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DO INVESTORS AND ENTREPRENEURS MATCH? – EVIDENCE FROM THE NETHERLANDS AND SWEDEN

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Do investors and entrepreneurs match? – Evidence from the Netherlands and Sweden¹

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Abstract: Entrepreneurs and investors face challenges in the ‘thin market’ for early stage entrepreneurial finance. Improving the situation has been a priority of policy makers for at least a decade, however, the challenges in this matching process are still poorly understood. Theory suggests that matching problems may originate in different perceptions in areas such as evaluation criteria, risk and risk management by investors and entrepreneurs. To find a good match it is essential to understand what is important to your counterpart. These problems are likely to be strongest in new and capital intensive sectors, like green tech innovations. Based on a mixed methods approach using semi structured interviews and a survey with both entrepreneurs and investors mostly active in green tech innovation, this study systematically analyses where their perceptions deviate and frictions in the matching process may occur. We find that a mismatch exists in the perception of risk, the importance attached to risk, the search channels used to find a potential partner and the evaluation criteria applied in evaluating a proposition (i.e. exit, innovativeness, capabilities of teams). Our results call for policy measures to increase market transparency and inform both sides of the searching process to create a mutual understanding of the investment process.

JEL codes: O31, O38, G24, G28

Keywords: matching, investors, entrepreneurs, risk perception, VC business model, green tech

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Introduction

This paper is about how financiers and entrepreneurs approach matching in thin markets for venture capital. There is growing interest in the interplay between finance and entrepreneurship (Mina et al. 2013; Stucki 2014). The matching issue is particularly acute in efforts to mobilise private funds in the green technology sector to support a transition towards a more sustainable economy (Mazzucato 2013; Kenney & Hargadon 2012; Foxon et al. 2008; van den Bergh 2013; Iyer et al. 2015). High-impact entrepreneurship is an important driver of this transformation process (Marcus et al. 2013; Cohen & Winn 2007; Wüstenhagen & Wuebker 2011). However, these young, high-impact entrepreneurial firms in the green tech space are also the most finance-constrained (Giudici & Paleari 2000; Demirel & Parris 2015; Mina et al. 2013; Stucki 2014). It has been argued that this constraint does not lie in a shortage of funds or ideas. Indeed, venture capitalists finance potential breakthrough innovations, and funding for disruptive technologies and profitable business ideas are not constrained on the supply side. The bottleneck is in the matching process: entrepreneurs struggle to find and then secure investment, whereas investors struggle to identify and establish projects that are investment grade (Nightingale et al. 2009; Bertoni, D'Adda, et al. 2015).

This characterises a 'thin market' for entrepreneurial finance, with few active investors and entrepreneurs (Bertoni, D'Adda, et al. 2015; Nightingale et al. 2009; Hall et al. 2016; Hopkins et al. 2013). Both sides of the market face high search and transaction costs to facilitate a successful match. Scholars model the matching between investors and entrepreneurs as a two-staged process, in which entrepreneurs look for investors first and then investors evaluate the entrepreneurs that find them. From this theory, one can derive propositions about selection mechanisms based on the ventures' characteristics (Bertoni, D'Adda, et al. 2015; Eckhardt et al. 2006; Sørensen 2007; Bengtsson & Hsu 2015). In this paper, we build on that literature by adding the possible effect of entrepreneur and investor perceptions on the (mis)matching process. To the best of our knowledge, such a perspective has been missing in the analysis of actual deal flow and completed investments, as well as aborted investments and matches that did not result in investments.

As a starting point, we assume that to effectively and efficiently find a match in a thin market it helps if investors and entrepreneurs understand each other's motivation, position, concerns, evaluation criteria and priorities (Ruef et al. 2003; Franke et al. 2006; Bengtsson & Hsu 2015). If entrepreneurs pitch information that investors do not value, or investors demand information or concessions that entrepreneurs are not willing to give, matching is hindered. A better understanding of the other side's position reduces the ex-ante search costs and facilitates the match ex-post. We therefore compare the investor and entrepreneur perspectives on the investment process and related decision-

making criteria (such as risk, return, channels and timing) to uncover different perceptions and investigate: *How do investors and entrepreneurs perceive critical stages in the matching process?*

We find that significant differences arise in the perception of risks, the choice of search channel and the evaluation criteria for potential deals (e.g. exit, innovativeness, capabilities of teams etc.). This paper contributes an investigation into how perceptions on both sides of the matching process differ. We focused our data collection efforts on investors and entrepreneurs in the green tech sector, where high capital intensity, technological uncertainty and non-monetary motivations are likely to exacerbate the problems of matching. We collected and analysed data for Sweden and the Netherlands.

The remainder of this paper is structured as follows. Section 2 reviews the diverse body of entrepreneurial finance literature relating both to the perception of the investment process from an entrepreneur's and investor's point of view. Section 3 presents the mixed methods approach consisting of semi-structured interviews and a fully structured survey. Section 4 then draws together the qualitative and quantitative results and relates these to existing theory. Concluding remarks and implications of this study for policy makers are presented in section 5.

Theoretical background

Thin markets for entrepreneurial finance

Early work on financing of young, innovative companies points towards the existence of a funding gap (also known as the 'valley of death') that relates both to the nature of innovation and the financing of start-ups (Cassar 2004; Giudici & Paleari 2000; Hall 2002; Cressy 2002). Uncertainty, limited appropriability of the returns, lack of collateral and asymmetric information make early stage ventures unsuitable for bank finance (Berger & Udell 2006; Berger & Udell 2003). As such, more specialised investors emerged to overcome these barriers. They have developed advanced methods to search, select and monitor potential investment targets in the early/seed stage (Gompers 1995; Gompers & Lerner 2001). These investors also add professional services such as networking and managerial advice to support start-up development (Gorman & Sahlman 1989; Hellmann & Puri 2002; Hellmann & Puri 2000; Hsu 2006; Sahlman 1990). However, this costly and knowledge intensive process can only be conducted by a limited number of highly skilled and specialised investors evaluating a limited number of prospective investments. Due to the high degree of diversity in prospective ventures and the intense, long term active commitments involved, the model of the venture capitalist is hard to scale up.

This led to the notion of 'thin markets' for venture finance (Bertoni, D'Adda, et al. 2015; Nightingale et al. 2009; Mina et al. 2013). 'Thin markets' occur when small numbers of high potential firms and small numbers of investors with the skills to help them grow find it difficult to find one another without incurring unacceptable transaction and/or search costs' (Nightingale et al. 2009, p.21)². These markets cannot be characterised simply by pointing towards a demand problem (i.e. low quality of firms) or supply problem (i.e. not enough investors). Instead the demand problem is that entrepreneurs are unable to credibly and reliably signal the quality of their projects, and the supply problem that investors struggle to tailor finance to the specific and rapidly changing needs of the venture. Nightingale et al. (2009) assert that 'because thin markets make it difficult for the supply and demand for finance to match they reduce overall levels of investment'. Standardization and repeated interaction between supply and demand characterising 'thick' markets would allow for the emergence of an ecosystem for early stage finance, but this is absent or dysfunctional in most countries. Scholars consequently diagnosed the valley of death phenomenon in entrepreneurial finance as a coordination problem and a matching problem (Bertoni, D'Adda, et al. 2015; Nightingale et al. 2009; Mina et al. 2013).

In general, VC markets in Europe are less developed than their US counterpart, arguably because of more conservative institutional investors and a strongly bank-based financial systems in many European countries (Hirsch-Kreinsen 2011; Bertoni, Colombo, et al. 2015). Perhaps in response to the thin supply side, a much smaller share of early stage ventures in Europe actively seek VC to finance firm growth (Bertoni, D'Adda, et al. 2015; Peneder 2010; Bertoni et al. 2011; Colombo & Grilli 2010). We conclude from this that European VC markets can be characterized as thin markets and therefore we may expect problems in the matching process.

Signalling and matching of investors and entrepreneurs

To analyse the matching process between entrepreneurs and investors we can build on a 2-stage matching process model as developed and used in earlier work (Bertoni, D'Adda, et al. 2015; Sørensen 2007; Eckhardt et al. 2006). In the first stage, entrepreneurs decide to go on the market and look for venture capital (self-selection). In the second stage, investors screen the potential candidates, select the best (sorting) and decide whether to invest. The motivation for entrepreneurs and investors to search is different from the outset. Eckhardt et al. (2006) found that entrepreneurs base their decision to look for venture capital on competition, market growth and employment growth, while investors base their funding decisions on indicators of venture growth, such as degree of organizing activities, marketing activities and the level of sales. This implies there is

² We thank an anonymous reviewer for pointing this out.

ample room for strategic search behaviour and a need for costly verification. Both stages are therefore costly in terms of search effort being spent on both sides. A way for entrepreneurs and investors to reduce these search costs is to signal relevant information to potential counterparties in the market. For instance, investors will limit the sectors in which they are active and entrepreneurs can signal the quality of their venture with a sound business plan in line with signalling theory as originally developed for labour market matching processes and successfully applied to corporate finance (Spence 1973; Connelly et al. 2011).

