Drivers of investment activity in equity crowdfunding

Anna Lukkarinen

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Anna Lukkarinen

Supervising professor

Professor Emeritus Jyrki Wallenius, Aalto University, Finland

Preliminary examiners

Professor Hans Landström, Lund University, Sweden

Associate Professor Rotem Shneor, University of Agder, Norway

Opponent

Associate Professor Rotem Shneor, University of Agder, Norway

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Anna Lukkarinen

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Drivers of investment activity in equity crowdfunding

Publisher School of Business**Unit** Department of Information and Service Management**Series** Aalto University publication series DOCTORAL DISSERTATIONS 40/2019**Field of research** Quantitative methods**Date of the defence** 29 March 2019**Language** English☐ **Monograph**☐ **Article dissertation**☒ **Essay dissertation****Abstract**

Equity crowdfunding is a novel form of equity financing in which entrepreneurial ventures solicit investments from large groups of people via online platforms. While equity crowdfunding has similarities with more traditional forms of early-stage equity financing, its digital nature clearly distinguishes it from the other forms. The equity crowdfunding market has been growing fast in recent years. With high interest from investors, platforms, ventures, and regulatory bodies, there is a strong demand for academic research on equity crowdfunding.

The objective of this dissertation is to improve our understanding of the campaign-, investor-, and investment-level drivers of investment activity in equity crowdfunding. Consequently, this dissertation addresses three research questions: 1) What are the key success drivers of online equity crowdfunding campaigns? 2) What are the motivations and decision criteria of equity crowdfunding investors? 3) Does the performance of first investments predict investors' later activity on an equity crowdfunding platform?

The research questions are addressed in the context of the Finnish market, which is among the forerunners of alternative finance in Europe. Specifically, I use data from the financial technology company Invesdor Oy, which operates an online investment platform. The key sources of empirical data are the internal databases of the focal platform and an online investor survey that was conducted as part of this research. The research method is quantitative, including multiple linear regression, two-step cluster analysis, factor analysis, analysis of variance, univariate analysis, logistic regression, and Poisson regression.

The results indicate that equity crowdfunding investors possess a unique combination of investment behavioral characteristics. At campaign level, tangible campaign features and the utilization of networks, rather than traditional investment criteria, predict investment volumes. However, an investor-level examination reveals strong heterogeneity among investors in terms of their investment motivations, decision criteria, and target campaigns, with different campaigns catering for different investor motivations. At investment level, investors seem to make their decisions about whether to return to make further investments with limited regard to the performance of their previous investments. Rather, the likelihood of returning is predicted by investor characteristics and motivations, with extrinsically motivated investors more likely to pursue diversification strategies than intrinsically motivated investors. The results corroborate the view of equity crowdfunding as a unique phenomenon distinct from other forms of early-stage equity financing.

Keywords Entrepreneurial finance; new ventures; online platforms; digital fundraising; crowdfunding; equity crowdfunding

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Tekijä

Anna Lukkarinen

Väitöskirjan nimi

Sijoitustoiminnan ajurit osakepohjaisessa joukkorahoituksessa

Julkaisija Kauppakorkeakoulu**Yksikkö** Tieto- ja palvelujohtamisen laitos**Sarja** Aalto University publication series DOCTORAL DISSERTATIONS 40/2019**Tutkimusala** Kvantitatiiviset menetelmät**Väitöspäivä** 29.03.2019**Kieli** Englanti☐ **Monografia**☐ **Artikkeliväitöskirja**☒ **Esseeväitöskirja****Tiivistelmä**

Osakepohjainen joukkorahoitus on uudenlainen oman pääoman ehtoisen rahoituksen muoto, jossa yritykset hakevat sijoituksia suurilta joukoilta ihmisiä digitaalisten alustojen kautta. Vaikka osakepohjaisella joukkorahoituksella on yhtäläisyyksiä perinteisempien varhaisen vaiheen oman pääoman ehtoisten rahoitusmuotojen kanssa, digitaalisuus erottaa sen selvästi muista muodoista. Osakepohjaisen joukkorahoituksen markkinat ovat kasvaneet nopeasti viime vuosina. Sijoittajien, joukkorahoituslustojen, kohdeyritysten ja regulaattorien kiinnostuksen myötä osakepohjaista joukkorahoitusta käsittelevälle akateemiselle tutkimukselle on vahvaa kysyntää.

Tämän väitöskirjan tavoitteena on parantaa ymmärrystämme sijoitustoiminnan kampanja-, sijoittaja- ja sijoitustason ajureista osakepohjaisessa joukkorahoituksessa. Täten väitöskirja keskittyy kolmeen tutkimuskysymykseen: 1) Mitkä ovat osakepohjaisen joukkorahoituksen kampanjoiden menestyksen avainajureita? 2) Mitkä ovat sijoittajien motivaatiot ja päätöskriteerit osakepohjaisessa joukkorahoituksessa? 3) Ennakoiko ensimmäisen sijoituksen performanssi sijoittajien myöhempiä toimia osakepohjaisen joukkorahoituksen alustalla?

Tutkimuskysymysten tarkastelun markkinakontekstina on Suomi, joka on yksi vaihtoehtoisten rahoitusmuotojen edelläkävijämaista Euroopassa. Käyttämäni datan lähteenä on finanssitekniologiayritys Invesdor Oy, joka ylläpitää verkossa toimivaa sijoituslustoja. Empiirisen datan pääasiallisia lähteitä ovat alustan sisäiset tietokannat sekä verkkopohjainen sijoittajakysely, joka toteutettiin osana tätä tutkimusta. Tutkimusmenetelmä on määrällinen kattaen lineaarisen monimuuttujaregression, kaksivaiheisen ryhmittelyanalyysin, faktorianalyysin, varianssianalyysin, yksimuuttujaregression, logistisen regression sekä Poisson-regression.

