have is my time. That's why I don't go into investments where there's no chemistry with the entrepreneur, as it's important to me that our relationship is functional and rewarding. Assessing character is becoming increasingly more important to me than anything else*. (T12)

> *I invest in opportunities that others don't think are worth the investment because I believe in people. And that turned out to be very positive. It is true, however, that I have a very good sense of recognizing the potential in people*. (T8)

> *I judge investment opportunities more or less only by the people. Because I really think any firm can reach at least some degree of success. What is success? Success is that you have enough for salaries and enough to be able to overcome a crisis that may come, and maybe have some moderate growth. If you have people who are willing to work and are in it wholeheartedly, I feel like you can't go wrong*. (T13)

4.4.2 Investors' perception of unpredictability

Investors recognized the high risk involved in early-stage equity investment and expected numerous investments to be losses: '*We know that most of the companies won't achieve expected*

return. But this is why this is venture capital investing, it's a risky investment' (T1); '*It's venture capital, you got to be a risk taker'* (T8).

Many investors believed that markets were the biggest source of risk due to their unpredictability. Many emphasized that early-stage investors were *'almost always investing in stages when the product–market fit isn't clear*' (T6). Consequently, the biggest challenge was '*establishing whether the product–market fit will be achieved or not*' (T6). The investors in our sample were aware that they could not predict a given market's future direction because '*trends come and go*' (T14):

> *These days trends are not something linear or stable. Trends are created every day, which is why doing market analysis is very stepmotherly. Trying to be trendy is like … However, there are some major changes in the industry to be taken into consideration*. (T8)

Some claimed that they adjusted their expectations as they gained more experience and did not *'fool themselves thinking [they] can read the market*' (T13). As one investor stated:

> *This team wants to enter the US market, where they expect product–market fit and rapid growth. We are old enough that we are accustomed to not expect anything but if they succeed, we will discuss additional investment*. (T15)

The COVID-19 pandemic has brought to the fore several examples of quick, extreme market shifts that were completely unexpected. These shifts have contributed to the investors' perception of market unpredictability, but reinforced their belief in the importance of strong entrepreneurial teams that are alert to the new opportunities brought about by market shifts:

> *We had a company that deals with sports streaming and during the first months of COVID, sports just died. No one was doing any sports, so their revenues went to zero, unlike their costs. And it was quite a dramatic situation. They thought long and hard about what they're going to do and pivoted from professional sports streaming to celebrity sports streaming. And that, it turns out, attracted even considerably bigger revenues than their traditional professional sports streaming. So we thought, well, that's a nice example of someone, you know, who found a new angle to do what they used to do in the new circumstances. It's not so easy for everyone*. (T7)

Furthermore, the early-stage equity investors recognized that they made investments based on very limited information about the companies. Moreover, they expected the companies to change direction one or several times before exit. Therefore, in addition to dealing with market uncertainties, the investors dealt with uncertainties related to the venture and its future direction:

> *The biggest challenge in evaluating opportunities is that these companies are far from being where they want to be in, let's say, five years' time. And the most difficult thing is that you see a small company in front of you with a small team and the technology they have at that point, and you have to judge its potential to be a thousand times bigger in five or more years. As an investor you need to believe that this is possible and probable*. (T19)

The investors realized that they did not *'possess any magic skills to be able to tell in advance who will be the big winner*' (T21). They relied partly on their own market research and partly on their assessment of the entrepreneur to evaluate the attractiveness of an investment opportunity. Investors emphasized that, on the one hand, '*before saying yes to an investment we really try to dive into the metrics and understand the market*' (T5); on the other hand, '*there's got to be someone [in the team] who really understands the market*' (T7) and is '*able to pivot and manage [market] risks'* (T16). One investor expressed that:

> *We have been investors for a number of years. We have seen many pivots. So if the founder is good, they learn as they go forward and then they make adjustments accordingly. And eventually they may end up in a somewhat different place than where they started and that's normal, that's OK, that's good*. (T21)

While we observed that investors largely shared the conviction that markets were unpredictable and rocky, they believed that they were '*good at reading people*' (T14) and recognized '*the potential in people*' (T8). In particular, they pointed to certain skills and dispositions they believed would help entrepreneurs to navigate uncertain markets, for example: '*Technologies come and go, products come and go but the ability of a person to understand why customers buy stays and will not become obsolete*' (T21). In addition, many investors believed that an entrepreneur's past behavior and performance were predictive of the entrepreneur's future behavior and performance. Accordingly, these investors showed strong biases towards experienced and successful entrepreneurs: '*Serial entrepreneurs are generally more successful than first-time entrepreneurs because, again, there's a learning curve*' (T9).

> "*If we have a choice, and one of the company is funded by serial entrepreneur and another one by first-time entrepreneur, we will invest in serial founder. It is less risky investment. I think it is also important to give a chance to first time entrepreneurs, but we have a deal flow like that and it is easier to make a decision*." (T1)

4.4.3 Investors' attributions of success and failure

Investors believed that the characteristics of the business opportunity, especially industry characteristics, strongly influenced the venture's outcome: '*when markets get rough, everything gets rough*' (T7). Most investors attributed a venture's success to the team involved; however, when discussing portfolio ventures that had failed, they attributed that failure to the market and to the entrepreneur to a similar degree. We noticed that more experienced investors had a greater tendency to attribute successes and failures to market conditions, as they seemed to have learned through their investing experience that even the best entrepreneurial teams and best products could have troubles in unfavorable market conditions:

> *What I can tell you is that some companies do significantly better than others. And the reasons for this are, first and foremost their markets. The market is the big tsunami that moves all the boats. And when the markets are moving very well for certain companies and not for others, it's hard to delineate the other factors because the founders of the companies and markets that are not doing very well need to double perform. They have to do something extraordinary in order just to stay afloat*. (T7)

> *An excellent entrepreneur in a bad market will never be a remarkable result; an average entrepreneur in an extremely fast growing market can be a very good result. I have an example of a startup where the entrepreneur is not that good, but because the market is growing fast, it does not matter because the market pulls the company. Someone who is better [entrepreneur] might have taken better advantage of that opportunity, but for me as an investor, what's happening now is very good*. (T3)

Market attributions were especially common when investors discussed the potential of exceptional returns on investment and unexpected startup failures due to the COVID-19 pandemic. The surprising market developments around the pandemic led some to discuss market timing: '*At the beginning, I thought that the team was relatively important, but with investing experience, I have found that the most important factor is whether the team caught the trend or not*' (T14). They also emphasized the importance of a bird's eye view in investing: '*Investors need to look at it from a bird's eye view. It's not whether I like the idea or not but whether there is a market for it or not*' (T8). One investor shared a story:

> *This company has been on the verge of bankruptcy several times; the company's reputation has been really hit by all the arguing with the VCs. But now they've sold that company for €360 million. A big part of the reason they were able to sell it is that biotechnology has finally come to a stage where it is technologically interesting and trendy*. (T14)

That being said, investors also attributed the failure of startups to the execution capabilities of entrepreneurs. One investor admitted: '*We underestimated the complexity of the market and we overestimated the capability of the team*' (T11). Another investor put it like this: *'They had a great business idea but lacked the competences to follow through with it*' (T2). These comments highlight the perceived interrelationship between the entrepreneur and the specific business opportunity. They show that, from the investors' perspective, the interaction between the characteristics of the entrepreneur and the characteristics of the business opportunity determines the outcomes of the venture: '*They are a credible team and the solution is good but they can still fail, of course* ' (T15). The investors also emphasized the importance of founders exhibiting team-building and leadership skills, as '*you rarely find it all in one person*' (T12); therefore, the entrepreneur needs to be '*a leader, someone who has the ability to build the right team for the job around him*' (T8).