In the context of venture finance, a signal helps both investors and entrepreneurs screen for suitable prospects. Hence the screening, selection and matching process will be heavily influenced by the perception of different signals by entrepreneurs and investors and also by the perception of how the other side will interpret the signal that is sent. In the entrepreneurial finance literature there is some evidence that characteristics that can objectively be signalled, like composition of the founding team, patents, R&D subsidies and company characteristics, have an impact (Busenitz et al. 2005; Audretsch et al. 2012; Kleer 2010). Scholars also find that objective and subjective quality criteria, and the perceptions of both investors and entrepreneurs of each other, matter in finding a match (Sørensen 2007; Eckhardt et al. 2006; Riding & Short 1987). From the available evidence we can even conclude that aligned perceptions between entrepreneurs and investors helps the matching process (Bengtsson & Hsu 2015; Murnieks et al. 2011; Franke et al. 2006; Ruef et al. 2003)³.

The theoretical developments in both signalling and matching literature lead us to assume that aligned perceptions can be an important precondition for efficient matching in the thin market for VC finance (Bertoni, D'Adda, et al. 2015; Connelly et al. 2011; Bengtsson & Hsu 2015; Franke et al. 2006). Such alignment is most important in the more critical stages of the matching process which include channels of contact, pitching and due diligence as well as perceptions of risk and risk management (Sørensen 2007; Bertoni, D'Adda, et al. 2015; Eckhardt et al. 2006).

Leveraging social networks to generate deal flow

To generate deal flow both investors and entrepreneurs first need to establish contact. A number of channels exist to establish a relationship, such as fairs and conferences, family and friends, existing business relations or more structured incubator programs (Gompers & Lerner 2001). The choice of search channel is important and, to make this choice, both parties typically use soft information (Berger et al. 2005; Petersen & Rajan 2002; Stein 2002). Social networks convey valuable information in this respect (Fried & Hisrich 1994;

³ We thank an anonymous reviewer for introducing us to this theory.

Granovetter 1973). We argue that a substantially different ranking of importance of these search channels by investors and entrepreneurs would impede a successful first connection. In a thin market for VC finance, reducing transaction costs by searching through the same channels may increase the likelihood of a successful match (Nightingale et al. 2009). This choice is characterized by strategic complementarity: the optimal search strategy for the entrepreneur depends on that of the investor and vice versa.

The investment pitch and due diligence phase

Investment pitch and due diligence represent the core phases of the actual matching process. The purpose of the pitching and due diligence process is to align and verify perceptions. If investors and entrepreneurs value the venture differently, this impacts the matching probability (Eckhardt et al. 2006). Financial criteria (present financial situation) and return expectations (future financial situation) influence both the decision to take in external capital by entrepreneurs (Söderblom 2012) as well as the evaluation of the venture by investors (Eckhardt et al. 2006; Petty & Gruber 2011). Conflicting views in that respect likely lead to a rejection/discontinuation of the cooperation (Higashide & Birley 2002). But even if entrepreneurs and investors are aligned in this respect, there are still numerous dimensions that matter.

Following earlier work, we can first distinguish between upside potential and downside risk. The literature suggests that cautious investors put more emphasis on downside risk, whereas optimistic entrepreneurs place more weight on the upside potential of the venture (Riding & Short 1987; Fried & Hisrich 1994; Shepherd & Zacharakis 2001). Even if both parties agree on the expected return, this fundamentally different mind-set can lead to a mismatch in the matching process.

Second, perceptions about the characteristics of the venture, such as the business model, the technology, its innovativeness and market potential, as well as e.g. scalability will need to be aligned in order to successfully start a cooperation (Bengtsson & Hsu 2015; Hsu 2006; Petty & Gruber 2011). On the one hand, these aspects are used to signal quality to the investor once the entrepreneur decides to enter the VC market (Eckhardt et al. 2006; Söderblom 2012; Bertoni, D'Adda, et al. 2015). On the other hand, these characteristics play a significant role in investor decision making in the second stage of the matching process, i.e. the screening, selection and monitoring of investments (Fried & Hisrich 1994; Boocock & Woods 1997; Sørensen 2007; Bertoni, D'Adda, et al. 2015).

A third set of matching criteria include the entrepreneurs' traits and competencies, such as the managerial and technical skills of the entrepreneurial team. These characteristics are obviously used to signal ability to potential investors (Busenitz et al. 2005; Barney et

al. 1996; Hsu 2007; Chen et al. 2009). Petty and Gruber (2011), however, found that the management team is not a decisive factor for investors and that matching might actually work the other way, i.e. entrepreneurs often welcome managerial experience and consultancy services from investors (Bertoni, D'Adda, et al. 2015; Casamatta 2003). It is then important for investors to understand how the entrepreneur rates specific services investors may bring to the venture (Barney et al. 1996; Busenitz et al. 2005). Either way, an alignment of perceptions here leads to a higher matching propensity.

Fourth, the matching between entrepreneurs and investors also seems to occur based on personal characteristics (Busenitz et al. 2005; Franke et al. 2006; Higashide & Birley 2002). More specifically, Murnieks et al. (2011) suggest venture capitalists evaluate opportunities represented by entrepreneurs who 'think' in ways similar to their own more favourably, whereas Bengtsson & Hsu (2015) find that sharing characteristics such as the same ethnicity increases the likelihood of a VC investment and the involvement of the VC in the board of the company. This strongly suggests that a match is easiest when the two sides to the deal 'speak the same language' and understand each other. This enhances trust and reduces transaction costs.

Finally, perceptions of the timing decision should be aligned (Bengtsson & Hsu 2015). The prospect of a long-term cooperation or the potential for a quick exit should be aligned between the partners as these translate into fundamentally different growth strategies and management styles (Hsu 2006; Hellmann & Puri 2000).

Risk perception and management

The behaviour of venture capitalists and entrepreneurs is influenced by the risk and uncertainty they perceive (Riding 2008; Amit et al. 1990; Parhankangas & Hellström 2007). Investment in innovation is impaired by information asymmetries between investors and entrepreneurs. Entrepreneurs have an incentive to distort the truth so they have difficulties in credibly conveying both the expected potential and risks of their innovations and corresponding business model (Shepherd & Zacharakis 2001; Söderblom 2012). The pitch and due diligence can take care of information asymmetries in business model and expected returns, but aligning risk perceptions is inherently more complicated.

Wüstenhagen & Teppo (2006) and others (Mrkajic et al. 2016; Criscuolo & Menon 2015) identify market risk, technology risk, policy risk and finance risk associated with new ventures. Market risk refers to the possibility that the product will not be sold in sufficient quantities due to competitors or barriers to entry. This is usually well understood by venture capital investors but may be under- or overestimated by entrepreneurs, leading to a misaligned valuation of the venture. Technology-risk entails the risk that the technology will fail, or only function with significant delays and/or higher costs. These

risks are typically well understood by the entrepreneur whereas most VC investors are reluctant to take these on (Criscuolo & Menon 2015). Policy-risk refers to changing government regulation that affects the venture's business model and thus can deter VC funding decisions (Teppo & Wüstenhagen 2006; Kenney & Hargadon 2012). Finance-risk touches on issues of securing finance and sustaining liquidity (Mrkajic et al. 2016).

All four types of risk largely depend on the sector the venture is operating in, for example more complex industries such as life-sciences, pharma and green tech are generally considered more risky than asset-light industries such as ICT (Bürer & Wüstenhagen 2009; Lüthi & Wüstenhagen 2012; Lüthi & Prässler 2011). We would argue that a *common and shared* understanding and appreciation of these risks facilitates a deal, especially since the financial crisis has made early-stage investors more risk averse (Block & Sandner 2009; Cowling et al. 2016). However, it is not a priori clear how diverging risk perceptions would affect the matching process. On the one hand, making a match is potentially impaired by diverging perceptions of these risks. On the other, one might argue that different risk perceptions are the reason to trade these risks.