Tulokset viittaavat siihen, että sijoittajien sijoituskäyttäytymisen ominaispiirteiden yhdistelmä osakepohjaisessa joukkorahoituksessa on ainutlaatuinen. Kampanjatasolla kampanjoiden konkreettiset ominaisuudet sekä verkostojen hyödyntäminen, pikemminkin kuin perinteiset sijoituskriteerit, ennakoivat sijoitusvolyymejä. Sijoittajatasolla tarkastelu kuitenkin paljastaa suurta heterogeenisyyttä sijoittajien sijoitusmotivaatioissa, päätöskriteereissä ja kohdekampanjoissa siten, että eri kampanjat palvelevat erilaisia sijoittajamotivaatioita. Sijoitustasolla näyttää siltä, että sijoittajat kiinnittävät vain rajallisesti huomiota edellisten sijoitustensa performanssiin tehdessään mahdollisia uusia sijoituspäätöksiä alustalla, ja että paluun todennäköisyyttä ennakoivat pikemminkin sijoittajien ominaisuudet ja motivaatiot. Ulkoisesti motivoituneet sijoittajat noudattavat todennäköisemmin hajautusstrategioita kuin sisäisesti motivoituneet sijoittajat. Tulokset vahvistavat näkemystä osakepohjaisesta joukkorahoituksesta muista varhaisen vaiheen oman pääoman ehtoista rahoitusmuodoista erottuvana ilmiönä.

Avainsanat Yritysrahoitus; uudet yritykset; digitaaliset alustat; digitaalinen rahoitus; joukkorahoitus; osakepohjainen joukkorahoitus

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This dissertation has been an experiment into academic curiosity, trusting an unfolding process, and enjoying the ride. While the beginning was characterized by high uncertainty, opportunities gradually started to open up and, along with them, a path of increasing clarity emerged. The outcome of the experiment is one that I am extremely happy with. Not only did it lead to this dissertation, but it also gave rise to avenues for further research, taught me how to work efficiently yet sustainably, and allowed me to submerge in the sparkling everyday life of a fintech venture. Most importantly, this journey has allowed me to cross paths with, to tread together with, and to receive guidance from many wise and inspiring people.

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Helsinki, February 2019

Anna Lukkarinen

PART I: OVERVIEW OF THE DISSERTATION

Contents

- 1. Introduction.....7
- 2. Research problem 14
- 3. Literature review 18
 - 3.1. Equity crowdfunding 19
 - 3.2. Micro funders..... 30
 - 3.3. Business angels 31
 - 3.4. Venture capitalists33
 - 3.5. Comparison of early-stage equity financing forms.....34
- 4. Data and methods.....46
 - 4.1. Empirical setting.....46
 - 4.2. Data sample47
 - 4.3. Analytical methods49
 - 4.4. Reflection on empirical choices 51
- 5. Key findings53
 - 5.1. Success drivers of online equity crowdfunding campaigns53
 - 5.2. Investor motivations and decision criteria in equity crowdfunding54
 - 5.3. First investment performance and subsequent investor activity55
- 6. Discussion.....58
 - 6.1. Synthesis and discussion of findings58
 - 6.2. Contributions to literature..... 61
 - 6.3. Practical implications65
 - 6.4. Limitations and future research66
- References..... 68

Original research papers

Research paper 1

Lukkarinen, A., Teich, J. E., Wallenius, H., Wallenius, J. (2016). Success drivers of online equity crowdfunding campaigns. *Decision Support Systems* 87, 26–38.

Research paper 2

Lukkarinen, A., Wallenius, J., Seppälä, T. (2017). Investor motivations and decision criteria in equity crowdfunding. Presented at INFORMS Annual Meeting, Houston, Texas. Unpublished manuscript.

Research paper 3

Lukkarinen, A. (2018). Does the performance of first investments predict investors' later activity on an equity crowdfunding platform? Presented at the Nordic Conference for Small Business Research, Luleå, Sweden. Unpublished manuscript.

Clarification of authors' contributions

Research paper 1: Success drivers of online equity crowdfunding campaigns.

Anna Lukkarinen was the lead author of this paper. She was the main author of the introduction and responsible for conducting and writing most of the literature review. She selected most of the variables and gathered the data necessary to operationalize them. She conducted all the analyses included in the published paper. She authored the discussion section based on the results. Jeffrey E. Teich contributed throughout the article creation process with comments and insights and revised different versions of the manuscript. He devised an early version of the literature review. He conducted early versions of the quantitative analyses. He also brought in his linguistic expertise. Hannele Wallenius contributed throughout the article creation process with comments and insights. She held a key role in gathering expert-sourced data for selected variables. She read and revised different versions of the manuscript. Jyrki Wallenius contributed throughout the article creation process with comments and insights. He held a key role in gathering expert-sourced data for selected variables. He read and revised different versions of the manuscript. He also led the process of publication.

Research paper 2: Investor motivations and decision criteria in equity crowdfunding

Anna Lukkarinen was the lead author of this paper. She conducted the literature review, collected all empirical data, conducted the quantitative analyses, and developed conclusions based on the results. She authored the entire manuscript. Jyrki Wallenius contributed throughout the article creation process with comments and insights. He provided actionable suggestions for the structure, hypotheses, and conclusions. Tomi Seppälä contributed at several points of the article creation process with comments. He provided actionable suggestions regarding the choice of quantitative analysis methods and models.

Research paper 3: Does the performance of first investments predict investors' later activity on an equity crowdfunding platform?

Anna Lukkarinen was the sole author of this paper.