In addition, the investors attributed a venture's failure and success to the character of the entrepreneur. Investors emphasized personal qualities such as ambition, perseverance, hard work, ingenuity, learning ability and action orientation. Many investors stressed the importance of understanding '*what is going on in founders' minds, what drives them*' (T22), since:

> *There is this specific breed of founders that are really eloquent. But the problem is that they're more focused on the next Forbes article about them then the right things. /.../ In my experience they just don't make it*. (T16)

Investors believed that founders who entered entrepreneurship because they saw it as '*the best way to solve a problem they found*' (T21) and were driven by a '*desire to create something great and make their mark on the world*' (T18) were more likely to succeed than those who were driven by financial gain and social recognition. Finally, some investors pointed to a lack of integrity or honesty that resulted in some entrepreneurs being unable to raise the next round of funding needed for the survival of the venture:

> *They basically lied to us. The money we invested to help the company grow in the US market was spent on product development. Now they need more money to actually enter the US market, but they will not get it from us. Other investors will not give them money either, because all the investors they are going to approach will contact us first to find out what happened, and we will tell them that this is not a credible team*. (T15)

Table 18: Representative data by aggregate dimensions and themes

Themes and concepts	**Representative data**
Dimension: Locus of attention	
Theme: Attention to the whole	
Investment opportunity is considered as a whole	'*I'm trying to combine all things and try to make some sort of a mental picture*.' (T6) '*I would not be convinced if I had not seen both the market opportunity and a credible team that had already developed and validated the product*.' (T15)
One aspect is not prioritized over another	'*I'm not sure which one is more important because I can't really distinguish. My investment decision-making is always a mix of all the factors not one by one*.' (T6). '*I don't know how to rank them [different factors] because you need to have a mix of all of them*.' (T4)
Different aspects of investment opportunity need to fit together	'*So one component is market, second component is the product, and these two have to somehow match with each other. Overlap. But then the third thing that ties the two things together is the team. /.../ If everything overlaps, there should be another point in the middle where entrepreneurs and investors can meet*.' (T7)
Theme: Attention to the entrepreneur	
Entrepreneur is a proxy for venture quality in the early stages	*'It's mostly the founder, because we invest in the seed stage. So you don't have anything usually to look for in the company.'* (T1) '*Eventually, the earlier you go with your investment, the more you have to rely on the softer factors. You know, is this the team that's going to pull through the whole thing?*' (T7)
Entrepreneurs deal with market risk and uncertainty	*'I think that a great team is the core because obviously, in early-stage we are dealing with a lot of unknowns, a lot of risks, and we need to have people that are able to pivot and manage these risks.'* (T16) *'I try to assess what will happen to the business if a depression, recession, or other crisis occurs. That's why I am most interested in how entrepreneurs will deal with the unknown and crises.'* (T2)
Entrepreneurs execute business ideas	'*They may have the best understanding of the customer and the best idea but if they can't implement it then nothing material will result of it*.' (T21) *'We know there are lots of good ideas. But at the end of the day, everything comes down to execution. The capability to execute is the first thing we look in a founder.'* (T23)

(*table continues*)

(*continued*)

Dimension: Perception of interrelatedness	
Theme: Entrepreneurs discover opportunities	
Competent entrepreneurs discover strong opportunities	'*Obviously, the market opportunity is very important, but most of the time that goes along with the team - because if they understand the market well and are good in conceptualizing the idea there are good chances that a team is good*.' (T4) '*So if the founders have the ability to understand the customer's problem really well, it means they will identify a meaningful problem in a meaningful industry, which in turn means they will discover an attractive business opportunity around which the business case will then be built*.' (T21)
Entrepreneurs who discover opportunities are more committed	'*We invest only in founders who have developed their own ideas and want to work on them, because it creates a much stronger connection between management and the company. And since there are always ups and downs, you want people who are going to persist when things get tough instead of throwing it away and moving on to something else.*' (T19) '*We have learned that if the vision is not the vision of the founders, it is very dangerous to push them in a direction they do not want or do not understand how or why they should go. The vision must be their own*.' (T5)
Theme: Entrepreneurs exploit opportunities	
Entrepreneurs need to have expertise specific to the business opportunity	*'If you had a successful startup in sports and now you're coming to me with an idea about a startup in agriculture, then your previous entrepreneur experience does not carry so much weight. Because I don't see how you understand the agriculture market and how are you the best founder for this idea*.' (T7) '*The best companies usually have management teams that have special knowledge in a particular area. This knowledge is not easy to acquire, but they were usually active in the field and gained insights that others do not have*.' (T19)
Dimension: Perception of unpredictability	
Theme: Market uncertainty	
Markets are unpredictable	"*Let's face it, we invest in early-stage companies where the fruits of your investment do not show up for three years or so. And then we really want to hit the big numbers, which again takes a few years. And guess what? Then there's an economic downturn or something happens like COVID or something else that you did not plan for*.' (T22)

(*table continues*)

(*continued*)

	The big challenge is figuring out what the world will look like in X years when the product comes to market after a very long development process. Will it still be relevant in X years? That's the big challenge.' (T11)
Uncertainty and failure are normal part of early-stage equity investing	*'We have this Darwinian process going on. You invest in 30 pre-seed companies and end up with 10 after five years and it's normal, it's expected. We don't cry because some of them died. It is basically what it is.'* (T16) *'When you are faced with the real world, sometimes things just do not work out the way you anticipated or predicted. And that's why we disproportionately rely on very high returns from a few companies versus average returns from all of them. I would not even count this as a failure, because that's a normal thing in this work.'* (T23)
Theme: Unpredictability of venture's direction	
Information about the venture is scarce	'*[In the seed stage] you don't have anything usually to look for in the company*.' (T1) *'The challenge is definitely imperfect information. It's one thing to assess a company with a three or four year history and see how it has performed in the past. It's great if you have that information, but we usually do not*.' (T23)
Shifts in business strategy are expected	'*In startups, there are big differences between how the business plan was written and how it was actually implemented. That's why it's even more important that the people who run these teams and these companies have the right qualities*.' (T2) *'In the beginning, these things aren't always known. The company can pivot, it can change direction. So you have to believe in the person you are investing in.'* (T1)
Dimension: Attribution of success and failure	
Theme: Market attributions	
Market determines venture's ability to grow	*'There certainly is an element of a rising tide lifts all boats and research shows that for the past 100 years, over 80 percent of all growth for businesses has come from the growth of the market. So unless you are in a market that grows, it's extremely difficult to grow. So you need to choose the right market if you want to grow.'* (T21) '*What I can tell you is that some companies do significantly better than others. And the reasons for this are, first and foremost their markets.'* (T7)
Market timing determines returns on investment and opportunities for exit	*'Sometimes we see companies with great technology, great product, but they're way too early and just don't make it. And then three years later, we see a competitor with the same type of proposition all of a sudden getting traction we couldn't achieve.'* (T22)

(*table continues*)

(*continued*)

	'Today, we live in an attention economy. For example, three years ago, we were able to sell blockchain to insurance companies because everyone was raving about it and executives were thinking, "Okay, let's do something about this." It was easy to get a customer because it was trendy at the time.' (T14)
Facing unattractive markets even the best entrepreneurs struggle	'*They were pivoting, pivoting, pivoting and there was no market need for the product, like they got to a certain number of users and that was it. This eventually led to some issues with fundraising. So they couldn't raise a new round and they went bankrupt and liquidated the company*.' (T17) '*I have invested twice in this entrepreneur and both times we failed. But I would invest a third time because I believe we did not fail because of him; it was the other part that was missing - there was no market, the business opportunity was too weak*.' (T18)
Theme: Entrepreneur attributions	
Entrepreneur's executing and teambuilding abilities	'*They had a very deep knowledge of the market need. /.../ We saw the capability of these people to actually develop the product, motivate others, and build a team around them*.' (T6) '*The founder was very good. He built a team, which was mainly a tech team and they created the state of the art solution. They are appreciated by all the clients*.' (T4)
Entrepreneur's character and ambitions	'*What differentiated these five successful investments from the rest was entrepreneur's personality. They were persistent, hardworking, efficient and bold*.' (T12) '*What hurts the most is that there is an opportunity we won't fully exploit. /.../ The team has no ambition to create something great, they have no vision to create something on a global scale. They also find it too easy to complain and feel sorry for themselves. You need to get up and push on*.' (T18)

4.5 Discussion

Much has been written about the investment criteria used by early-stage equity investors (Ferrati & Muffatto, 2021), yet research has failed to agree on the relative importance of the strength of the business opportunity and the strength of the entrepreneur (Mitteness, Baucus, et al., 2012). The business opportunity and entrepreneur are often portrayed as two distinct parts of the investment opportunity that compete for investors' attention (Harrison & Mason, 2017; Huang & Pearce, 2015; Kaplan et al., 2009). Moreover, researchers have observed that sometimes investment opportunities that score positively on the criteria related to the business opportunity and entrepreneur nonetheless fail to secure early-stage investment (Cox et al., 2017).

In fact, these findings suggest that early-stage equity investors do not reach investment decisions by scoring investment opportunities based on predefined investment criteria, as many studies have (implicitly) assumed (Maxwell et al., 2011).