In addition to taking risks, investors and entrepreneurs may deploy a range of risk management techniques (Parhankangas & Hellström 2007). Depending on the perception of the importance of these techniques, VCs and entrepreneurs are more or less likely to cooperate (Teppo & Wüstenhagen 2006; Chassot et al. 2014). First, a thorough legal and financial due diligence as well as external expert advice are usually called upon by the investor to reduce information asymmetry and gain insight into technical, legal and financial aspects of the venture. Entrepreneurs may want to be cautious not to disclose proprietary information (Parhankangas & Hellström 2007). Second, and related, the investor usually stresses the importance of formal intellectual property rights (Harhoff 2011) to mitigate technological and market risk/uncertainty, whereas entrepreneurs may find this a long, costly and cumbersome process. Third, the importance of initial customers and a marketing strategy, valued by a VC, is usually underestimated by entrepreneurs (Baum & Silverman 2004; Hellmann & Puri 2002). Different emphasis on these initial marketing activities could lead to a mismatch (Hsu 2006). Finally, investors typically stage the investment to limit the commitment in the early stages and contract on milestones and KPIs for the venture to fulfil to unlock further investment (Bengtsson & Hsu 2015). If the staging of the investment is not made clear and attractive to the entrepreneur this could lead to a fundamentally different perception of the relationship and thus end in rejection or early exit (Eckhardt et al. 2006).

Signalling and matching challenges are exacerbated in the green tech sector

Green technologies are associated with benefits such as reduced costs of materials, capital and labor as well as reduced risks (Ambec & Lanoie 2008). The matching

problems mentioned above are amplified in the market for early stage green tech ventures in Europe. Green tech investments are associated with higher managerial and technical complexity (Ghosh & Nanda 2010; Criscuolo & Menon 2015; Mrkajic et al. 2016; Bocken 2015) and these nascent markets are characterised by number of barriers that have financial consequences (Mrkajic et al. 2016; Petkova et al. 2014). High upfront investment (compared to asset-light industries such as ICT), long payback periods, and slow diffusion as a result of dependencies on infrastructure developments, innovation cycles in other industries, national and international regulation and information asymmetries lead to a complex environment in which matching needs to take place (Polzin et al. 2016; Foxon et al. 2008; Demirel & Parris 2015). The need for aligned perceptions is more pronounced as uncertainty prevails (Petkova et al. 2014; Dimov et al. 2012). Moreover, as green tech typically resides within and depends on regulation (Mrkajic et al. 2016; Petkova et al. 2014; Ghosh & Nanda 2010; Hockerts & Wüstenhagen 2010), policy risk is a key potential source of misaligned perceptions in the case of green tech venture finance. If perceptions on both sides of the market are misaligned, this might explain the lower capital expenditure, shorter exit cycles and a focus on later investment stages that characterises the nascent green tech VC sector (Kenney & Hargadon 2012; Marcus et al. 2013; Bocken 2015; Kenney & Hargadon 2014).

Theory conclusion

We can summarize the 2-stage matching process model in figure 1 below. At the top, we see entrepreneurs and investors deciding in what channels to search with what intensity. Conditional on them meeting through these channels they then move into the second stage of pitching and due diligence, aligning perceptions on the venture and managing the risks affecting it.

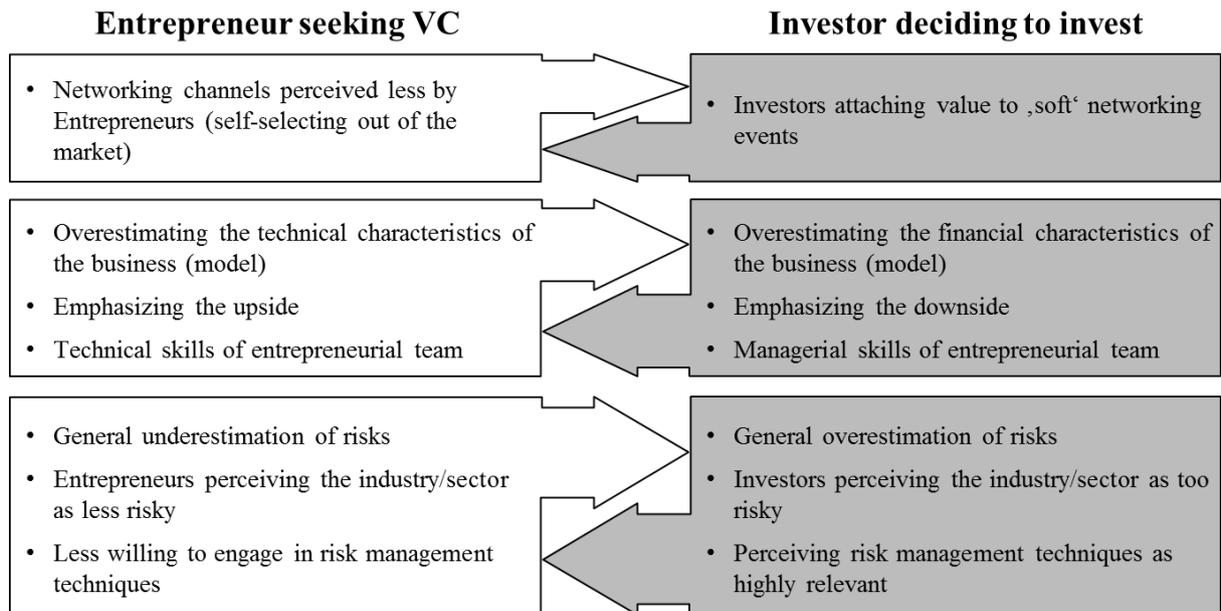


Figure 1: Potential sources of mismatching in a 2-stagematching process

We have established that this process is easier when perceptions are more aligned going into the process. Thus we feel a possible actionable problem in the matching process is to align perceptions about critical stages in the matching process on both sides of the market which in turn reduces search, screening and selection costs (Bengtsson & Hsu 2015; Ruef et al. 2003; Franke et al. 2006; Murnieks et al. 2011).

Methods

Research design

The assumption that matching is easier when perceptions of the other party are aligned can only be tested in full in a sample of matched and non-matched investor-entrepreneur pairs. Given misalignment of perceptions is a necessary condition for our assumption to hold, our method is designed to test for the existence of perception (mis)alignment, not for the effect perception (mis)alignment has on matching probabilities.

In line with previous research, the perspective of both entrepreneurs and investors on the investment process as well as the entrepreneurial team (self vs. third party evaluation) is necessary to understand if (mis)alignments arise (Eckhardt et al. 2006; Sørensen 2007; Riding & Short 1987). We expect the misalignment to be greater for those entrepreneurs who have not successfully acquired external business angel or VC funding, as successful entrepreneurs typically have gained first-hand experience with the other side through repeated interaction (Bengtsson & Hsu 2015; Franke et al. 2006; Ruef et al. 2003). Therefore, to avoid endogenous selection biases, we need information on perceptions from both successful and unsuccessful entrepreneurs and investors. Unfortunately, it is easier to identify and get survey responses from successful

entrepreneurs. In our survey, 30 out of 56 entrepreneurs were successful in attracting investment, whereas investors indicate that only about 1 of 10 proposals move to the next stage and less than 2% of all proposals get funded. These results are also seen in our interviews where it holds for 5 of the 8 entrepreneurs. The sample is therefore not representative of the population, but non-invested and invested can be considered representative for their respective category. To increase the generalizability of our results we have this information from at least two different institutional contexts (the Netherlands and Sweden).

As this is the first systematic study of perception alignment we are aware of, we used both qualitative (i.e. interviews, archival data analysis, participant observation) and quantitative tools (i.e. survey research). This mixed methods approach is also often referred to as 'triangulation', defined as 'the use of two or more methods that draw on different meta-theoretical assumptions (i.e. that are cross-paradigmatic)' to validate conclusions drawn from one method with data obtained through another (Moran-Ellis et al. 2006, p. 46; Jick 1979). Hence we combine in-depth understanding with assessing magnitude and frequency of constructs (Creswell & Clark 2010; Olsen 2004; Tapio et al. 2011; Haegeman et al. 2013). We collected our data from open and structured interviews and a survey of entrepreneurs and investors in Sweden and the Netherlands.⁴

The combination of both methods allows for the emergence of new constructs and unexpected results (inductive) in the first (qualitative) phase of the research whereas in the later stages by then known assumptions and/or propositions can be verified. The gathered data is then merged, connected and embedded in the research context (Creswell & Clark 2010). More specifically, the information obtained in the interviews we conducted has informed and inspired the questions included in the survey we conducted. In this case we were able to reflect on the perception of the investment process and its context of both entrepreneurs and investors by also using quantitative survey data (Cohen et al. 2009).

Research context

The research took place in the context of an international research project looking at the differences of early stage green tech investing in their policy environment to stimulate private investments in the Netherlands and Sweden between 2013 and 2015 (Adenfelt et al. 2013; Adenfelt et al. 2014). The two countries are similar in the sense that they are both small, open countries relying on international trade with a large and advanced

⁴ An aligned survey consists of a general part, a part for investors and one for entrepreneurs, with questions that are 'aligned' in the sense that we asked entrepreneurs about their perception of investors' opinions on matters we asked the investors about and vice versa.

knowledge base and a highly educated labour force. They are both committed to achieving significant CO₂ reduction either by a national roadmap or by adhering to the 20-20-20 targets of the European Union (Adenfelt et al. 2013). Both countries spend significant money and effort in promoting early stage green tech investments. However, they differ in their policy approaches with regard to support in early stage investments. The Swedish government relies more on 'soft' instruments such as networking whereas the Dutch administration is focused on subsidizing green energy production (Adenfelt et al. 2013). This difference in policy approach was not investigated further, but it is telling that in the Netherlands almost all policies towards entrepreneurship in general and green tech venturing specifically are coordinated by the Ministry of Economic affairs, whereas in Sweden the policy competencies are much more diffuse. Moreover, Sweden would qualify as a Nordic country, whereas the Netherlands is typically classified as Continental when we follow the Varieties of Capitalism literature (Hall 2015; Hall & Soskice 2001).