1. Introduction

Most entrepreneurs need monetary resources in order to turn entrepreneurial opportunities into new ventures and to steer their ventures towards success (Paschen, 2017; Shane and Venkataraman, 2000). The majority of new ventures start with investments from their founders as well as the family and friends of the entrepreneurs (Reynolds et al., 2004). While family and friends have a very important role as providers of informal equity investments to new ventures, they tend to remain one-off investors (Riding, 2008). After exhausting these sources of “love money”, many entrepreneurial ventures face a need for further external investments in order to continue to finance their operations and growth (De Clercq et al., 2012). However, they often find themselves facing a funding gap, as they have not yet developed sufficiently to become attractive to established investors of early-stage equity, most typically business angels and venture capitalists, or as they may have secured only part of their funding needs from these sources (Kleinert et al., 2018; Lam, 2010).

Especially as business angels and venture capitalists have been shifting towards making larger, later-stage investments, small and mid-sized companies have remained strongly underfunded, leading to negative consequences for employment and economic growth (Guenther et al., 2018; Silanes et al., 2015). Furthermore, an observed and often widespread lack of participation in the stock markets by households implies welfare losses to individuals as well as the economy (Cocco et al., 2005). Early-stage companies, in particular, have traditionally been unavailable to the majority of household investors due to a lack of suitable marketplaces (Gerber and Hui, 2013).

Equity crowdfunding is a novel form of entrepreneurial finance in which a venture sells equity shares to a large number of small investors through an open call on an online platform (Ahlers

et al., 2015). It provides opportunities for an increasing number of people to invest in the equity of unlisted companies (White and Dumay, 2017).

Investment activity in equity crowdfunding encompasses the activities of three key stakeholder groups: crowdfunding platforms, fundraising ventures, and investors. Through their actions and interactions, they enable and conduct equity crowdfunding activity in the broader context of the capital markets and regulatory frameworks (Mochkabadi and Volkmann, 2018). Ventures create and market campaigns to sell equity shares, investors assess the campaigns and other available signals when deciding whether to invest, and online platforms offer a marketplace where investors can view campaigns and through which transactions can be conducted (Ahlers et al., 2015). In addition, regulators set the framework within which these actions take place, with the aim of finding a balance between the promotion of economic activity and investor protection (Cumming and Johan, 2013).

While many companies are either unable (Brown et al., 2018; Lukkarinen et al., 2016) or unwilling (Estrin et al., 2018) to gather financing through equity crowdfunding, numerous new ventures are also raising funds successfully through it (Block et al., 2018b; Piva and Rossi-Lamastra, 2018). In particular, ventures with features suitable for attracting the crowds, such as understandable product offerings (Belleflamme et al., 2013; Lukkarinen et al., 2016), can be especially suitable for equity crowdfunding. Equity crowdfunding holds therefore promise as a contributor towards addressing the funding gap by offering a new marketplace for matching ventures with investors (Brown et al., 2018; Guenther et al., 2018; Hornuf et al., 2018).

Indeed, the equity crowdfunding market has been growing fast in several parts of the world in recent years (Zhang et al., 2016; Ziegler et al., 2018). In Europe¹, the market grew by 38%, while in Finland, the market size over quadrupled between 2015 and 2016 (Ziegler et al., 2018). Selected market size and growth figures are presented in Figure 1.

¹ Due to data source convention, European market volume does not include the United Kingdom.

Figure 1. Equity crowdfunding market volume (data sourced from Ziegler et al., 2018)

A descriptive observation of the rising relevance of equity crowdfunding is the interest expressed by large bank groups. In Finland, Nordea Bank experimented with its own equity crowdfunding platform in 2016, followed by OP Financial Group in 2017. Further in 2018, Nordea established a partnership with the equity crowdfunding platform Invesdor.

In line with the market developments, several leading academic journals have called for research on crowdfunding (Bruton et al. 2015; Drover et al., 2017a; McKenny et al., 2017; Wright et al., 2016). Accordingly, research on equity crowdfunding has begun emerging fast in recent years, and the legitimization of equity crowdfunding research as a sub-field of entrepreneurial finance is ongoing, with the first wave of research focusing especially on the regulatory and campaign perspectives of equity crowdfunding (Mochkabadi and Volkmann, 2018).

The presence of information asymmetries can form an obstacle to the development of new firm financing markets (Leland and Pyle, 1977). The equity crowdfunding setting is characterized by high information asymmetries, as entrepreneurs possess more knowledge about their venture and its future potential than do prospective investors (Piva and Rossi-Lamastra, 2018). These asymmetries can, however, be mitigated through the use of signals of underlying venture

quality and of social networks (Ahlers et al., 2015; Shane and Cable, 2002). In addition, it is possible that equity crowdfunding is most suitable, or offers best success prospects, for ventures that represent industries associated with lower information asymmetries (Chen, 2017).

For equity crowdfunding activity to take place, ventures need to conduct successful campaigns by attracting investors to invest despite the presence of information asymmetries. However, we do not yet fully understand the drivers of campaign success. Although unanimity among research findings exists regarding the influence of several campaign features such as campaign videos (Li et al., 2016; Vismara et al., 2017), minimum investment size (Hornuf and Schwienbacher, 2017; Lukkarinen et al., 2016), and campaign updates (Angerer et al., 2017; Block et al., 2018b; Hornuf and Schwienbacher, 2018; Li et al., 2016), venture characteristics such as previous funding from experienced investors (Kleinert et al., 2018; Mamonov and Malaga, 2018), as well as herding behavior (Hornuf and Schwienbacher, 2018; Vismara, 2018a; Vulkan et al., 2016; Åstebro et al., 2018), contradictory results prevail as well. For example, it remains unclear whether campaign duration (Lukkarinen et al., 2016; Piva and Rossi-Lamastra, 2018; Vismara, 2018), the portion of equity retained by the entrepreneurs (Ahlers et al., 2015; Ralcheva and Roosenboom, 2016; Vismara, 2016), or intellectual property rights (Ahlers et al., 2015; Kleinert et al., 2018; Piva and Rossi-Lamastra, 2018; Ralcheva and Roosenboom, 2016) influence funding success.