Using an exploratory approach and in-depth semi-structured interviews with investors, we point to the important role of the nature of the investment context that makes it difficult for investors to apply analytical or structured approaches to decision-making investment context in early-stage investment. We find that early-stage equity investors consider the entrepreneur and the business opportunity to be entwined when making investment decisions, recognizing the inherent ambiguities associated with investment opportunities. This reflects a more holistic approach to decision-making. Drawing from rich qualitative data, we identified four main aspects of investors' decision-making. The first aspect concerns the locus of investor attention on the investment opportunity as a whole rather than on the individual aspects of the opportunity. Second, investors acknowledge the interplay between the entrepreneur and the business opportunity. Third, the outcomes of the entwined opportunity and entrepreneur are perceived as unpredictable due to the limited ability to predict changes in the business environment and the company's mid- and long-term direction. Finally, in the process of making decisions, investors assume that the outcomes of their funding decision (success or failure) depend also on situational factors and not just on the entrepreneur.

There was certainly observable heterogeneity across individual investors in the approach to their investment decisions. Some investors were more inclined to partition investment opportunities into discrete aspects and then integrate them to make sense of the investment opportunity, while others considered the investment opportunity as a whole from the outset. We did not find that this tendency was related to investor type, investment stage, or industry, suggesting that investors' predominant thinking style depends to a substantial extent on their personal characteristics. In regards to differences between investor types, we observed that angel investors were more likely than venture capitalists to discuss various aspects related to the entrepreneur, which may indicate that angel investors place greater importance on the entrepreneur compared to venture capitalists (a finding that corroborates the results of (Mason & Stark, 2004a)). Finally, we noted considerable heterogeneity in the investment policies of angel investors. We observed a specific subtype of angel investors who like to take a co-founder role in portfolio ventures ("founding angels"). These angel investors prefer to enter ventures at the earliest stages and are very actively involved in them. This is consistent with their primarily non-financial motives, such as supporting novice entrepreneurs. This subtype of angel investor places a high value on the personality of the entrepreneur and is willing to compromise on other indicators of the strength of the entrepreneur, such as the entrepreneurial experience, which they believe they can provide.

4.5.1 Implications for theory and practice

Our findings make several theoretical and practical contributions. First and foremost we contribute to the literature on early-stage investors' decision-making behavior and investment criteria. Our results show that early-stage equity investors make investment decisions by considering interrelated factors associated with the entrepreneur (team) and business opportunity (market/industry characteristics). We found that the business opportunity serves as the backdrop for investors to assess the strength of the entrepreneur. In line with previous research (Carpentier & Suret, 2015), we noticed that early-stage equity investors are particularly concerned with entrepreneurs' execution capabilities (more so than, for example, moral hazard). Therefore, investors seek to understand not only whether the entrepreneur has the personal qualities required for being successful (Markman & Baron, 2003), but also whether entrepreneurs possess specific knowledge and skills that will enable them to succeed in a particular market. In other words, investors need to perceive that there is a good fit between the entrepreneur and the proposed business opportunity. At the same time, early-stage investors recognize that the entrepreneurs themselves discover business opportunities (Shane, 2000). Therefore, the strength of the entrepreneur is at least partially judged by the perceived strength of the business opportunity presented. In effect, the results of our research show that the strength of the entrepreneur and the strength of business opportunity do not compete for the investor's attention, as is sometimes portrayed in the literature (Baum & Silverman, 2004; Harrison & Mason, 2017; Huang & Pearce, 2015; Kaplan et al., 2009; Mitteness, Baucus, et al., 2012); rather, these aspects are considered together when investors are making sense of the investment opportunity as a whole.

The tendency to consider the entrepreneur and business opportunity as interrelated is associated with a holistic thinking style (Norenzayan et al., 2002; Norenzayan & Nisbett, 2000). This thinking style is considered especially adaptive when decision-making is done under conditions of uncertainty and ambiguity (Isomura & Kobayashi, 2020). Early-stage investment decisions are made on the basis of noisy and ambiguous signals about the ventures (Plummer et al., 2016) in the context of high market uncertainty (Huang & Pearce, 2015; Kollmann & Kuckertz, 2010). This makes early-stage investment an activity characterized by risk and uncertainty (Huang, 2018). The results of our research extend the findings of previous studies suggesting that early-stage investors integrate different information to reach their final investment decision (Huang, 2018). We found it is necessary for investors to combine information about the entrepreneur and the business opportunity in order to discern the available information, which is often ambiguous and subject to change. This finding has implications for research focused on signaling and screening behaviors in the context of high uncertainty and ambiguity.

In addition to investors' perceptions of uncertainty, outcome attributions also play an important role in why investors consider the characteristics of the entrepreneur and the business opportunity together. Investors believe that the market is a powerful force shaping the outcomes of portfolio ventures. At the same time, they recognize that outcomes depend on the entrepreneur's skills and ambitions. In other words, success is a result of the interplay of skills and circumstances ('luck') (Cope, Cave, & Eccles, 2004; Zunino, Dushnitsky, & van Praag, 2021). This finding has implications for the entrepreneurial failure literature, as it suggests that investors do not automatically attribute past entrepreneurial failure to the entrepreneur. Investors are interested in understanding the circumstances under which the failure occurred.

Apart from the entrepreneurship and management literature, the results of this research offer interesting insights into the conditions under which holistic thinking styles may be preferred and informs the emerging stream of literature on individual differences in the preference for holistic or analytic thinking (Choi et al., 2007). The results suggest that individuals who need to make decisions in contexts characterized by high information asymmetry and unpredictability are more likely to combine and entwine different types of information, including the characteristics of the context.

Finally, the practical implications of our research extend to entrepreneurs and investors. Entrepreneurs should realize that early-stage investor decisions rely heavily on the information the entrepreneur provides (Bollazzi et al., 2019; Glücksman, 2020). Therefore, entrepreneurs need to demonstrate that there is a strong business opportunity that they are uniquely positioned to exploit. Since the structure of a business plan, investment application form, or standard investment pitch deck may not emphasize this aspect, it is particularly important that entrepreneurs recognize that they are being evaluated with respect to the proposed business opportunity. On the flip side, our findings can help investors become more aware of their decision-making process (Zacharakis & Meyer, 1998) and improve their screening and selection efforts. Investors who approach their assessment of investment opportunities using checklists (Huang, 2018) could, for example, include entrepreneur–opportunity fit criteria to gain a more holistic understanding of the investment opportunity.

4.5.2 Limitations and future research

Although we have carefully conducted our data collection and analysis, our study has several limitations. Qualitative research is well suited to exploring complex decision-making processes. However, qualitative research may be subject to potential retrospective bias and limited generalizability. For our study, we sampled only investors who were active in continental Europe, which may limit the generalizability of our results to other research contexts. Indeed, research has

shown that cultural factors influence the inclination towards particular thinking styles (Masuda & Nisbett, 2001). In addition, researchers have observed differences in the use of investment criteria between investors based on their geographic location (Ding et al., 2014; Schwienbacher, 2008).

Our findings also open up questions that could be addressed by future research. Although we observe some between-investor differences in their investment policies, these potential differences should be further explored. Our research results are a combination of informant-centric first-order data (concepts) and a more abstract second- and third-order analysis and theorization. As such, our research offers a great base for the future development of a scale to explore investors' propensity for holistic thinking. Such a scale would enable researchers to evaluate the impact of a holistic thinking style on portfolio performance. More specifically, psychological research suggests that people whose thinking styles match the requirements of the task perform significantly better (Phillips et al., 2016). Therefore, future research could explore whether holistic thinking is indeed adaptive in the context of early-stage equity investment. In addition, such a scale could enable better investigation of individual differences between investor types or experience in terms of decision-making behavior (Franke et al., 2008; Hsu et al., 2014).

Thinking styles could also influence access to capital. Psychological research has repeatedly shown that people form more favorable attitudes towards individuals who share the same thinking style (Na, Choi, & Sul, 2013). These findings have been replicated in the context of early-stage investment. Investors who use causal decision-making processes prefer entrepreneurs who focus on causation as opposed to those who focus on effectuation, and vice versa (Murnieks et al., 2011). Therefore, it may be fruitful to investigate investment decision biases as a result of preferences for 'matching' based on the holistic versus analytic thinking style.

Finally, although we suggested that holistic information processing might be an important cognitive capacity when making decisions in uncertain and ambiguous environments, the potential downsides associated with this particular thinking style should be explored. In particular, holistic thinkers may be more susceptible and responsive to information that should not impact their decision-making (noise) (McElroy & Seta, 2003). This could have implications for the effectiveness of this particular thinking style in the context of early-stage equity investment, where information is frequently noisy and sometimes purposely altered by entrepreneurs who want to increase their chances of securing early-stage capital (Cottle & Anderson, 2020).

4.6 Conclusions

Early-stage equity investors make investment decisions based on scarce and ambiguous information. Our research suggests that investors integrate information about the entrepreneur and the business opportunity to make sense of the investment opportunity as a whole. We identified four aspects of early-stage investor decision-making that led us to conclude that investors' evaluation of investment opportunities is holistic in nature. We hope that future research will use our work as a starting point for further exploration of investor decision-making processes. We believe that research on decision-making processes will complement research on early-stage equity investors' investment criteria and clarify the conflicting results of previous studies aimed at answering whether investors bet on the jockey or the horse.