Both the Netherlands and Sweden, certainly compared to Anglo-Saxon equity markets, can be characterised as a 'thin markets' for entrepreneurial finance (Bertoni, Colombo, et al. 2015; Lerner & Täq 2013; Li & Zahra 2012; Nightingale et al. 2009). This is supported by evidence in Table 1.

Table 1: VC Investments in Europe 2007-2015 in thousand € (Source: InvestEurope)

Country (fund origin)	2007	2008	2009	2010	2011	2012	2013	2014	2015
Austria	38.002	31.850	33.604	29.132	24.827	24.291	25.548	24.548	27.185
Baltic countries	12.583	13.620	3.671	4.516	8.199	12.273	7.532	18.919	18.651
Belgium	174.756	183.607	177.816	85.625	102.059	124.406	102.023	123.676	61.390
Bulgaria	0	8.036	4.100	3.328	100	88	1.598	1.440	800
Czech Republic	2.026	4.333	1.446	11.578	5.503	724	779	5.586	3.987
Denmark	169.677	151.857	83.252	94.310	119.275	102.375	121.967	98.440	134.373
Finland	122.909	106.596	85.938	97.685	72.847	79.247	99.888	96.739	96.728
France	912.202	1.109.146	879.014	810.327	673.578	649.421	747.231	720.729	699.008
Germany	770.720	887.576	650.155	685.494	682.407	514.135	546.075	545.400	671.046
Greece	583	4.500	13.17	5.000	9.291	0	1.129	198	0

Hungary	6.112	10.177	529	17.90 0	29.99 5	66.84 0	16.71 0	29.89 7	23.79 8
Ireland	64.556	42.093	40.84 4	26.40 4	36.55 4	72.81 4	72.49 0	59.13 1	68.20 6
Italy	116.66 5	57.220	63.31 8	54.92 9	47.39 7	66.22 3	42.84 2	31.34 3	31.77 2
Luxembourg	28.467	41.725	24.48 9	36.71 0	41.46 0	38.79 9	34.53 9	30.56 9	35.15 4
Netherlands	282.68 0	224.13 6	155.2 28	143.6 17	157.7 36	135.1 93	152.3 06	177.4 78	200.6 57
Norway	274.60 3	157.10 9	118.7 91	157.7 93	120.4 55	112.1 69	79.73 8	92.32 2	79.84 2
Other CEE*	21.890	8.153	1.050	2.372	7.427	1.300	7.120	10.05 2	11.54 4
Poland	19.846	57.509	1.002	8.063	23.85 5	8.319	22.42 6	21.89 7	27.33 4
Portugal	120.67 6	87.474	34.16 9	55.13 2	12.84 6	13.28 1	27.30 3	44.26 5	68.76 3
Romania	1.125	7.366	527	0	0	0	3.500	2.435	1.236
Spain	320.17 6	477.39 3	131.0 31	104.0 88	121.6 25	88.06 0	77.30 1	73.00 6	91.38 0
Sweden	394.64 1	331.90 9	211.2 26	229.4 78	217.2 36	193.2 60	216.2 23	192.7 98	143.5 03
Switzerland	325.93 6	356.43 9	218.1 26	165.2 78	218.6 44	103.5 86	203.1 43	156.7 30	187.3 85
Ukraine	4.611	20.071	0	0	0	0	750	1.924	4.110
United Kingdom	1.518.4 96	1.558.5 40	800.6 04	710.3 52	742.7 35	593.4 24	499.6 50	693.7 65	804.6 49

This holds for early-stage green tech finance which includes only a few active players and deals (Frankfurt School-UNEP Centre & BNEF 2014). Figure 2 shows the amounts of VC invested in green tech companies as well as the number of investments and number of companies across a set of selected countries.

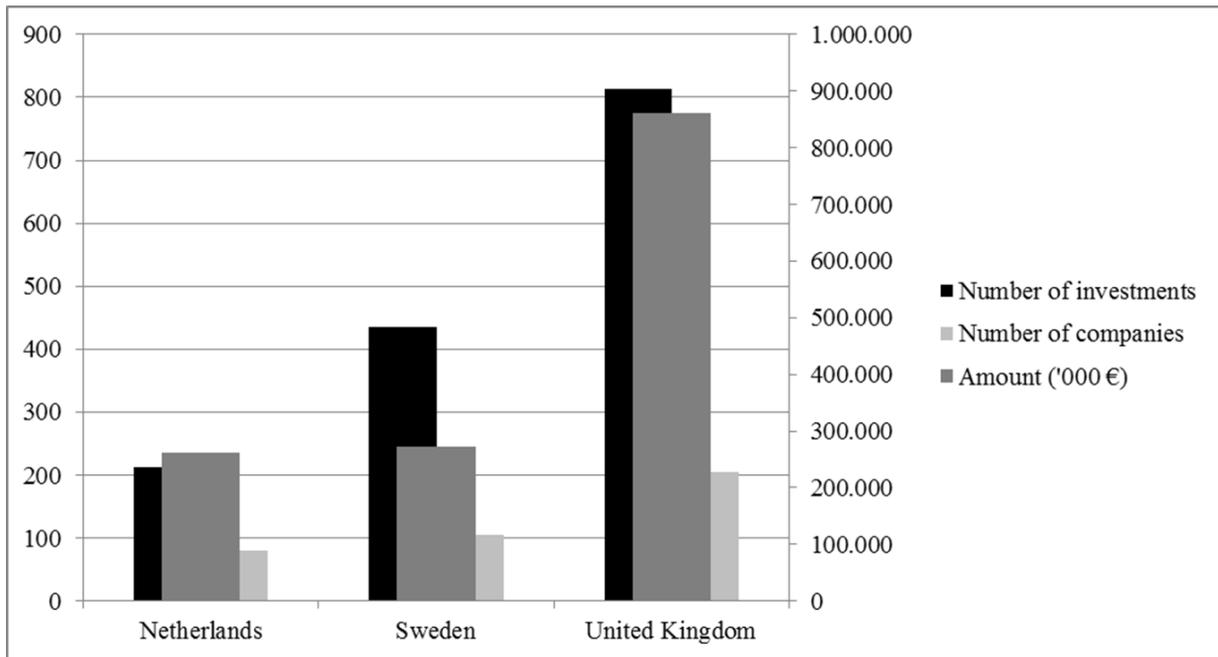


Figure 2: Top green tech sectors⁵ which received PE/VC investments in NL, SWE and UK, in the period 2007- Q3 2014 (number of investments and companies on left axis, amount invested on right axis) (Source: InvestEurope)

Data collection

Interview study

We conducted qualitative interviews to make a comparative study of the investment decision processes in the green tech sector in both the Netherlands and Sweden, an appropriate method for explorative questions (Yin 2009; Moran-Ellis et al. 2006). Through Dutch and Swedish VC industry associations as well as the researchers personal networks, we identified suitable, typical cases (see also Bürer & Wüstenhagen 2009; Polzin et al. 2016). Our selection criteria for the interviewees included early stage investors⁶ and early stage entrepreneurs⁷ that have recently (the last six months before the interview) been involved in an investment decision (positive or negative). 5 out of 8 interviewed entrepreneurs acquired external finance. The unique contribution of this paper is that we explore both sides of the investment process with a similar interview to obtain comparable data. The interviewed cases can be regarded as typical, although not

⁵ Alternative energy, Environmental services, Business and industrial products, Biotechnology, Energy: other, Other.

⁶ VC, financial institutions when relevant with 5-20 years industry experience and corresponding investment portfolio in the two countries and/or Europe, middle aged, both men and women.

⁷ Founders or senior employees at small- and medium-sized firms in their early stages, defined by the Global Entrepreneurship Monitor (GEM) as up to three and half years old, and in different spheres of green tech.

representative for the general population of investors and entrepreneurs in the Dutch and Swedish green tech sector (Seawright & Gerring 2008).

Our semi-structured interview guide⁸ consists of four parts. First, we asked about the general characteristics of the firm or investment fund and the role of the interviewee in that organisation. The second set of questions referred to the funding process. For entrepreneurs this related to their firm and for investors their typical firm investment process. We then asked questions about the funding of early stage firms and early stage investment, zooming in on the decision -making process. Finally, we asked questions about how entrepreneurs found the right investor and questions about the importance of their network.