In addition to the existence of differing levels of information asymmetries and differing ways of mitigating them, different investors also have different motivations for investing and therefore different campaign and venture preferences (Lukkarinen et al., 2017). Indeed, fundamentally, investment activity in equity crowdfunding is driven by investors' underlying motivations. According to the self-determination theory of motivation, motivations can be intrinsic, in which case the investment is made because it is inherently rewarding, or extrinsic, in which case the investment is made because it leads to a separate and distinct outcome (Ryan and Deci, 2000).

The necessity of investor-level research was well highlighted by Josefy et al. (2017) who stated: "trying to understand crowdfunding without an understanding of the crowd is like trying to

understand traditional venture funding without understanding the nature of angels and venture capitalists” (p. 176). Different campaigns appeal to different investors with different motivations, and different motivations call for different types of investor communication (Allison et al., 2015). Although a few papers have already begun exploring investors’ motivations in equity crowdfunding (Bretschneider and Leimeister, 2017; Cholakova and Clarysse, 2015; Daskalakis and Yue, 2017; Moysidou and Spaeth, 2016), our understanding thereof is not yet complete and it is somewhat blurred by apparent contradictions in the findings presented thus far. It remains unclear whether investors are primarily motivated by extrinsic (Cholakova and Clarysse, 2015) or intrinsic (Schwienbacher and Larralde, 2012) reasons or by a combination of both (Collins and Pierrakis, 2012; Daskalakis and Yue, 2017). As this unclarity may be related to the investor-level heterogeneity of investment motivations in equity crowdfunding (Niemand et al., 2018), it calls for research settings that would allow for this granularity.

A key topic expected to shape investment activity in equity crowdfunding is the performance of investments made via equity crowdfunding and the performance of equity crowdfunded ventures (Mochkabadi and Volkmann, 2018). Relevant performance measures are linked to investors’ motivations (Lukkarinen et al., 2017) and can include financial returns (Signori and Vismara, 2016), follow-up funding rounds (Hornuf et al., 2018; Signori and Vismara, 2018), and firm survival (Hornuf et al., 2018; Signori and Vismara, 2018). Indeed, as time goes by and investing activity in equity crowdfunding becomes increasingly driven by recurring investments rather than by the experimentation of first-time investors, the drivers of investors’ willingness to make further investments become important in shaping the field.

First results indicate that the average returns generated by equity crowdfunded investments are in line with stock market returns (Signori and Vismara, 2016) and that the majority of equity crowdfunded firms remain operational a few years after their campaign (Hornuf et al., 2018; Signori and Vismara, 2018). Additional evidence suggests, however, that most equity crowdfunded ventures fail to reach their financial targets (Herrala and Rajala, 2018) and that ventures that seek equity crowdfunding are less profitable and have higher debt than their peers, making them riskier and less financially attractive investment targets (Walthoff-Borm

et al., 2018). However, to a large extent, we do not yet know how equity crowdfunded investments and ventures perform after the funding round. Accordingly, research about investment performance has been called for by researchers (Mochkabadi and Volkmann, 2018) as well as practitioners (Simola, 2018).

According to reinforcement learning theory, investment outcomes that have been experienced personally have a stronger influence on investor behavior than outcomes that the investor learns from external sources (Kaustia and Knüpfer, 2008). Therefore, it becomes relevant to investigate investment performance and activity at investor level. Although two recent working papers touch upon the topic of recurring investor-level investments in equity crowdfunding (Hervé et al., 2017; Wallmeroth, 2017), we do not yet know how the performance of equity crowdfunding investments influences investors' willingness to come back to platforms to make further investments.

Three forms of equity financing, in particular, are adjacent to equity crowdfunding on the spectrum of entrepreneurial financing sources: micro funding, business angel investing, and venture capital (Rossi, 2014). Venture capital and business angel investors often become topical later than equity crowdfunding on the funding lifecycle of early-stage companies. However, many ventures have also already secured venture capital or business angel funding before raising funds through equity crowdfunding (Kleinert et al., 2018), or they may do so in connection with their equity crowdfunding campaign (Hornuf et al., 2018; Kleinert et al., 2018; Rossi, 2014). These adjacent forms of equity financing can thus be closely intertwined with equity crowdfunding.

Parallels can also be drawn between equity crowdfunding and other prevalent forms of crowdfunding, namely donation-based, rewards-based, and debt-based crowdfunding (Cholakova and Clarysse, 2015). However, equity crowdfunding differs significantly from these other forms (Mochkabadi and Volkmann, 2018), as only in equity crowdfunding do contributors obtain an ownership stake in a venture (Drover et al., 2017b). Indeed, contributors' decision making differs between the different types of crowdfunding (Moysidou and Spaeth, 2016).

This dissertation addresses the above described gaps in equity crowdfunding literature through quantitative assessments of a unique and comprehensive dataset extracted from the databases of a leading Nordic equity crowdfunding platform, as well as an unprecedentedly large set of responses to an investor survey conducted in cooperation with the platform. In order to do so, this dissertation leverages extant research on equity crowdfunding, research on adjacent forms of equity financing and, to a lesser degree, research from other forms of crowdfunding. Through its findings, this dissertation contributes to the growing stream of research on equity crowdfunding and forms part of a foundation on which more specific later research can be built. This dissertation also offers practical insights to equity crowdfunding platforms and ventures to help them target campaigns to their relevant investor segments and to implement campaigns in a way that promotes success.

This dissertation consists of an overview chapter and three research papers that examine the drivers of investment activity in equity crowdfunding from the perspectives of campaigns, investors, and investments.