CONCLUSION

Access to early-stage funding is one of the factors determining which new ventures thrive and which struggle (Gilbert et al., 2006). Obtaining early-stage equity funding is critical to a new venture's performance (Grilli & Murtinu, 2014; Lee, Lee, & Pennings, 2001; Lee, 2014). However, most ventures with high growth potential fail to obtain early-stage equity financing (Davila, Foster, & Gupta, 2003) due to high information asymmetries between entrepreneurs and prospective investors (Wiklund, Baker, & Shepherd, 2010). To date, a large number of studies have focused on identifying the criteria that early-stage equity investors consider when making investment decisions (Ferrati & Muffatto, 2021), yet these criteria have frequently proven to be unreliable predictors of the received early-stage funding (Cox et al., 2017).

The purpose of our work was to explore not only which information early-stage equity investors use in their decision-making, but also how and why they use that information in a particular way. In our research, we acknowledge that, in the early stages of investment, information on venture performance is limited (Bernstein et al., 2017). This is why early-stage equity investors must rely heavily on information provided by entrepreneurs and information about entrepreneurs (Maxwell et al., 2011). Compared to later stage investors, early-stage investors base their decisions on information that is selective, largely unregulated, and less reliable (Plummer et al., 2016). Such information precludes the use of fully compensatory analytical information processing (Brusovansky, Glickman, & Usher, 2018).

Our literature review showed that most research to date has treated new ventures as signal senders. A substantial body of research has examined the signaling value of prior venture funding, affiliations and alliances, patents, and prototypes. However, researchers are increasingly realizing that, due to the limited track record of a new venture, investors rely on their assessment of the entrepreneur as a proxy for venture quality (Kaplan et al., 2009). The founder's education and experience are considered the most important signals for early-stage equity investors, and thus these have been the most studied. In addition to human capital, researchers have also uncovered the role of the founder's social and relational capital in obtaining early financing. A smaller body of literature has also investigated the role of the entrepreneur's displayed personal characteristics in obtaining early-stage funding. This stream of literature has successfully challenged the assumption that costly signals are more effective because signal receivers recognize that they are harder to imitate by inferior prospects (Nagy et al., 2012).

Based on the literature, we identified several avenues of future research in the field. First, we observed increased interest in understanding how the gender of entrepreneurs affects their chances of obtaining early-stage financing. We suggest that research should expand to other

unexplored indices such as age and race. Second, we observed that most researchers hold the implicit assumption that investors consider signals independently from one another (Busenitz et al., 2005). We review preliminary evidence against this assumption and suggest that future research explore how signals interact to inform early-stage equity investors' decisions. Third, we recognize that entrepreneurs and investors form long-term, reciprocal relationships in which they exchange not only financial resources but also non-financial resources (e.g., mentoring) (Huang & Knight, 2017). We note that research has thus far largely overlooked the value of interpersonal signals that inform investors about the potential return on non-financial resources (Ciuchta et al., 2018). This also leads us to the fourth suggestion that researchers should investigate how entrepreneurs and early-stage investors match by building on similarity research (Murnieks et al., 2011). Fifth, not all signals work to the advantage of entrepreneurs. We therefore suggest that researchers investigate the value of negative signals in investors' decision-making. Because investors are exposed to a variety of signals about entrepreneurs and business opportunities that are rarely univocal, researchers should examine how investors make decisions in the face of incongruent signals. Seven, entrepreneurs have an incentive to send dishonest signals to increase their chances of obtaining financing and to increase their firm's valuation. Therefore, research efforts should be directed toward understanding how investors can distinguish honest from dishonest signals. Eight, we identified only one study that explicitly addressed differences between angel investors and venture capitalists (Hsu et al., 2014) and found that the majority of research has treated these two investor groups as monolithic in their investment decision-making. This leads us to the ninth suggestion which relates to how investors and entrepreneurs match. This is particularly important in early-stage equity investing, where investors also provide non-financial resources by working closely with entrepreneurs. Next, there has also been little research on the role of investment stages in investors' decision-making. Finally, we recognize that information asymmetry in early-stage investing is two-sided (Glücksman, 2020). Therefore, not only entrepreneurs but also investors need to signal, and future research could address how investors can signal to attract high-quality new ventures.

Through primary research, we investigated how the different signals interact and the role of interpersonal signals. We also considered the possible differences between investor types and investor post-investment activities. We argue that investors perceive entrepreneurs through the lens of two major factors – competence (agency) and cooperativeness (communion) – that shape social judgments about others (Abele et al., 2021). Our results suggest that investors primarily pay attention to the entrepreneur's competence, possibly because their returns are highly dependent on the entrepreneur's ability to execute. Entrepreneurs can signal their competence in several ways. Although industry experience is commonly considered a signal of the entrepreneur's competence (Mitchelmore & Rowley, 2010), we have found that inexperienced entrepreneurs

can overcome this weakness by demonstrating their in-depth knowledge of the industry through thoroughly prepared market research. Signals of competence are particularly valued when combined with signals of cooperativeness, especially coachability. We suggest that this is not only because coachable entrepreneurs are more likely to capitalize on the mentoring and coaching that many early-stage equity investors provide (Ciuchta et al., 2018), but also because these entrepreneurs are more susceptible to the relational governance mechanisms that investors use to curb entrepreneurs' opportunitsm (Carson et al., 2006). The combination of these different signals is, therefore, important to early-stage investors because it presents a lower risk of adverse selection and moral hazard (Eisenhardt, 1989) in decision-making. These results illustrate that there is a wide range of signals that inform investors about an entrepreneur's competence and cooperativeness, and that entrepreneurs can selectively choose those that are to their advantage. However, signals that correspond to different dimensions of social perception (competence and cooperativeness) reinforce each other and increase the likelihood of securing early-stage financing.

We have also observed the complementary nature of information at the level of the investment opportunity. Our results suggest that the entrepreneur and the business opportunity are not two elements of the investment opportunity that are considered separately by early-stage investors, as has been widely argued in the literature (Harrison & Mason, 2017; Kaplan et al., 2009; Mitteness, Baucus, et al., 2012). By contrast, we find that the entrepreneur is evaluated with respect to the proposed business opportunity. First, investors are aware that entrepreneurs discover business opportunities, and therefore the perceived strength of the business opportunity is an indication of the strength of the entrepreneur. Second, investors are particularly interested in the entrepreneur's ability to exploit opportunities. Consequently, they pay particular attention to signals about whether the entrepreneur will be able to follow through on the identified business opportunity. We also find that many investors tend not to prioritize one aspect of the investment opportunity over another because they prefer to get a sense of the opportunity as a whole. In particular, this finding extends the work of Huang (2018), who found that a "gut feeling" about the investment opportunity as a whole determines whether or not an investor will invest. We point to how investors combine different pieces of information to gain an overall impression of the investment opportunity. This holistic information processing style (Choi et al., 2007) reflects investors' belief that a venture's outcomes are shaped by the interplay between the entrepreneur's competence and favorable circumstances (Cope et al., 2004), as well as their recognition that their decisions are based on imperfect information, which limits their ability to predict the trajectories of both markets and ventures.

Besides the research directions identified in the literature review, the results of our primary research open up several avenues of future research. As far as we are aware, we are the first to study early-stage equity investors' investment decisions through the lens of social perception and

judgment research (Abele et al., 2021; Abele, Uchronski, Suitner, & Wojciszke, 2008). Not only does this lens simplify our understanding of how investors evaluate entrepreneurs (since there are only two dimensions that guide social perception, rather than the 71 different criteria studied in previous work), but it also enables us to theorize about how information pertaining to these two dimensions interacts. We suggest that these two areas of information may complement each other, whereas different information pertaining to the same dimension may compensate for each other. Therefore, the role played by a particular signal in relation to other signals depends on the similarity of the content. We therefore suggest that future studies investigate how the different entrepreneur attributes considered by investors fall into these two dimensions from the investors' perspective. Such research would significantly advance our understanding of how different signals should be combined to convincingly convey relevant information to early-stage equity investors.

We also show that the investment selection process is influenced by the investor's expected involvement in post-investment activities. In particular, investors who are more involved prefer entrepreneurs who are more cooperative, suggesting that investors consider their compatibility with the entrepreneur. This opens up a debate on the role of complementarity and similarity in matching (Dryer & Horowitz, 1997) between investors and entrepreneurs. In particular, the role of complementarity in deal selection has been under-researched (Knockaert & Vanacker, 2013). At the same time, research on early-stage equity investors has shown that venture capitalists prefer entrepreneurs who are similar to them in professional background (Franke et al., 2006) and thinking style (Murnieks et al., 2011). The latter suggests that it could be fruitful to investigate biases in investment decisions resulting from the preference of holistic over analytic thinking, with implications for decision-making research in the context of early-stage equity investment.