Interviews were conducted face-to-face or via telephone and lasted on average one hour (between 40 minutes and 2 hours). These were recorded and transcribed verbatim (Patton 2002). 2 interviewers in the Netherlands and 3 in Sweden, often in pairs, performed a total of 30 interviews. We classified the interviews into four different groups to detect differences within and between each group and to examine the phenomena studied from different perspectives (Patton 2002; Yin 2009). The different types of interviewees are: entrepreneurs (in an incubator or not), business angels and investors in private or public venture capital (see Table 2).

Table 2: Overview about of the interview study (Types of actors, country descriptive statistics)

Code	Type of actor	Country	Type	Date	# inter- viewers
SE1	Entrepreneur – not in incubator	Sweden	Face to face	Oct 2014	2
SE2	Entrepreneur – in incubator	Sweden	Face to face	Oct 2014	1
SE3	Investor – Business angel	Sweden	Face to face	Oct 2014	1
SE4	Investor – Business angel	Sweden	Face to face	Oct 2014	2
SE5	Investor – public	Sweden	Face to face	Oct 2014	2
SE6	Investor – public	Sweden	Phone	Oct 2014	1
SE7	Investor – Business angel	Sweden	Face to face	Oct 2014	2

⁸ The interview guide can be obtained from the authors upon request.

SE8	Investor		Sweden	Face face	to	Oct 2014	1
SE9	Investor		Sweden	Face face	to	Oct 2014	2
SE10	Investor		Sweden	Face face	to	Oct 2014	2
SE11	Entrepreneur		Sweden	Face face	to	Oct 2014	2
SE12	Investor – Business angel		Sweden	Phone		Oct 2014	1
SE13	Investor – VC		Sweden	Face face	to	Nov 2014	1
SE14	Entrepreneur		Sweden	Face face	to	Nov 2014	1
SE15	Investor – VC		Sweden	Face face	to	Nov 2014	1
SE16	Investor – VC		Sweden	Face face	to	Nov 2014	2
NL1	Investor – public – VC		Netherlands	Face face	to	Oct 2014	1
NL3	Investor – VC		Netherlands	Phone		Nov 2014	1
NL4	Investor – VC		Netherlands	Face face	to	Oct 2014	1
NL5	Investor – VC		Netherlands	Face face	to	Nov 2014	1
NL6	Investor – VC		Netherlands	Phone		Nov 2014	1
NL7	Investor – VC		Netherlands	Face face	to	Oct 2014	1
NL8	Investor		Netherlands	Face face	to	Nov 2014	1
NL11	Entrepreneur		Netherlands	Face face	to	Sep 2014	1
NL13	Investor – Business angel		Netherlands	Phone		Sep 2014	1
NL15	Entrepreneur incubator	– in	Netherlands	Face face	to	Oct 2014	2
NL16	Entrepreneur		Netherlands	Face face	to	Nov 2014	1
NL17	Entrepreneur		Netherlands	Face	to	Sep	1

			face		2014	
NL18	Entrepreneur	Netherlands	Face face	to	Sep 2014	1
NL19	Entrepreneur	Netherlands	Face face	to	Sep 2014	1

Survey study

Based on the theoretical framework (section 2) and the qualitative study, we developed a survey instrument to verify and extend our results (Moran-Ellis et al. 2006; Cohen et al. 2009).⁹ There are several important aspects to be considered when using this methodological approach. First, the difference between respondents and non-respondents (response bias). As we followed a typical case approach, we expect our respondents not to be significantly different to the industry average. Second, common method bias (i.e. gathering all information for this analysis via a survey) could be present. This type of bias generally affects survey data (Podsakoff et al. 2003). We reduced the bias by minimizing item ambiguity in the questionnaire which included avoiding vague concepts, complicated syntax and unfamiliar terms. We deliberately kept questions simple, specific and concise. We also guaranteed respondents' anonymity.

In the period from April 2015 – January 2016, Swedish and Dutch entrepreneurs and investors were surveyed using a fully structured online survey (82 questions in 39 groups). The questionnaire consisted of items relating to the perception of the investment process by entrepreneurs and investors, notably channels to generate deal flow, pitching and due diligence, risk perception and the importance characteristics of the entrepreneurial/investment team. We gathered key performance indicators and the level of agreement with statements was determined. We used 5 point and 10 point Likert scales as well as open and closed questions. In total 819 investors or entrepreneurs received an invitation to participate in the survey and we advertised the survey in several entrepreneurial and private equity investor networking events. We collected 46 complete and 36 incomplete surveys, which represents a response rate of 10.1 percent¹⁰. 56 Entrepreneurs and 18 Investors participated. 30 entrepreneurs had investment experience. Although the target group was like the one in the interview study, these two samples are distinct. Our participants were mostly highly educated (postgraduate

⁹ The questionnaire can be obtained from the authors upon request and is still active online at:

<http://www.matchinvent.nl/survey/index.php/155426>

¹⁰ It is hard to compute a precise response rate as general advertising of the survey at events reaches many more (but is generally also less effective) than direct personal invitations.

degree) and had backgrounds in Engineering, Business, Sciences, Medicine and Law (in descending order). These variables, alongside industry experience, correspond to other studies in the field of early stage green tech finance (Bürer & Wüstenhagen 2009; Chassot et al. 2014). See Table 3 for more descriptive statistics of the individual matching variables.

Table 3: Descriptive statistics of responses to the survey items (Variables, description and values)

Matching variable	Obs	Mean	Std. Dev	Min	Max	Variable description		
Networks to generate deal flow (How important do you rate the following items?)								
Fairs and conferences	64	5.16	3.32	1	10	10	point scale	likert
TV, press and magazines	63	4.03	3.03	1	10	10	point scale	likert
Friends and family	66	5.94	3.46	1	10	10	point scale	likert
Business relations	66	8.61	2.71	1	10	10	point scale	likert
Actively going after them	65	8.49	3.01	1	10	10	point scale	likert
Incubators	65	5.88	3.13	1	10	10	point scale	likert
Risk attitudes (How important do you rate the following items?)								
Risk self-assessment (Caliendo et al. (2009))	52	7.87	2.28	1	10	10	point scale	likert
Technical risk (ICT) The risk that the technology will not work or cannot be scaled.	30	4.63	3.15	0	10	10	point scale	likert
Market risk (ICT) The risk that the product/service finds no profitable market.	19	4.05	3.54	0	10	10	point scale	likert
Policy risk (ICT) Government policies make the venture impossible or unprofitable.	21	3.76	3.04	0	10	10	point scale	likert
Finance risk (ICT) The risk that the venture will fail due to lack of funding.	30	6.37	3.15	0	10	10	point scale	likert
Technical risk (Life sciences)	18	4.83	4.26	0	10	10	point scale	likert
Market risk (Life sciences)	20	4.30	3.31	0	10	10	point scale	likert

								scale	
Policy risk (Life sciences)	30	3.17	2.63	0	10	10	point	likert	
Finance risk (Life sciences)	18	3.5	3.88	0	10	10	point	likert	
Technical risk (Renewable energy)	21	3.67	3.55	0	10	10	point	likert	
Market risk (Renewable energy)	30	5.70	3.15	0	10	10	point	likert	
Policy risk (Renewable energy)	18	3.5	3.75	0	10	10	point	likert	
Finance risk (Renewable energy)	21	5.52	3.76	0	10	10	point	likert	
Risk management (How important do you rate the following items?)									
Thorough legal and financial due diligence	49	5.90	2.44	1	10	10	point	likert	
Get expert advice on technology	49	6.61	2.27	1	10	10	point	likert	
Protect Intellectual Property	49	6.35	2.33	1	10	10	point	likert	
Launching customers and order book	48	7.60	2.08	2	10	10	point	likert	
Stage finance in rounds	49	6.33	2.46	1	10	10	point	likert	
Set milestones and KPIs	48	6.75	2.60	1	10	10	point	likert	
Pitch and due diligence (How important do you rate the following items?)									
Promised/Credible exit (in months)	54	4.99	2.29	1.33	10	10	point	likert	
The financials	55	5.76	2.50	1	10	10	point	likert	
The business model (scalability)	54	8.59	1.67	4	10	10	point	likert	
The technology	54	6.81	2.14	1	10	10	point	likert	
The innovativeness	54	6.91	2.15	2	10	10	point	likert	
The market potential (internationally)	54	8.78	1.56	3	10	10	point	likert	
The managerial skills of the	55	7.89	2.13	1	10	10	point	likert	

entrepreneurial team						scale		
The technical skills of the entrepreneurial team	54	6.89	2.13	1	10	10 point scale	likert	
Potential of a long-term cooperation	52	6.25	2.42	1	10	10 point scale	likert	
Potential for a quick exit	54	5.06	2.78	1	10	10 point scale	likert	
High upside potential vs. a low downside risk (<i>trade-off with 1 leaning totally towards high-upside potential and 10 leaning towards downside risk</i>)	49	3.41	2.41	1	10	10 point scale	likert	

Data analysis

First, the interviews were read and relevant information was extracted. In order to avoid interpretation bias, each interview was read by at least two members of the project team (Patton 2002). The data was then categorized, coding key terms that are related to our theoretical framework. For the data analysis and data management the software tool MaxQDA 11.1 was used. The coding scheme that incorporates the theoretical framework is included in the supplementary online material. We present the results across interviews by referring to a view expressed by two or more individuals in a group with the group name e.g., 'some investors ...', if we saw a consensus among all informants in one group, it was labelled 'many entrepreneurs ...'.