This overview chapter first presents the research problem and an overview of literature on equity crowdfunding and adjacent forms of equity financing. These are followed by a presentation of the empirical setting as well as the data and analytical methods used. Next, the key findings are presented for each paper. The chapter concludes with a synthesis and discussion of the findings and a presentation of contributions to literature and to practitioners.

2. Research problem

As described in the previous section, the current base of research on equity crowdfunding falls short of offering a holistic and unanimous understanding of the drivers of investment activity in equity crowdfunding, despite an academic as well as a practical need for an improved understanding (Mochkabadi and Volkmann, 2018; Simola, 2018). Accordingly, the research problem of this dissertation is:

What drives investment activity in equity crowdfunding?

The research problem can be dismantled into more specific research questions in line with the key stakeholder groups whose actions make up investing activity in equity crowdfunding.

Fundraising ventures set up campaigns on equity crowdfunding platforms. The campaigns disclose information about the venture, the entrepreneurs, and the terms of the equity offering. In doing so, the ventures may receive guidance and boundary conditions from the platform they have chosen to conduct the campaign on (Hagedorn and Pinkwart, 2016; Mäschle, 2012).

Platforms have a key role in shaping the space of ventures that gather equity crowdfunding, as platforms typically screen new ventures carefully and aim to only select ventures that fulfil the platform's criteria and offer promise in their ability to attract investors (Löher, 2017; Salomon, 2016). Successful campaigns that reach their funding target are in the mutual interest of platforms and ventures, as unsuccessful campaigns incur costs but lead to the ventures not receiving monetary resources and to the platforms typically receiving no or lower compensation for their efforts (Hagedorn and Pinkwart, 2016; Simola, 2018). However, although success rates have been increasing along with the industry learning curve, many equity crowdfunding campaigns fail (Löher, 2017; Vulkan et al., 2016). It is therefore important to understand the drivers of campaign success.

In the presence of high information asymmetries (Leland and Pyle, 1977), success can be driven by the ventures' and campaigns' inherent characteristics as well as the signals sent by the entrepreneurs to prospective investors (Ahlers et al., 2015). Research aiming to build an understanding of campaign success drivers already exists, but it is not unanimous in several drivers and there is space to build a more comprehensive understanding of the set of success determinants (Ahlers et al., 2015; Kleinert et al., 2018; Piva and Rossi-Lamastra, 2018; Ralcheva and Roosenboom, 2016; Vismara, 2018). Therefore, the first research question is:

1. What are the key success drivers of online equity crowdfunding campaigns?

When making investment decisions on equity crowdfunding platforms, prospective investors assess the fundraising ventures and their campaigns (Ahlers et al., 2015) against numerous and varying decision criteria (Niemand et al., 2018). Fundamentally, investors' decisions and actions are driven by their motivations, which may be intrinsic or extrinsic (Ryan and Deci, 2000). Therefore, in order to understand how investors make their decisions on equity crowdfunding platforms, we need to understand what motivates investors and how their different motivations link to concrete investment decision criteria.

While some research has been conducted aiming to understand investors' motivations in equity crowdfunding (Bretschneider and Leimeister, 2017; Cholakova and Clarysse, 2015; Daskalakis and Yue, 2017; Moysidou and Spaeth, 2016), findings are somewhat contradictory (Cholakova and Clarysse, 2015; Collins and Pierrakis, 2012; Daskalakis and Yue, 2017; Schwienbacher and Larralde, 2012) and the empirical setups have included samples of individuals who may not have made investments in actuality (Daskalakis and Yue, 2017; Moysidou and Spaeth, 2016) or hypothetical investment situations (Cholakova and Clarysse, 2015). In addition, no research thus far has examined the linkages between motivations and decision criteria.

In order to account for the heterogeneity of equity crowdfunding investors (Wallmeroth, 2017), the motivations and decision criteria call for an assessment by investor segment. However, although segmentations have been done for business angels (Sullivan and Miller, 1996) and for contributors in rewards-based crowdfunding (Ryu and Kim, 2016), no research exists at

present that would offer a typology of equity crowdfunding investors (Mochkabadi and Volkmann, 2018).

In summary, it is still unclear what equity crowdfunding investors' main motivations are and how investor-level heterogeneity in motivations expresses itself in investment decisions. The second research question aims to address this shortcoming:

2. What are the motivations and decision criteria of equity crowdfunding investors and how are they related to each other?

Eventually, in order to understand the longer-term dynamics of investment activity in equity crowdfunding, it becomes important to understand whether, and under the influence of what kind of drivers, investors return to make further equity crowdfunding investments after their initial investment. In the public stock markets, a key driver of investors' investment activity are investors' personally experienced investment outcomes (Kaustia and Knüpfer, 2008). At present, although some studies have assessed the number of investments at investor level (Hornuf and Schmitt, 2017) and linked investor-level investment activity in equity crowdfunding to the characteristics of individual investors (Hervé et al., 2017), no investor-level assessment of the influence of investment performance on further investment activity in equity crowdfunding exists. The third research question addresses this gap:

3. Does the performance of their first investment predict investors' later activity on an equity crowdfunding platform?

The stakeholders of equity crowdfunding activity and the positioning of each research question are depicted in Figure 2. Research question 1 addresses the venture and campaign level, research question 2 addresses the investor level, and research question 3 addresses the intersection of investors and investments. The regulatory context and assessments with platforms as the unit of analysis fall outside the scope of this dissertation. Research questions 1, 2, and 3 correspond to research papers 1, 2, and 3, respectively.

Figure 2. Stakeholders of equity crowdfunding activity and the focus of each research question

3. Literature review

Entrepreneurial ventures often need monetary resources to survive and grow (Block et al., 2018a). Accordingly, new ventures in their seed, early, and growth stages often aim to secure external equity financing (Drover et al., 2017; Kleinert et al., 2018). The main sources of external equity financing include business angels, venture capital funding, and most recently equity crowdfunding (Bapna, 2017; Brown et al., 2018; Drover et al., 2017). In addition, micro funders can play an important role (De Clercq et al., 2012).