Finally, our results provide insights into early-stage equity investors' decision-making processes and decisions. We suggest that in contexts characterized by risk and uncertainty, a holistic information processing style may be adaptive (Ji, Nisbett, & Su, 2001). In fact, such contexts preclude the use of analytical information processing due to the variety and ambiguity of available information (Huang, 2018). However, a holistic information processing style comes with limitations. Specifically, holistic thinkers are more susceptible to noise, meaning that they are more likely to consider irrelevant signals (McElroy & Seta, 2003). Further research is needed to determine how identified decision-making processes impact portfolio performance, in particular whether holistic information processing actually leads to better portfolio performance.

Our research differs from much of the previous work that has assumed that different information about the entrepreneur and the business opportunity is considered independently (Colombo, 2021). We challenge this assumption and argue that, in the context of early-stage equity investment, investors combine different information to make sense of the entrepreneur and the

investment opportunity as a whole. Our research also challenges the implicit assumption of much previous work that early-stage equity investors use a fully compensatory analytical approach to decision-making (Maxwell et al., 2011). We suggest that the nature of available information and conditions of high uncertainty preclude the use of fully compensatory analytical information processing and favor a holistic approach to information processing. Our insights complement previous research on the investment criteria of early-stage equity investors by exploring how information pertaining to these criteria is actually used when making investment decisions.

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APPENDIX

Summary in Slovenian language/Daljši povzetek disertacije v slovenskem jeziku

Naslov disertacije v slovenskem jeziku: Dejavniki odločanja zgodnjih vlagateljev kapitala

1. Uvod

Angelski vlagatelji in vlagatelji tveganega kapitala veljajo za najpomembnejši vir zunanjega lastniškega financiranja za nova podjetja, in sicer skupaj predstavljajo več kot 90 % celotnega trga zgodnjih naložb (EBAN, 2019). Zunanje lastniško financiranje podjetij v zgodnjih fazah razvoja je prepoznano kot motor inovacij in gospodarske rasti (Drover, Busenitz idr., 2017). Mlada podjetja z visokim potencialom rasti, ki jih finančno in nefinančno podpirajo angelski vlagatelji in vlagatelji tveganega kapitala, imajo namreč nadproporcionalno velik učinek na ekonomsko rast (Andersson idr., 2012; Pradhan idr., 2017; Samila in Sorenson, 2011; Szabo in Herman, 2012), raven zaposlenosti (Acs in Mueller, 2008; Van Stel in Storey, 2004), razpoložljivost visokokakovostnih delovnih mest (Dolan in Metcalfe, 2012) in družbeno blagostanje (Svetek in Drnovšek, 2022). Prav nezmožnost pridobitve zunanjega lastniškega kapitala predstavlja eno največjih ovir za preživetje in rast mladih podjetij z visokim potencialom (Lee, 2014). Zaradi visokega tveganja in negotovosti, povezanih z mladimi inovativnimi podjetji, ta podjetja namreč pogosto ne morejo pridobiti dolžniškega kapitala za svoj razvoj. Ker zgodne financiranje s strani podjetnikov, njihove družine in prijateljev pogosto ne zadostuje za razvoj podjetij z visokim potencialom rasti, v nekatera izmed teh podjetij vstopijo zunanji zgodnji vlagatelji. Številni raziskovalci so poskušali ugotoviti, kaj razlikuje peščico (do 4 %; Evans in Hudson, 2005; Mason idr., 2017) tistih investicijskih priložnosti, ki uspešno pridobijo naložbo v zgodnji fazi razvoja podjetja, od tistih, ki se za tovrstne investicije potegujejo, vendar jih ne uspejo pridobiti.

Večina študij na tem področju se je bodisi ukvarjala z identifikacijo kriterijev ocenjevanja naložbenih priložnosti, ki jih uporabljajo angelski vlagatelji in vlagatelji tveganega kapitala (npr. MacMillan idr., 1985; Maxwell idr., 2011; Sudek, 2006), ter z empirično oceno pomembnosti posameznih kriterijev odločanja (npr. Epure in Guasch, 2020; Hsu idr., 2014; Malmström idr., 2020; Murphy idr., 2007). Do danes so raziskovalci odkrili več kot 200 dejavnikov, ki naj bi vplivali na verjetnost investicije angelskih vlagateljev in vlagateljev tveganega kapitala (Ferrati in Muffatto, 2021). Številčnost kriterijev kaže na število različnih vidikov naložbene priložnosti, ki jih vlagatelji upoštevajo (Shepherd idr., 2000).

Odločitve o zgodnjih investicijah lastniškega kapitala so zahtevne zaradi velike asimetrije informacij (Sohl, 1999), dvoumnosti in nezanesljivosti razpoložljivih informacij (Daily idr., 2005; Plummer idr., 2016), nepredvidljivosti strateških usmeritev mladih podjetij (Plummer idr., 2016)

in visoke negotovosti trgov (Baron, 1998; Huang in Pearce, 2015). Poleg tega pa je rezultate zgodnjih naložbenih odločitev težko napovedati še ob tako obsežnih analizah (Sadler-Smith in Shefy, 2004). Kljub tem izzivom se angelski vlagatelji in vlagatelji tveganega kapitala vendarle odločajo za naložbe v mlada podjetja z visokim potencialom rasti. Prav to – selekcija podjetij z visokim potencialom rasti – namreč predstavlja ključno nalogo zgodnjih vlagateljev; poleg tega pa ti vlagatelji pogosto igrajo pomembno vlogo tudi pri podpiranju razvoja teh podjetij (Brander idr., 2002).

2. Raziskovalni cilji

Dosedanje raziskave so pomembno prispevale k našemu razumevanju širine in kompleksnosti odločanja zgodnjih vlagateljev (Ferrati in Muffatto, 2021), vendar pa še vedno ni jasno, kako zunanji vlagatelji lastniškega kapitala uporabljajo razpoložljive informacije o mladih podjetjih, ki iščejo investicije. V tej disertaciji poskušamo odgovoriti na sledeča vprašanja:

(1) Katere značilnosti podjetnika in poslovne priložnosti pri svojih naložbenih odločitvah upoštevajo zgodnji vlagatelji lastniškega kapitala (tj. angelski vlagatelji in vlagatelji tveganega kapitala)?

(2) Kako zgodnji vlagatelji lastniškega kapitala uporabljajo informacije o podjetniku in poslovni priložnosti za sprejemanje naložbenih odločitev?

(3) Zakaj zgodnji vlagatelji lastniškega kapitala uporabljajo informacije o podjetniku in poslovni priložnosti na tak način?

(4) V kolikšni meri se naložbene politike zgodnjih vlagateljev lastniškega kapitala razlikujejo glede na vpletenost vlagateljev v razvoj podjetij v portfelju?

3. Metodološki pristop

Doktorska naloga temelji na kombinaciji raziskovalnih metod. Raziskovalnih vprašanj smo se lotili tako, da smo izvedli tri ločene študije: pregledno študijo, kvantitativno študijo in kvalitativno študijo.

3.1 Sistematičen pregled literature

Najprej smo izvedli sistematičen pregled literature. Pregled literature je ključen del vsakega raziskovalnega projekta, saj predstavlja nekakšen zemljevid znanja na dotičnem področju (Frank in Hatak, 2014). Sistematičen pregled literature se od preprostega narativnega pregleda literature

razlikuje v tem, da sledi metodologiji, ki je transparentna in ponovljiva. Od drugih pristopov k pregledu literature (npr. metaanaliz ali bibliografičnih analiz) pa se razlikuje po bogastvu izsledkov, saj po navadi v ospredje postavlja podrobno analizo izsledkov, ne pa analize velikosti učinkov ali kategorizacije obstoječega znanja. Rezultat sistematičnega pregleda literature je po navadi sinteza ugotovitev na dotičnem področju ter agenda za nadaljnje raziskovanje. Med različnimi pristopi, ki se uporabljajo za pregled literature, prav sistematičen pregled literature velja za zlati standard v raziskovanju (Snyder, 2019).