Second, we analysed the survey results. The data analysis is conducted in several steps. First, the dataset has been thoroughly screened and cases with missing or absurd values have been excluded (e.g. when there was no variance in their answers). This concerned 8 cases in total whose characteristics were not different from the rest of the sample. Second, we selected central variables for our analysis based on our theoretical framework. Third, we matched investor and entrepreneur questions to obtain a single sample and to do between group comparisons (i.e. comparing their perception of central constructs). Finally, we conducted simple t-test analyses using Stata 13.1 to determine the level of agreement about the questions among entrepreneurs and investors (see Table 4).

Finally, the results of qualitative and quantitative analyses have been merged and connected to each other. As the coding scheme and subsequent survey build upon the same conceptual background, the comparison of key constructs relating to the investment process between qualitative and quantitative results (as well as a contextualisation of quantitative results through the interviews) was straight forward.

Qualitative statements of both entrepreneurs and investors as well as the results of the t-test analysis were combined to determine of the overall level of 'perception alignment' in our sample.

Results and discussion

In our inquiry we aim to answer the question: *How do investors and entrepreneurs perceive critical stages in the matching process?* The results of the statistical analysis can be found in Tables 4, 5, 7 and 8. A summary comparing qualitative and quantitative results can be found from Table 6.

Social networks and deal flow

Our results point towards high mismatch in perception about the usefulness and beneficial role of networking through various channels. Investors rate fairs and conferences, classical media and personal relations as more important than entrepreneurs. Entrepreneurs are less likely to target these channels, making a matching less likely to occur.

They have too many events. I can't keep track of them anymore (NL19 – Entrepreneur).

Basically, you read, you look at what is happening in the market, you go to congresses, you talk to high level individuals who know a lot about these markets and discuss with them, 'what do you think' or 'when is everything going to change' (NL1 – Investor)

Investors and entrepreneurs agree on the usefulness of general business relations and incubators to get in contact. This holds for both entrepreneurs that have received investment and those who have not.

We mainly came into contact with them through the incubators. These are programs where you actively explore the market and talk to potential customers [...] to know whether the business model is viable or not (NL19 – Entrepreneur).

In our network there are, incubators [...]that sometimes tell us: 'this is a really interesting company I came across', or 'you should talk to these guys' (NL7 – Investor).

That said, entrepreneurs perceive that it is more important to actively go after the investors than vice-versa (i.e. investors actively look for target companies).

Table 4: Survey results – means comparison analysis (networks to generate deal flow)

Matching variable	Obs.	Mean (Std. Dev)	Mean (Std. Dev.)
		Investors	Entrepreneurs

Fairs and conferences	64	6.900 (0.836)**	4.833 (0.456)**
TV, press and magazines	63	5.700 (1.044)**	3.717 (0.399)**
Friends and family	66	7.727 (0.895)**	5.582 (0.468)**
Business relations	66	8.364 (1.002)	8.655 (0.351)
Actively going after them	65	6.727 (1.236)**	8.852 (0.360)**
Incubators	65	6.400 (1.046)	5.782 (0.420)

*,**, *** refers to statistically significant difference on the 10, 5 and 1% level respectively. Stata command ttest was used.

Most investors indicate that networks serve as a means for accessing relevant information and knowledge, but also for identifying new prospects. Some of the more experienced entrepreneurs (i.e. who already raised funds and who were more advanced in the start-up process) also saw the importance of networking and building relationships proactively to get advice and secure investments in the future. Inexperienced entrepreneurs, by contrast, do not see networking as such an important activity. Table 4 shows that both in intensity and rank the entrepreneurs deviate quite significantly from the investors. They rank 'going after them actively' highest. And put much less emphasis or see less of a role for 'Fairs and Conferences' and 'Family and Friends' as investors do. Both agree on the importance of 'Business Relations'. Our results contribute to the discussion about the importance of social networks for accessing venture capital resources (Berger et al. 2005; Petersen & Rajan 2002; Stein 2002; Nightingale et al. 2009). We argue that this difference in perception of the importance of search channels reduces the likelihood that investors and entrepreneurs will find a suitable match without incurring high transaction costs.

Investment process (Pitching and due diligence)

Entrepreneurs and investors were both asked to rate the importance of two sides in the trade-off between 'high upside potential on the one hand and low downside risk'. Interestingly, the investors rate the upside potential significantly higher than the entrepreneurs.

[We also go along with] having very little downside potential with a very reasonable upside potential (NL4 – Investor).

This contradicts over-optimism theory in entrepreneurship research (Riding & Short 1987; Fried & Hisrich 1994). However, our interview results suggest that entrepreneurs do not explicitly think about these criteria when pitching their idea.

An investor does not want uncertainty, they want a calculated risk (SE11 – Entrepreneur).

Regarding the perception of important criteria, our results also show significant disagreement among entrepreneurs and investors. On the one hand, both the financials of the venture as well as the business model (including scalability) were assigned a higher priority in investor decision-making by entrepreneurs than by the investors themselves in the survey. However, our qualitative results do not support this disagreement, suggesting both care about the business model and scalability.

But I would say that one of the important factors of us investing in a company here would be that we can help globalize the technology or commercialize it (SE16 – Investor).

The business model is important. For example, do not build on production capacity, but focus on the brand and core-business (SE11 – Entrepreneur).

The financials of the company [are important] we must believe the financial plan (NL4 – Investor).

The investor is seriously investing in tech and hardware, they want to see both [numbers and details on technology] (SE14 – Entrepreneur).

Our results specifically highlight the diverging perception of ‘hard criteria’ in investing in an early stage venture. The general venture capital literature highlights the different business vs. technical mind-sets among entrepreneurs and investors with the latter focussing on financials and business models (Söderblom 2012; Petty & Gruber 2011; Eckhardt et al. 2006). We observe the opposite effect in our quantitative study, although our qualitative study contains evidence of the generally assumed relationship. On the other hand, both technology and the degree of innovativeness are rated more important by the investors than by the entrepreneurs which confirms earlier work (Bengtsson & Hsu 2015; Hsu 2006; Petty & Gruber 2011).

Table 5: Survey results – Means comparison analysis (Pitching and due diligence)

Matching variable	Obs.	Mean (Std. Dev) Investors	Mean (Std. Dev) Entrepreneurs
Upside vs downside risk	56	4.200 (0.389)**	3.283 (0.188)**
The financials	55	4.300 (0.844)**	6.089 (0.354)**
The business model (scalability)	54	7.889 (0.807)*	8.733 (0.219)*
The technology	54	8.444 (0.580)***	6.489 (0.311)***
The innovativeness	54	9.222 (0.434)***	6.444 (0.296)***
The market potential	54	9.222 (0.778)	8.689 (0.206)

(internationally)

The managerial skills of the entrepreneurial team	55	6.400 (1.147)***	8.222 (0.224)***
The technical skills of the entrepreneurial team	54	6.600 (0.872)	6.955 (0.301)
Promised/Credible exit (in months)	53	8.000 (0.730)***	4.303 (0.251)***
Potential of a long-term cooperation	52	6.889 (1.230)	6.116 (0.320)
Potential for a quick exit	54	2.333 (0.373)***	5.600 (0.403)***

*, **, *** refers to statistically significant difference on the 10, 5 and 1% level respectively. Stata command ttest was used.

In the interviews, some investors stress that the team is more important than the venture. They suggest that a good team can be successful with a bad idea, but a bad team cannot make a success out of a good idea. There is no consensus on this matter, however, with other investors stressing the importance of the idea (technology). They believe they can intervene in the team if necessary. Investors also stressed in the interviews that they invest in companies with business ideas that they understand. High tech ventures might thus have a harder time obtaining finance as they bring innovative technology to the market. Most importantly, the entrepreneur should be able to explain to the investor how the venture will be commercially successful.

Regarding necessary/successful skills in the entrepreneurial team, investors give a lower priority to the managerial skills than the entrepreneurs themselves in the survey. This contradicts the results from the interviews.