While the focus of this dissertation is equity crowdfunding, it also presents and utilizes findings from other forms of early-stage equity financing for three main reasons. First, despite the recent surge in equity crowdfunding literature, the field is still in its early stages and can therefore benefit from findings from adjacent fields. Indeed, much early equity crowdfunding research has built on findings from business angel and venture capital research (Bretschneider et al., 2014; Cholakova and Clarysse, 2015; Löher et al., 2018; Piva and Rossi-Lamastra, 2018; Venturelli et al., 2018). Similarly, several hypotheses in the research papers of this dissertation are built utilizing findings from these adjacent sources of early-stage equity financing.

Second, with the recent rise in equity crowdfunding activity and research, literature that incorporates and compares different forms of early-stage financing is relevant for understanding the evolving dynamics of the early-stage financing market and the roles of different financing providers within the landscape (Hornuf and Schwenbacher, 2016; Tuomi and Harrison, 2017). Business angels and venture capital firms are increasingly active on equity crowdfunding platforms (Baek et al., 2014; Brown et al., 2018; Wright et al., 2015), and previously secured financial backing from expert investors is positively related to ventures' equity crowdfunding success prospects (Kleinert et al., 2018; Mamonov and Malaga, 2018). While some have voiced concerns about equity crowdfunding posing a considerable threat to

more traditional forms of early-stage equity financing (Vulkan et al., 2016), others rather deem it as a welcome complement to the others forms (Tuomi and Harrison, 2017). At the same time, concerns have been raised that more promising ventures may be able to capture venture capital or business angel financing, whereas the less promising ventures would need to resort to equity crowdfunding due to a lack of alternatives (Walthoff-Borm et al., 2018).

Third, researching equity crowdfunding in the context of, and reflecting the research findings against, other forms of entrepreneurial financing supports the positioning and legitimization of the emerging equity crowdfunding research field into the broader entrepreneurial finance literature (Mochkabadi and Volkmann, 2018).

This section begins with an overview of research on equity crowdfunding, with a specific focus on the drivers of investing activity in equity crowdfunding. To set equity crowdfunding into its broader context of early-stage equity financing, this is followed by a presentation of more traditional sources of equity financing, including venture capitalists, business angels, and micro funders. The section concludes with a comparison of the different forms of early-stage financing and a synthesis regarding the unique position of equity crowdfunding.

3.1. Equity crowdfunding

Online equity crowdfunding emerged in the early 2010s as a new financing mechanism for early-stage entrepreneurial ventures. In line with strong market growth, a base of research around equity crowdfunding has begun to build up rapidly (Martínez-Climent et al., 2018). This section presents an overview of equity crowdfunding research available by fall 2018. It covers research from entrepreneurship, management, and finance, whereas law and the regulatory perspective remain outside its scope.

3.1.1. Overview of equity crowdfunding

Equity crowdfunding offers ventures an opportunity to seek and secure investments via digital platforms (Estrin et al., 2018; Horvát et al., 2018). In addition to offering an online setting for the entrepreneur-side pitching process and investor-side investing activities, equity

crowdfunding platforms allow for high levels of digital visibility, with all prospective investors usually able to see real-time the total amount already invested and the number of investors already committed to a campaign (Kim and Viswanathan, 2018). Investors have been observed to leverage visibility by, for instance, herding towards expert investors and away from amateur investors (Wick and Ihl, 2018).

While funds from family and friends have an important role in different forms of non-equity crowdfunding (Agrawal et al., 2013), people with social ties to the venture have been suggested by several researchers to have a more limited role in equity crowdfunding (Ahlers et al, 2015; Vismara, 2018a). Indeed, according to a survey conducted by Guenther et al. (2014), 4% of equity crowdfunding investors are family members or friends of the fund seekers. Similarly, a dataset sourced from an equity crowdfunding platform database indicates that 3% of equity crowdfunding investors are somehow connected to the venture (Guenther et al., 2018). Rather than leveraging existing networks, entrepreneurs who conduct equity crowdfunding campaigns tend to make an effort to build new ties and expand their networks by attracting new investors via the platform (Brown et al., 2018). However, some research has also suggested that the venture's social networks do play a significant role in influencing funding success (Lukkarinen et al., 2016; Vismara, 2016).

Equity crowdfunding investors are a very diverse group of individuals with varying levels of professional and educational backgrounds (Lukkarinen et al., 2017) and investor professionalism (Guenther et al., 2018). Thus far, the majority of equity crowdfunding investments have been made domestically and by individuals who have no professional affiliation with investing. For instance, in the Australia-based sample of Guenther et al. (2018), 10% of equity crowdfunding investors were accredited or professional and 9% were cross-border investors. These numbers are in line with the Finland-based sample of Maula and Lukkarinen (2018), in which 9% of investors invested via legal entities and 9% were cross-border investors.

Although at market level, the equity crowdfunding field is growing in relevance and may have significant implications to new venture financing (White and Dumay, 2017), the activity has limited centrality from investors' point of view, with most investors describing the sums they

invest via equity crowdfunding as “small” and as representing a small part of their overall investment portfolios (Estrin et al., 2018).

The existence of platforms that bring together entrepreneurial ventures and prospective investors reduces transaction costs for both parties (Lissowska, 2018). Equity crowdfunding platforms utilize standardized investment processes, readily providing investors and fund seekers with the legal and technical infrastructure needed for seeking and making investments and thereby contributing to significantly reduced transaction costs (Hornuf and Schmitt, 2017; Löher, 2017). Another aspect contributing to low transaction costs is that ventures rarely need to create a costly prospectus due to the relatively small size of equity crowdfunding offerings (Hornuf and Schwienbacher, 2018). Indeed, low investor-side transaction costs are imperative to justify the making of the often small investments prevalent in equity crowdfunding (Hornuf and Schwienbacher, 2015).