Pri pregledu literature smo se omejili na raziskave, ki so preučevale signaliziranje v kontekstu zgodnjega lastniškega financiranja. Odločitev, da se omejimo na študije, ki se naslanjajo na teorijo signaliziranja (Spence, 1973), je bila sprejeta zaradi dveh razlogov. Prvič, raziskovalci že od sredine osemdesetih let preučujejo odločanje zgodnjih vlagateljev lastniškega kapitala (prva študija na to temo je bila objavljena leta 1984 pod avtorstvom Tyebjeeja in Brunota). Od takrat je bilo na to temo napisanih več kot 890 raziskav (Ferrati in Muffatto, 2021), kar je preveč za poglobljeno analizo vsebine teh študij. Drugič, teorija signaliziranja predstavlja ključno teoretsko perspektivo za preučevanje kriterijev zgodnjih vlagateljev lastniškega kapitala. Teorija signaliziranja je posebej primerna za to področje, saj predvideva visoko asimetrijo informacij in prepoznava vlogo stališč, ki jih imajo odločevalci o informativnosti posameznih signalov (Gulati in Higgins, 2003). Študije, ki uporabljajo teorijo signaliziranja, po večini preučujejo prav relativno pomembnost različnih podjetnikovih značilnosti in značilnosti poslovne priložnosti pri naložbenih odločitvah zgodnjih vlagateljev lastniškega kapitala.

3.2 Kvantitativna raziskava

Na podlagi ugotovitev sistematičnega pregleda literature smo načrtovali dve empirični raziskavi. V prvi raziskavi smo z vprašalnikom in eksperimentom ugotavljali relativno pomembnost dveh dimenzij, ki sta vezani na podjetnika in predstavljata osnovo, na kateri temeljijo socialne zaznave. To sta podjetnikova kompetentnost in podjetnikova kooperativnost. Zanimalo nas je predvsem, kako zgodnji vlagatelji zunanjega lastniškega kapitala uporabljajo signale, ki pripadajo omenjenima dimenzijama. Prav tako smo raziskali razlike med investitorji glede na tip vlagatelja (angelski vlagatelj oz. vlagatelj tveganega kapitala) in raven aktivnosti vlagatelja pri razvoju podjetij iz portfelja.

V raziskavi smo uporabili eksperiment sestavljenih učinkov (angl. *conjoint experiment*), saj ta omogoča oceno relativne pomembnosti, funkcije in interakcije izbranih značilnosti. V eksperimentu je bilo 86 vlagateljev, dejavnih v Evropi, soočenih s serijo nalog, v katerih so morali sprejeti odločitev na podlagi podanih atributov. Skupaj so sprejeli 1.376 naložbenih odločitev. Rezultate smo analizirali s pomočjo hierarhičnega linearnega modeliranja, ki omogoča analizo

rezultatov tako na ravni odločitve kot tudi na ravni odločevalca, s tem pa vpogled v pomembnost značilnosti in razlike med vlagatelji.

3.3 Kvalitativna raziskava

Nazadnje smo izvedli tudi kvalitativno raziskavo po metodi dveh zornih kotov (angl. *twin slate approach*). Gre za eksplorativno metodo, ki vključuje zgodnjo integracijo izsledkov, ki izhajajo iz primarne raziskave, in izsledkov, ki izhajajo iz pregleda področne literature (Kreiner, 2015). Izvedli smo 23 polstrukturiranih intervjujev z zgodnjimi vlagatelji zunanjega lastniškega kapitala, v katerih smo se z njimi pogovarjali o njihovem odločanju o naložbenih priložnostih. Po analizi prvih 15 intervjujev smo se oprli na teorije kognitivnih slogov, da smo lažje osmislili pripovedi investitorjev. Ugotovitve smo dopolnili še z osmimi polstrukturiranimi intervjuji, ki so temeljili na posodobljenem protokolu. Izsledki nudijo vpogled ne le v to, katere informacije zgodnji vlagatelji uporabljajo pri odločanju in kako jih uporabljajo, temveč tudi v to, zakaj k odločanju pristopajo na dotičen način. Prav tako rezultati intervjujev razkrivajo razlike v odločanju med vlagatelji glede na tip investitorja, fazo vstopanja v podjetja ter preferenco glede aktivnega vključevanja v podjetja v portfelju.

4. Ugotovitve

Naš pregled literature je pokazal, da večina raziskav do danes preučuje signale na ravni podjetij. Raziskovalci so dodobra preučili signalno vrednost že pridobljenih sredstev, bodisi javnih bodisi zasebnih, pa tudi lastniških kot tudi dolžniških. Veliko raziskav se je osredotočilo tudi na signalno vrednost partnerstev in povezav z uglednimi akterji iz raziskovalne ali podjetniške sfere. Raziskovalci so se osredotočili tudi na preučevanje, kako patenti in prototipi vplivajo na zmožnost podjetja, da bi pridobilo zgodnji lastniški kapital. Vendar pa raziskovalci vse pogosteje izpostavljajo, da v zgodnjih fazah podjetja ni na voljo prav veliko informacij o podjetju, na katere bi se vlagatelji lahko oprli, zato se ti pri ocenjevanju kakovosti naložbene priložnosti v znatni meri zanašajo na svoje ocene podjetnika oz. podjetniškega tima (Kaplan idr., 2009). Izobrazba in izkušnje podjetnika veljajo za najpomembnejše signale za zgodnje vlagatelje lastniškega kapitala in so tudi najbolj preučeni signali na ravni podjetnika. Poleg človeškega kapitala raziskovalci poudarijo tudi vlogo socialnih mrež, saj podjetniki, ki so bolj vpleteni v podjetniški ekosistem in gojijo poznanstva med investitorji, lažje pridobijo zgodnje investicije in so deležni ugodnejših vrednotenj podjetja (Hsu, 2007; Zhang, 2011). Manjši del literature se osredotoča tudi na pomen osebnostnih značilnosti podjetnika pri pridobivanju sredstev. Te raziskave kažejo na vlogo podjetniške strasti in odprtosti do povratnih informacij (Warnick idr., 2018), pa tudi podjetnikovo pripravljenost (Ciuchta idr., 2018) in zaupanjavrednost (Maxwell in Lévesque,

2014). To raziskovalno področje je zanimivo predvsem zato, ker nasprotuje eni glavnih hipotez teorije signaliziranja, in sicer, da so dragi signali učinkovitejši, saj so prepoznani kot zanesljivejši.

Na podlagi analize področnih člankov, ki so bili objavljeni v zadnjih 20 letih, smo identificirali več perspektivnih smeri za nadaljnje raziskovanje:

- *Indeksi*. Zaznali smo naraščajoče zanimanje za preučevanje vloge, ki jo ima spol na podjetnikove možnosti za pridobitev zgodnjega financiranja. Kakor je to značilno za indekse, spol nima zares informativne funkcije za sprejemanje (naložbenih) odločitev, vendar pa lahko pomembno vpliva na učinkovitost signalov, ki jih posameznik (podjetnik) pošilja. Poleg spola bi tak učinek lahko imeli tudi nekateri drugi indeksi, na primer starost in rasa podjetnika. Preučevanje moderatorske vloge indeksov je pomembno za razumevanje pristranskosti vlagateljev, ki vodijo v neenak dostop do zgodnjih virov financiranja.
- *Interakcije med signali*. Opazili smo, da večina raziskovalcev pristaja na (implicitno) predpostavko, da vlagatelji signale obravnavajo neodvisno enega od drugega (Busenitz idr., 2005). Peščica raziskav, ki se je ukvarjala z interakcijskimi učinki različnih signalov, kaže, da investitorji interpretirajo različne signale v odnosu do drugih razpoložljivih signalov, ni pa jasno, kdaj prihaja do substitutivnih ali komplementarnih učinkov med signali.
- *Medosebni signali*. Zgodnji vlagatelji s podjetniki pogosto nimajo le transakcijskega odnosa, temveč poskušajo tudi na drugačne načine podpreti razvoj podjetij, v katere investirajo (npr. skozi mentorstvo) (Huang in Knight, 2017). Do danes so se raziskovalci skoraj ekskluzivno ukvarjali s preučevanjem signalov, ki komunicirajo kakovost podjetja ali podjetnika, spregledali pa so tiste signale, ki vlagatelje informirajo o naravi odnosa, ki se bo najverjetneje vzpostavil med njimi in podjetnikom (Ciuchta idr., 2018).
- *Negativni signali*. Vsi signali ne delujejo v prid podjetnikom. Zato predlagamo, da raziskovalci raziščejo učinek negativnih signalov na odločitve zgodnjih vlagateljev.
- *Neskladni signali*. Vlagatelji so izpostavljeni različnim signalom o podjetnikih in poslovnih priložnostih, ki so redko povsem skladni (Drover idr., 2018). Zanimivo raziskovalno vprašanje, ki se poraja ob tem, je, kako se zgodnji vlagatelji odločajo navzlic neskladnosti signalov, ki jih prejmejo, in kako to vpliva na njihovo oceno podjetnika in podjetniške priložnosti.
- *Lažni signali*. Naslednji izziv se nanaša na navzkrižje interesov med podjetniki in vlagatelji. Podjetnikom je v interesu pošiljati lažne signale, ki povečujejo njihove možnosti za pridobitev financiranja ter višajo vrednotenje podjetja. Ni povsem jasno, kako (če sploh) zgodnji vlagatelji razločijo med lažnimi in resničnimi signali v kontekstu, kjer je signale lahko potvarjati in težko preverjati (Momtaz, 2021).