Traditional VCs look for better skilled management. This firm build the management team (NL6 – Investor).

However, both do agree on the importance of the technical skills for the success of the entrepreneurial team.

Obviously, you need the technological mind, whoever that is. And if that's the professor, great (SE16 – Investor).

Our results (see Table 5) confirm the notion that a good match between the investors and entrepreneurs is pivotal for the success (Higashide & Birley 2002; Bengtsson & Hsu 2015; Franke et al. 2006). Managerial skills are expected to be less prevalent among the entrepreneurial team as they are contributed or complemented by the investors (Bertoni, D'Adda, et al. 2015; Busenitz et al. 2005; Petty & Gruber 2011). Technical skills and a profound understanding of their product and market are mutually highlighted.

Investors and entrepreneurs in our survey seem to agree on the fact that the investment should yield the possibility for a long-term cooperation. This contradicts somehow our interview results. Investment is perceived as entering a partnership and investors acknowledge the value-added of a good match.

If the people involved are not the right people, I mean, we look at this as a marriage almost (SE16 - Investor).

However, especially more inexperienced entrepreneurs indicate that they have difficulties finding the right partner.

I think there is enough [money]. What is difficult is to find the right one for you. There are lots of different types of companies at different stages (NL17 - Entrepreneur).

The investors in our interviews all realize that an investment is never a one-time event. Entrepreneurs, however, seem less aware of long-term commitment. Entrepreneurs rarely mention other things besides the willingness to invest the money as important when evaluating investors. Again, more experienced entrepreneurs are an exception. Such entrepreneurs see the investor as a partner and carefully consider other firms in the investors' portfolio and the time horizon as highly relevant information.

Entrepreneurs rate the potential for a quick exit a much higher criterion in investors evaluating potential investment opportunities than they attribute to this themselves. In the interviews, in contrast, potential and fast exists where not mentioned very often by entrepreneurs but are mentioned by investors.

Our fund in general, and our documentation, is five years. So, it's rare we'd stay in. Usually once the five years is hit we either have been taken by a larger venture or they've been purchased or maybe they've gone IPO (SE16 - Investor).

This could mean that entrepreneurs are reluctant to take on VC (phase 1 of the matching process) as they expect them to look mainly for a quick exit. Alignment of expectations about exit strategies was considered important by investors.

You get an idea [...] how good the entrepreneur is from their exit strategy. Making sure that the team is aligned with the exit is also very important (NL4 - Investor).

These results contribute to the discussion about short-termism in the green tech venture capital industry (Mazzucato 2013; Kenney & Hargadon 2012; Marcus et al. 2013). Whereas relatively short cycles (<5 years) are indeed mentioned, investors seem flexible in extending these for the prospective business case. This was supported by the relatively lower importance of an early exit (Hsu 2006; Hellmann & Puri 2000). This could

indeed be an impediment to disruptive innovations that need longer timespans to materialize.

Table 6: Overview about the mixed method results (Interviews and survey)

Matching of Investors (I) and Entrepreneurs (E)	Entrepreneurs perception of importance relative to investors perception			Combination of interviews and survey	
	E<I	E=I	E>I		
Social networks and deal flow	3	2	1	++	Highest disagreement/mismatch between entrepreneurs and investors which is supported by the interviews. Mostly incubators are mentioned. Networks generally not so important for entrepreneurs.
Investment process (pitching and due diligence)	4	3	4	O	Investors focus more on financials and scalability/market potential in the interviews, innovativeness on the other hand aligns with survey results (more important for entrepreneurs). Time to exit in months and upside potential more highly rated by investors. Usually no mention of return expectations and upside vs. downside by entrepreneurs. Managerial skills of the entrepreneurs are more highly rated than by investors. Interviews support the survey results.
Risk perception	6	7	0	-	Entrepreneurs usually underestimate the risks compared to investors, especially market and policy risk.
Risk management	1	4	1	-	Entrepreneurs do not often refer to ways of managing the risks (such as diversification and specialization).

++ ,+, O, -, -- indicate a scale of alignment of qualitative and quantitative results.

Risk

Risk perception

Alignment of risk perception differs among the interviewed and surveyed participants (see Table 7). In general, investors assess their willingness to take risks significantly higher than entrepreneurs which contradicts earlier work that highlights increased risk aversion after the financial crises (Block & Sandner 2009; Cowling et al. 2016).

[There is a] misunderstanding that perceived risk equals risk, risk equals uncertainty (SE14 – Entrepreneur).

This heterogeneity is apparent when entrepreneurs and investors evaluate technological, market, policy and finance risks. First, entrepreneurs and investors agree on technological risk as the main barrier for early stage ventures, with this result cutting across ICT, life sciences and renewable energy sectors. However, in the qualitative interview study, technology, or production risk, seemed more important to investors whereas the entrepreneurs mentioned this risk less frequently.

Offshore wind, the big challenge there is cost right now. The Dutch government has decided that the levelised cost of offshore wind electricity has to be reduced to 40€ per MWh in 10 years time (NL19 – Entrepreneur).

Initially it's the technology risk, during proof of concept or product development, and then once, as your risk starts to decrease, the focus becomes more on the business risk, the market risk, getting the technology into the hands of the people that are going to be able to get it into the market place (NL6 – Investor).

Table 7: Survey results – Means comparison analysis (risk attitudes)

Matching variable	Obs.	Mean (Std. Dev) Investors	Mean (Std. Dev.) Entrepreneurs
Risk self-assessment	52	8.900 (0.407)*	7.619(0.372)*
Technical risk (ICT)	30	5.100 (1.038)	4.400 (0.701)
Market risk (ICT)	30	6.700 (0.967)	6.200 (0.728)
Policy risk (ICT)	30	3.700 (1.075)	2.900 (0.492)
Finance risk (ICT)	30	4.700 (1.023)	6.200 (0.687)
Technical risk (Life sciences)	19	5.250 (0.921)	3.182 (1.197)
Market risk (Life sciences)	18	6.714 (1.063)*	3.636 (1.416)*
Policy risk (Life sciences)	18	6.429 (1.395)***	1.636 (0.834)***
Finance risk (Life sciences)	18	6.143 (1.335)***	1.818 (0.872)***

Technical energy)	risk	(Renewable energy)	21	4.600 (1.568)	3.500 (0.742)
Market energy)	risk	(Renewable energy)	21	6.200 (1.594)*	3.667 (0.797)*
Policy energy)	risk	(Renewable energy)	21	7.000 (1.265)***	2.625 (0.785)***
Finance energy)	risk	(Renewable energy)	21	7.400 (1.030)	4.938 (0.998)

ICT: Information and communication technology; LS: Life sciences; RE: Renewable energy; *, **, *** refers to statistically significant difference on the 10, 5 and 1% level respectively. Stata command ttest was used.

Second, entrepreneurs, especially for the life sciences and renewable energy sectors, assess market risk as significantly lower. The assessment of market risk in the ICT sector does not significantly differ among investors and entrepreneurs.

Third, survey participants assessed the finance risk, which also highlights a higher assertion of risks by investors in the life sciences and renewable energy ('asset heavy') sectors.

There is the risk that the company runs out of money (NL7 – Investor).

Fourth, in the interviews, policy or regulation risk is mentioned most. It is deemed incalculable and thus perceived as deep uncertainty by both investors and entrepreneurs. In particular, investors dislike this type of risk. It cannot be managed, hedged or avoided.

Capital intensive and long cycles [imply] large uncertainty [...]. Will the Swedish policy last? is a questions we asked ourselves (SE3 – Investor).

Regulation risk we generally do not like. [...] If you are standing in front of total darkness, we do not go in the investment, no matter how good the upsides are (SE9 – Investor).

This result is supported by the survey study, showing that investors perceive policy risks in the life sciences and renewable energy sectors as higher than entrepreneurs. In ICT this is not the case which supports earlier evidence (Bürer & Wüstenhagen 2009; Lüthi & Wüstenhagen 2012; Lüthi & Prässler 2011).

Risk assessment plays a central role in the investment process (Mrkajic et al. 2016; Criscuolo & Menon 2015; Parhankangas & Hellström 2007; Teppo & Wüstenhagen 2006). We disentangle these risks by type and sector to reflect upon different perceptions and detect mismatches. Policy, market and finance risks are assessed lower by

entrepreneurs. This may cause them to value their venture higher than the investor and could hamper a potential match. Further, we contribute to the discussion on the suitability of VC for green tech investments (Kenney & Hargadon 2012; Marcus et al. 2013; Bocken 2015) by highlighting misaligned (policy) risk perceptions as one cause of the perceived unsuitability.

Risk management

A range of tools exist to address the risks of early stage investments. Our findings (Table 8) suggest that, although investors and entrepreneurs perceive most risk management techniques as equally important, the value of financial and legal due diligence as well as staging needs to be conveyed to entrepreneurs generate greater alignment.