Entrepreneurs who seek equity crowdfunding typically define the details of the equity offering beforehand with support from the crowdfunding platform, which entails that equity crowdfunding investors have no possibilities to negotiate about transaction terms, covenants, or staged investing opportunities (Hornuf and Schmitt, 2017). Equity crowdfunding investors are typically left with decisions about whether, when, and how much to invest (Lukkarinen et al., 2016). A somewhat different mechanism applies to equity crowdfunding platforms that utilize an auction bidding mechanism, although they similarly do not offer investors opportunities to negotiate about terms with the entrepreneurs (Hornuf and Schwienbacher, 2018).

Entrepreneurial ventures can conduct equity crowdfunding campaigns at very early or early stages of their lifecycle (Cumming and Vismara, 2017; Horvatinović and Orsag, 2018), as well as at a growth stage when they have already reached market penetration and become financially healthy (Paschen, 2017). Consequently, equity crowdfunding investments carry typically very high risk and uncertainty, to the extent that crowdfunded ventures may fail even soon after the campaign (Lukkarinen, 2018; Signori and Vismara, 2016; Walthoff-Borm et al., 2018).

The investment target evaluation process of equity crowdfunding investors tends to be very limited. In line with bounded rationality (Simon, 1991), this makes sense economically considering the relatively small investment amounts (Ahlers et al., 2015). A survey of equity crowdfunding investors by Guenther et al. (2014) found that, on average, investors spend less than an hour to study the business plan, less than an hour on the campaign page, and less than an hour to study the venture's home page. However, while individual equity crowdfunding investors' due diligence activities are very limited, equity crowdfunding platforms dedicate significant time and effort to evaluate each venture before deciding on its applicability for equity crowdfunding, thereby providing investors with a certain level of quality assurance (Cumming et al., 2018; Guenther et al., 2018; Lukkarinen et al., 2016).

Similarly as with the limited due diligence process, investing time and effort in one-on-one communications makes little economic sense for small-sum investors or fund seeking entrepreneurs during equity crowdfunding campaigns (Moritz et al., 2015). Accordingly, the vast majority of equity crowdfunding investors do not communicate directly with the entrepreneur by any means, be it online, via telephone, or face-to-face (Guenther et al., 2014; Moritz et al., 2015). However, entrepreneurs and investors utilize digital pseudo-personal communications, such as videos, online investor relations channels, and social media, which enable investors to form a view of the venture and its management (Moritz et al., 2015). In addition, entrepreneurs strategically utilize opportunities for one-way communication through campaign updates towards the crowd of prospective investors (Dorfleitner et al., 2018).

Research assessing the role of geography has found that equity crowdfunding investments are locally biased (Hornuf and Schmitt, 2017), that investors are sensitive to geographic distance when investing domestically but not when investing across borders (Guenther et al., 2018), that investors avoid foreign currency transactions (Niemand et al., 2018), and that cross-border investors favor entrepreneurs with whom they share a nationality (Maula and Lukkarinen, 2018).

Equity crowdfunding investors do not usually proceed to hold formal board or advisory roles at crowdfunded ventures, and they typically have a very limited influence on the venture beyond the impact of the funds invested. Some investors do, however, become informally

involved, offering ventures the benefits of expanded networks and new skills (Brown et al., 2018). General shareholder rights vary by country and platform. While some platforms call for the use of the same share class for equity crowdfunding investors as for other equity investors (Vismara, 2018a), others offer shareholders' agreements in which the shares offered via crowdfunding form a separate class of shares without voting rights (Frydrych et al., 2014; Hornuf and Neuenkirch, 2017; Ivanov and Knyazeva, 2017; Tuomi and Harrison, 2017, Walthoff-Borm et al., 2018).

3.1.2. Drivers of investment activity in equity crowdfunding

Equity crowdfunding activity is driven by the actions of four key stakeholders (see Figure 2). In line with the scope of this dissertation, this section presents literature on the drivers of investing activity in particular, as opposed to platform operation or ventures' fundraising activity. The perspectives adopted are those of the fundraising ventures and the prospective investors.

Information asymmetries in the equity crowdfunding setting are high, as prospective investors possess considerably less knowledge about the fundraising ventures than do the entrepreneurs (Piva and Rossi-Lamastra, 2018). Such high information asymmetries between entrepreneurs and investors can strongly hinder the development of venture financing markets (Leland and Pyle, 1977). However, these asymmetries can be partially mitigated through a variety of signals about the attractiveness of the investment opportunity and the underlying venture quality that are observable to potential investors (Ahlers et al., 2015). Indeed, a multitude of drivers and mechanisms beyond those most typically relevant in traditional early-stage equity financing play a role in determining investing activity in equity crowdfunding (Lukkarinen et al., 2016).

Campaign features

Several easily observable campaign features, which ventures and platforms can influence before or during the campaign, have been found to influence investor interest and investment volumes.

Displaying an introductory video on the campaign page has been found to have a positive impact on funding success, possibly because it offers a complementary channel for ventures to provide information and because it may convey a positive message to prospective investors about the activeness of the entrepreneur(s) (Li et al., 2016). Furthermore, longer videos may be related to higher success probability, as they may convey messages about venture quality and entrepreneurial commitment (Vismara et al., 2017).

Entrepreneurs and platforms together define the minimum investment required from investors in each campaign. Smaller minimum investment requirements have been shown to be related to larger numbers of investors and more total capital raised, as they allow participation from investors who are not willing or able to dedicate larger sums, and as smaller minimum investments translate into smaller minimum risks of losing the investment (Hornuf and Schwenbacher, 2017; Lukkarinen et al., 2016). Indeed, a sufficiently small minimum investment was stated by investors to be one of the most important decision criteria in the survey of Lukkarinen et al. (2017).