- *Razlike med vlagatelji*. Identificirali smo le eno študijo, ki je eksplicitno obravnavala razlike med angelskimi vlagatelji in vlagatelji tveganega kapitala (Hsu idr., 2014). Angelsko vlagateljstvo je vedno pogosteje prepoznano kot alternativna tveganemu kapitalu (Hellmann idr., 2021), zato je presenetljivo, da le ena študija direktno naslavlja potencialne razlike med obema tipoma zgodnjih vlagateljev.
- *Ujemanje*. Ugotavljamo, da le peščica raziskav naslavlja vprašanje ujemanja med vlagatelji in podjetniki. Tiste raziskave, ki so naslovile to vprašanje (npr. Murnieks idr., 2011; Franke idr., 2006), pa se osredotočajo le na podobnosti med podjetniki in vlagatelji, zanemarjajoč potencialne komplementarnosti, ki vodijo do tega ujemanja.
- *Faza odločanja*. Odločanje o investiciji je večfazni proces, pri čemer ima vsaka faza svoj dotični cilj. Le ena raziskava do danes (Mitteness, Baucus idr., 2012) je ugotavljala razlike v pomembnosti investicijskih kriterijev v različnih fazah investicijskega procesa.
- *Signaliziranje vlagateljev*. Asimetrija informacij v kontekstu zgodnjega zunanjega vlagateljstva je obojestranska (Glücksman, 2020). Prihodnje raziskave pa bi lahko obravnavale, kako vlagatelji signalizirajo, da bi pritegnili visokokakovostna mlada podjetja z visokim potencialom rasti v svoj portfelj.

Naše nadaljnje raziskovalno delo je bilo osredotočeno predvsem na preučevanje interakcijskih učinkov med signali ter razlike med vlagatelji, vendar pa z ugotovitvami doprinašamo tudi k razumevanju vloge medosebnih signalov in ujemanju med vlagatelji in podjetniki. Pri tem smo izhajali iz modelov dvodimenzionalnosti socialnih zaznav (Abele idr., 2021) in slogov mišljenja (Nisbett idr., 2001).

Rezultati naše eksperimentalne raziskave kažejo, da ima podjetnikova kompetentnost večjo težo pri odločitvah zgodnjih vlagateljev lastniškega kapitala v primerjavi s podjetnikovo kooperativnostjo. To je smiselno, saj so donosi vlagateljev močno odvisni od podjetnikove sposobnosti izkoriščanja podjetniške priložnosti. Vendar pa, kot ugotavljamo, lahko podjetniki svojo kompetentnost signalizirajo na več načinov. Kljub temu da večina raziskovalcev poudarja vlogo podjetnikovih panožnih izkušenj (Mitchelmore in Rowley, 2010), smo ugotovili, da lahko podjetniki pomanjkanje izkušenj kompenzirajo tako, da svoje poglobljeno poznavanje panoge izkažejo s temeljito pripravljeno tržno raziskavo. Signali podjetnikove kompetentnosti imajo večji učinek na odločitve zgodnjih vlagateljev lastniškega kapitala, kadar podjetniki izkazujejo tudi odprtost do povratnih informacij (potencialnih) vlagateljev. Odprtost do povratnih informacij vlagateljev ni le znak, da bo podjetnik dobro izkoristil nefinančne naložbe investitorjev (npr. mentorstvo) (Ciuchta idr., 2018), ampak tudi zato, ker vlagatelji s takšni podjetniki lažje sodelujejo in regulirajo njihovo delovanje skozi (neformalenm) odnos (Carson idr., 2006). Informacije, ki signalizirajo podjetnikovo kooperativnost, so nekoliko pomembnejše tistim zgodnjim vlagateljem, ki so bolj aktivni pri podpiranju razvoja podjetij v portfelju. Angelski

vlagatelji v primerjavi z vlagatelji tveganega kapitala dajejo nekoliko večjo težo na podjetnikovo sodelovanje z mentorji in svetovalci, medtem ko razlik v pomembnosti signalov, vezanih na kompetentnost glede na tip vlagatelja ali vključenost v podjetja, nismo zasledili.

Signali kompetentnosti in kooperativnosti so torej komplementarni, saj zgodnjim vlagateljem komunicirajo, da je podjetnik na eni strani pripravljen na odnos, ki koristi vlagatelju, hkrati pa je sposoben izkoristiti podjetniško priložnost. Te informacije torej signalizirajo nizko tveganje, da bi se podjetnik z vloženimi sredstvi osebno okoristil, in hkrati nizko tveganje, da podjetnik ne bi bil sposoben realizirati podjetniške priložnosti (Eisenhardt, 1989). Zgodnji vlagatelji dajejo največji poudarek na signale podjetnikove kompetentnosti, pri tem pa se med seboj ne razlikujejo glede na tip ali preferenco do vključenosti v podjetja v portfelju. Hkrati pa ugotavljamo, da lahko podjetniki s selektivnim signaliziranjem zaobidejo nekatere svoje šibkosti, kot na primer pomanjkanje izkušenj.

Kvalitativna raziskava je pokazala, da vlagatelji informacij o podjetniku ne obravnavajo ločeno od informacij o podjetniških priložnostih. Opažamo, da zgodnji vlagatelji lastniškega kapitala podjetnike ocenjujejo skozi lečo poslovne priložnosti. Prvič, vlagatelji se zavedajo, da so podjetniki tisti, ki odkrivajo poslovne priložnosti, zato menijo, da je zaznana kvaliteta poslovne priložnosti tudi pokazatelj kakovosti podjetnika. Drugič, vlagatelje zanima predvsem podjetnikova sposobnost izkoriščanja podjetniških priložnosti. Zato so še posebej pozorni na signale, ali bo podjetnik uspel uresničiti poslovno priložnost, ki jo je prepoznal. Ugotavljamo tudi, da mnogi vlagatelji ne dajejo prednosti enemu vidiku naložbene priložnosti pred drugim (tj. podjetniku pred poslovno priložnostjo oz. obratno), kot predpostavljajo raziskovalci na tem področju (Harrison in Mason, 2017; Kaplan idr., 2009; Mitteness, Baucus, idr., 2012). Opažamo, da vlagatelji integrirajo informacije o podjetniku in podjetniški priložnosti, saj lahko le tako osmislijo naložbeno priložnost kot celoto, to pa dejansko vpliva na njihovo naložbeno odločitev.

Iskali smo tudi razloge, zakaj vlagatelji uporabljajo informacije o podjetniku in podjetniški priložnosti na način, ki je v psihologiji poznan kot holistično procesiranje informacij oz. holistično mišljenje (Choi idr., 2007). Ugotavljamo, da k temu prispevata predvsem dva dejavnika. Prvi je zavedanje zgodnjih vlagateljev lastniškega kapitala, da njihove odločitve temeljijo na nepopolnih informacijah, kar omejuje njihovo sposobnost napovedovanja trgov in usmeritev podjetij, ki v zgodnjih fazah razvoja običajno tudi spremenijo različne vidike poslovne strategije. Drug razlog pa leži v mnenju vlagateljev, kaj prispeva k uspehu podjetij v zgodnjih fazah razvoja. Večina vlagateljev meni, da je podjetniški uspeh pravzaprav interakcija med tržnimi okoliščinami ter podjetniškim delovanjem. Opažamo pa, da obstaja podskupina angelskih vlagateljev, ki izrazito poudarjajo osebnostne značilnosti podjetnikov. Za te angelske vlagatelje je značilno, da se zelo aktivno vključujejo v delovanje podjetij v svojem portfelju in s tem v podjetja prinašajo lastne

podjetniške izkušnje in tržna znanja. Ti vlagatelji so prav tako pogosto pripravljeni sprejeti manjše donose v zameno za pozitivno izkušnjo, ki jo prinaša sodelovanje z mladimi visokorastočimi podjetji.