Entrepreneurs value a thorough financial and legal due diligence significantly less.

We are doing the market validity tests with our corporate partners (SE16 – Investor).

Survey results also show that general agreement among entrepreneurs and investors exist with relation to including external advisors to evaluate the technology which extends earlier work (Parhankangas & Hellström 2007), ruling out this source of mismatching.

Technology is often key to a green tech venture and sometimes hard to formally protect, meaning entrepreneurs may be reluctant to be completely transparent. Investors like to see formal protection (IP) (Harhoff 2011). Entrepreneurs acknowledge this finding which is also supported by the survey results.

Well 'is there a market and do you have contact with potential customers already?' That's usually the first question, then after we say in which market we are off shore wind, the next question is 'do you have IP?' (NL19 – Entrepreneur).

Does it have IP or not, or is it more project organisation - we don't like project organisations, we want to invest in IP (NL7 – Investor).

To address market risk, the two parties also agree that initial customers and an order book shows commercial viability of the venture which supports previous analyses (Baum & Silverman 2004; Hellmann & Puri 2002).

A company needs to have either a proven concept with the technology or they must have a user, a customer that is utilizing that technology in some shape or form (SE16 – Investor).

[It is problematic] to be defined as a start-up with regard to customers (SE2 – Entrepreneur).

Investors manage risk by staging the investment. Occasionally, investors indicate in the interviews that they will ask prospects to return in a later stage, after some key uncertainties have been resolved. The investors strategically time their commitment by structuring the deal in stages (Eckhardt et al. 2006; Bengtsson & Hsu 2015). Interestingly, this technique for managing risk is significantly less well perceived by investors as the survey results which suggest this should not lead to a mismatch in supply/demand of finance then.

In our due diligence of the company making sure that there is enough money around the table is important, but before we have to have a pretty good idea [how] to get someone else to invest at a later stage (NL4 – Investor).

However, many of the barriers [relate to the fact] that investors have raised their fund under conditions that they have to [invest in certain industries, in certain stages, in firms with turnover etc]” (SE14 – Entrepreneur).

Finally, there is agreement about setting milestones and KPIs for the entrepreneurs in the survey. This finding however is not supported by interview results as entrepreneurs do not mention it as a way of reducing risks. Failing to agree on a roadmap and milestones etc. leads to a mismatch between investors and entrepreneurs (Bengtsson & Hsu 2015; Eckhardt et al. 2006).

Table 8: Survey results – Means comparison analysis (risk management)

Matching variable	Obs.	Mean (Std. Dev) Investors	Mean (Std. Dev.) Entrepreneurs
Thorough legal and financial due diligence	39	6.231 (0.351)**	4.600 (0.957) **
Get expert advice on technology	49	6.7 (0.990)	6.590 (0.328)
Protect Intellectual Property	49	6.1 (0.948)	6.410 (0.348)
Launching customers and order book	48	7.222 (0.596)	7.692 (0.345)
Stage finance in rounds	49	5.400 (1.127) *	6.564 (0.334) *
Set milestones and KPIs	48	5.889 (1.252)	6.949 (0.364)

*,**, *** refers to statistically significant difference on the 10, 5 and 1% level respectively. Stata command ttest was used.

Additional and sensitivity analyses

In addition to comparing perceptions between investors and entrepreneurs, we split the survey sample by country of origin and green tech vs. non-green tech, pooling investors and entrepreneurs due to limited sample size. We find no significant results regarding

country differences in line with our qualitative findings. However, we find differences regarding green tech vs. non-green tech. First, actors within the green tech sector rate the importance of incubators and business relations significantly lower than those non-green tech actors. This stands in contrast to our qualitative analyses where virtually all actors agreed on the importance of these two channels. Interestingly, in terms of evaluation criteria, green tech actors rate themselves as less risk-taking and they believe a quick exit is a more important criterion which would impede innovation in this sector (Kenney & Hargadon 2014). The investors we interviewed do not consider green tech different from normal early-stage enterprises. The risk-return they require is no different than the one observed in general. Investors evaluate these ventures considering the non-green tech alternatives they also have.

Conclusions and implications

From this study of entrepreneurs and investors perceptions of key stages in the investment process, several conclusions can be drawn. First, to understand why early stage technology investors often fail to provide adequate financing for new high-technology-based firms, we breakdown the matching process into different dimensions. We find that misaligned perceptions between parties exist and may explain why fewer deals than would be economically optimal are completed. This diagnosis is different to the traditional idea that the supply of funds for venture capital investments is lacking. And so is the cure: if matching problems are the bottleneck, to 'thicken' markets for venture capital in Europe repeated interactions are pivotal.

Second, our study has shown that in critical phases of the matching process significant misalignment of perceptions indeed exists. The different perception of channels to meet potential investors/entrepreneurs as well as the overall perception of networking already leads to a lower number of 'initial contacts' being taken made. When it comes to pitching, entrepreneurs think that investors rely more on financial and other hard criteria to evaluate the commercial viability of the venture than investors themselves indicate they do. This may cause entrepreneurs to pitch and signal the wrong things. Furthermore, the perceived importance of market, policy and finance risk is misaligned, which explains the often found 'over optimism' that is attributed to asymmetric information (Shepherd & Zacharakis 2001). Entrepreneurs seem to not understand the tools investors have at hand to mitigate these risks. Finally, investors seem to have a dynamic view on investments. They view the investment decision as a staged, multi-round process, whereas entrepreneurs have a more static view on investments and perceive an investment as a one-time event. Overall, investors seem to accept the challenge of financing potentially disruptive innovation; in fact, that is what they are in the business for. But investors need to reach a certain level of comfort and be allowed to apply their

full range of instruments and techniques to assess, evaluate and manage the many risks involved. We conclude there is no supply constraint or demand problem in European VC markets in general or for green tech in particular. There are sufficient funds to finance any project deemed worthy and there is no shortage of projects looking for funding. The bottleneck in thin markets for venture capital is the matching process. This diagnosis requires a different treatment.

Implications

Entrepreneurs need to invest in networking activities, especially fairs and conferences to extend their business relations as these are perceived as highly important by investors. In addition, incubators provide a good platform for finding a match. To increase their chances of making a match they should also work on better communicating the policy, market and finance risks associated with their venture. Hence, entrepreneurs should focus on the business case and the technology whilst also developing communication skills to convey the necessary information to investors. In addition an understanding of the personal level of interaction will increase the chance of funding (see also Bengtsson & Hsu 2015).

Investors are well advised to actively search for potential entrepreneurs and expand their network, as the entrepreneurs rely less on channels such as personal networks and business relations. Beyond decision criteria such as technical skills and personal characteristic, investors should disclose their way of risk assessment and risk management to entrepreneurs to enable them to provide the right kind of information and improve the matching probability throughout the pitching and due diligence process.

Policy makers (see OECD 2015) need to understand this largely social process of matching between investors and entrepreneurs in order to effectively mobilise private finance for low-carbon innovation (Foxon et al. 2008; van den Bergh 2013; Iyer et al. 2015). The lack of VC finance for many of the green tech ventures out there may not be an inadequate flow of funds, especially in the 'valley of death' (Marcus et al. 2013; Kenney & Hargadon 2012), but rather a lack of searching and matching processes due to 'thin market'. This implies a very different policy approach. In line with earlier work (Bertoni, D'Adda, et al. 2015) our findings warrant the implication that 'soft instruments' such as start-up competitions and contests, pitching events, training as well as other intermediation activities between investors and entrepreneurs could reduce misaligned perceptions, create a mutual understanding between entrepreneurs and investors and thus increase the probability of matching. Policy makers could support economic and financial literacy among would-be entrepreneurs. In the broader discussion, these measures could also 'thicken' the markets for entrepreneurial finance by increasing the (successful) interaction between these two groups. Policy makers cannot be match-

makers, but they can certainly increase the probability of successful matching by organising more intensive interactions.

Limitations and future research

Although the combination of qualitative and quantitative methods addresses some concerns about the generalizability of our findings, the relatively small sample warrants some caution. Our initial simple statistical analyses give indication for misaligned perceptions. We believe this generalizes to the wider population, because our interviews and survey oversampled successful entrepreneurs. If anything, one would expect this oversampling to bias the results towards more aligned perceptions. In the survey study, about half the entrepreneur population gained investment experience. As such, the results should more accurately reflect actual misalignment in perceptions. The small sample size does not allow for more sophisticated econometrics and statistics. Future research could aim to increase our sample of investors and entrepreneurs. Our data also does not allow us to identify the two parties to a proposed match. This implies we cannot verify that, all else equal, misaligned perceptions ex ante indeed reduces the probability of a match being made. In future, we aim to collect such data at events that bring investors and entrepreneurs together and/or conduct experimental field and lab research with nested matching decisions.

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