5. Prispevek k teoriji in praksi

Raziskave v okviru pričujoče disertacije nudijo številne teoretične in praktične prispevke. Pričujoče delo ponuja sistematičen pregled in sintezo spoznanj raziskav na področju zgodnjega lastniškega financiranja, ki so se opirale na teorijo signaliziranja (Spence, 1973). Teorija signaliziranja namreč predstavlja eno glavnih teoretskih leč za proučevanje odločitev zgodnjih vlagateljev lastniškega kapitala. Pregled literature omogoča vpogled v znanje, trende in vrzeli v znanju na dotičnem področju. S pregledom prispevamo k razjasnitvi ključnih konceptov teorije signaliziranja, hkrati pa pokažemo na potencialne razširitve te teorije z različnimi kognitivnimi perspektivami, ki presegajo omejitve, ki izhajajo iz predpostavk teorij signaliziranja, kot so racionalnost agentov (Bergh idr., 2014) in uniformnost procesiranja signalov (Vanacker in Forbes, 2016). S tem se odprejo možnosti za rigorozno raziskovanje, kako vlagatelji procesirajo skupke signalov in zakaj se različni vlagatelji na podlagi istih (skupkov) signalov odločajo različno.

Prav zato smo sami svoje raziskovanje odločanja vlagateljev lastniškega kapitala v začetnih fazah podjetja obogatili z uvajanjem psiholoških spoznanj o socialnih zaznavah (Abele idr., 2021) in slogih mišljenja (Nisbett idr., 2001). Kolikor nam je znano, smo prvi, ki preučujemo naložbene odločitve zgodnjih vlagateljev lastniškega kapitala skozi spoznanja, ki jih ponuja omenjena psihološka literatura.

Opirajoč se na modele dvodimenzionalnosti socialnih zaznav predpostavljamo, da vlagatelji podjetnike ocenjujejo na dveh temeljnih dimenzijah – kompetentnosti in kooperativnosti. Na podlagi spoznanj iz psihološke in podjetniške literature ponujamo več hipotez o komplementarnih in kompenzatornih učinkih informacij, ki se nanašajo na ti dve dimenziji – informacije, ki se nanašajo na različne dimenzije, se med seboj dopolnjujejo, medtem ko se informacije, ki se nanašajo na isto dimenzijo, med seboj lahko kompenzirajo, kar pomeni, da se lahko ena informacija uporabi namesto druge, ne da bi to vplivalo na odločitev zgodnjega vlagatelja lastniškega kapitala. Svoje hipoteze tudi empirično preverjamo in ugotavljamo, da je vloga posameznega signala v odnosu do drugega signala odvisna od podobnosti vsebine in pomembnosti obeh signalov. To spoznanje odpira nadaljnje možnosti za teoretiziranje in empirično raziskovanje komplementarnih, substitutivnih in kompenzatornih učinkov različnih informacij v zgodnjem lastniškem financiranju.

V nasprotju z dominantno logiko na tem področju raziskovanja ugotavljamo, da vlagatelji osmišljajo različne vidike podjetnika z informacijami o podjetniški priložnosti in obratno. Podjetnik in podjetniška priložnost torej nista dva ločena vidika naložbene priložnosti, ki tekmujeta za vlagateljevo pozornost, saj sama zase nimata velike informativne vrednosti za vlagatelje. Menimo, da odločanje investitorjev ni intuitivno, kot so predlagali nekateri raziskovalci pred nami (npr. Huang, 2018), temveč holistično, saj vlagatelji ciljno integrirajo informacije z namenom njihovega osmišljanja v kontekstu visokega tveganja in negotovosti.

Prispevamo tudi k literaturi, ki se ukvarja s preučevanjem ujemanja med vlagatelji in podjetniki. Ugotavljamo, da dajejo bolj aktivno vključeni vlagatelji večji poudarek na odprtost podjetnikov za povratne informacije. Ti vlagatelji predstavljajo specifično podskupino angelskih vlagateljev, saj poleg vloge (aktivnega) vlagatelja, ki podjetju tudi svetuje, prevzamejo tudi nekatere operativne naloge v teh podjetjih, s tem pa delujejo kot del zgodnjega podjetniškega tima.

Ti teoretični doprinosi pa se odražajo tudi v spoznanjih, ki so koristna za prakso. Na podlagi naših ugotovitev lahko podjetniki optimizirajo svoje signaliziranje zgodnjim vlagateljem in si povečajo svoje možnosti za pridobitev financiranja v zgodnji fazi. S premišljenim signaliziranjem lahko uspešno presežejo tudi nekatere svoje pomanjkljivosti. Naši izsledki so koristni tudi za vlagatelje, saj pokažejo, kako lahko podjetniki manipulirajo z informacijami, da bi pridobili financiranje. Predlagamo, da vlagatelji za vsak kriterij, ki ga uporabljajo za ocenjevanje naložbene priložnosti, uporabijo več signalov in so pri pozorni na kongruentnost le-teh.

6. Omejitve in smernice za nadaljnje raziskovalno delo

Kakor vse raziskave imajo tudi raziskave v okviru te disertacije svoje omejitve. Prva omejitev se nanaša na značilnosti vzorca. Angelski vlagatelji in vlagatelji tveganega kapitala veljajo za eno najtežje dostopnih populacij v podjetniškem raziskovanju, zato je pridobivanje kakovostnih vzorcev zelo zahtevno (Hsu idr., 2014). V našem raziskovanju smo se omejili na zgodnje vlagatelje lastniškega kapitala, ki so aktivni v Evropi, seveda pa obstaja znatna heterogenost med različnimi evropskimi državami. Razlike med odločitvami zgodnjih vlagateljev, ki bi lahko bile posledica kulturnih ali institucionalnih razlik, smo zato tudi statistično preverjali in ugotovili, da imajo vlagatelji iz različnih evropskih držav podoben pristop k odločanju o naložbah. Kljub temu da naša velikost vzorca dosega metodološka priporočila in presega vzorce iz primerljivih študij, pa je naš vzorec morda premajhen, da bi lahko zaznali razlike v odločitvah, ki izhajajo iz razlik v nacionalnem kontekstu, ravni vključenosti v podjetja v portfelju, tipa vlagatelja ali drugih značilnosti na ravni vlagatelja.

V naših raziskavah, glede na naravo metodologije, nismo eksplicitno upoštevali faze odločitvenega procesa zgodnjih vlagateljev. Eksperimenti sestavljenih učinkov se navadno uporabljajo za preučevanje druge faze odločitvenega procesa, ki zajema hiter pregled informacij o naložbeni priložnosti, vendar pa zaradi narave atributov na ravni podjetnika, vključenih v eksperiment, naše raziskovanje bolje odraža tretjo fazo odločitvenega procesa, ki vključuje ocenjevanje različnih vidikov naložbene priložnosti. To velja tudi za našo kvalitativno raziskavo, kjer smo proučevali, kako zgodnji vlagatelji lastniškega kapitala uporabljajo razpoložljive informacije.

Zanimivo opažanje, ki izhaja iz našega raziskovanja, je tudi, da so lahko atributi, na katere so zgodnji vlagatelji lastniškega kapitala pozorni, precej dvoumni. Posledično ni vedno jasno, ali je nek atribut pozitiven ali negativen signal niti ali informira vlagatelja o podjetnikovi kompetentnosti ali kooperativnosti. Zato predlagamo, da prihodnje študije raziščejo, kako vlagatelji razumejo različne atribute, ki jih uporabljajo pri svojem odločanju glede na vsebino in valenco. To bi namreč omogočilo bolj rigorozno teoretiziranje in empirično raziskovanje interakcij med različnimi signali.

Zanimivo vprašanje, ki ga odpirajo naši izsledki, je vloga komplementarnosti pri ujemanju med podjetnikom in zgodnjim vlagateljem lastniškega kapitala. Raziskovalci so se do danes osredotočili na preučevanje vloge podobnosti med vlagateljem in podjetnikom (npr. Franke idr., 2006; Murnieks idr., 2011), naši izsledki pa kažejo, da izkušeni vlagatelji, ki se v podjetja vključujejo zelo aktivno, bolje ocenjujejo naložbene priložnosti, ki jih predstavljajo podjetniki, ki so odprti do povratnih informacij, četudi nimajo podjetniških izkušenj (ki jih v ta podjetja lahko prinesejo vlagatelji sami).

Nenazadnje pa je pomembno ponovno izpostaviti, da smo se pri našem raziskovanju osredotočali na preučevanje *odločanja* zgodnjih vlagateljev lastniškega kapitala. Čeprav naši izsledki razkrivajo, katere značilnosti podjetnika in poslovne priložnosti pri svojih naložbenih odločitvah upoštevajo zgodnji vlagatelji lastniškega kapitala, kako uporabljajo te informacije, zakaj jih tako uporabljajo in ali se različni vlagatelji pri tem razlikujejo, naše raziskovalno delo ne odgovarja na vprašanja, ali so pristopi k odločanju, ki se jih zgodnji vlagatelji lastniškega kapitala poslužujejo, tudi učinkoviti pri doseganju želenih donosov.