Some equity crowdfunding research has suggested that campaign duration may be negatively associated with campaign success, as a shorter duration may prompt investors to act fast, and as more limited durations may also be interpreted as a sign of entrepreneurial determination (Lukkarinen et al., 2016). However, results regarding the possible relevance of campaign duration have not saturated towards a consensus. Piva and Rossi-Lamastra (2018) and Vismara (2018) found campaign duration not to be a significant predictor of campaign success. It is worth noting that as some platforms allow for campaigns to close early if they do not begin gaining the desired momentum (Vismara et al., 2017) or if they reach the funding target ahead of time (Vismara, 2018), such platforms may feature an underrepresentation or overrepresentation, respectively, of successful offerings among campaigns of shorter durations.

Findings regarding the effect of the amount of capital that ventures aim to collect through equity crowdfunding are not unanimous. Some articles have found that funding targets are negative predictors of campaign success (Piva and Rossi-Lamastra, 2018; Vismara et al., 2017; Vulkan et al., 2016). Evidently, a higher target implies that a larger amount of money is

necessary for a campaign to succeed. These results may also be related to the equity retention signal (Ahlers et al., 2015, Vismara, 2016), as lower target funding connects with entrepreneurs' willingness to retain more equity themselves (Vismara et al., 2017). Indeed, while the univariate tests of Ahlers et al. (2015) indicate that successful campaigns have significantly lower funding targets than unsuccessful campaigns, their regression models, which also include a measure of equity retention, find no significant relationship between target funding and the number of investors or the funding amount. On the contrary, Lukkarinen et al. (2016) present evidence of a weak positive relationship between the funding target amount and the number of investors. They suggest that, in line with the reasoning of Hakenes and Schlegel (2014), higher funding targets may offer security to investors, as their investment will only be realized if a sufficient amount is invested by others. Lukkarinen et al. (2016) also highlight that larger targets allow entrepreneurs to take more substantial actions towards venture growth. Indeed, Signori and Vismara (2016) show that ventures with higher funding targets in their equity crowdfunding campaigns are more likely to proceed towards eventually conducting subsequent equity offerings.

As equity crowdfunding investments are usually made in early-stage companies, the uncertainty and risks related to investment outcomes are high (Kleinert et al., 2018). Investors prefer taking these risks when they are aware of the possible scenarios and their probabilities, rather than only possessing ambiguous venture information (Ahlers et al., 2015). Indeed, providing sufficient information about risks has been shown to predict investing activity (Ahlers et al., 2015).

Research findings about the influence of updates posted by entrepreneurs on the campaign site during the campaign are unanimous. Updates have a positive impact on fundraising performance, as they can convey messages about venture value to prospective investors in a trustworthy and easily observable manner, thereby reducing investor-side search costs (Angerer et al., 2017; Block et al., 2018b; Hornuf and Schwiendbacher, 2018; Li et al., 2016). However, Block et al. (2018) also highlight that the positive impact of each incremental update does not continue *ad infinitum*, as an excessive number of updates may result in loss of

credibility. They also note that update content matters, with updates about developments that have taken place during the campaign being considered most relevant by investors.

In the presence of information asymmetries, entrepreneurs can signal venture quality to prospective investors by offering to sell only a relatively small portion of their venture in the equity crowdfunding campaign and thereby retaining a larger portion of equity themselves (Ahlers et al., 2015). While results regarding equity retention are somewhat mixed (Block et al., 2018b), research does appear to indicate that retaining a larger portion of equity with the entrepreneurs is related to success either positively (Ahlers et al., 2015; Vismara, 2016) or in a weakly positive or insignificant (Ralcheva and Roosenboom, 2016) manner. Similarly, the amount of financial commitment the entrepreneurs have made in the venture prior to the campaign is positively related to funding success (Löher et al., 2018).

While most equity crowdfunding research has identified drivers of investment activity through campaign-level assessments, a few researchers have also turned to prospective investors to directly ask them about what they perceive to affect their intention or willingness to invest (Mochkabadi and Volkmann, 2018). Investment decision criteria that respondents have highlighted as important include the perceived informativeness of the campaign page and materials, clarity and uniqueness of the business idea and products, characteristics of the entrepreneur and the team, the explanation for the planned use of funds offered in the campaign, perceived openness and trustworthiness, and the presence of a credible lead investor (Bapna, 2017; Kang et al., 2016; Lukkarinen et al., 2017; Moritz et al. 2015; Ordanini et al., 2011).

Venture characteristics

In addition to campaign features, the characteristics of the fundraising ventures influence investing activity.

Entrepreneurs' human capital, as measured by business education and entrepreneurial experience, can drive campaign success, as it serves as a low-ambiguity signal of venture quality (Piva and Rossi-Lamastra, 2018). A randomized field experiment by Bernstein et al. (2017) indicates that prospective investors react strongly to information about the venture

team. They suggest this is caused by the success-critical nature of the team's operational skills and by the decision of high-quality team members to commit to the specific endeavor despite other attractive outside options sending a promising signal about the venture's prospects.

Similarly, entrepreneurs' social capital promotes success, as it drives investments from people directly in the entrepreneurs' networks and allows for information about the investment opportunity to spread (Vismara, 2016). As to intellectual capital, a venture's intellectual property rights can send a signal to prospective investors about the venture's innovation capabilities, managerial skills, and quality (Ralcheva and Roosenboom, 2016). They also create entry barriers to competitors and thereby support long-term success (Piva and Rossi-Lamastra, 2018). At present, research results are mixed about whether the possession of intellectual property rights as stated in the equity crowdfunding campaign has a positive (Piva and Rossi-Lamastra, 2018; Ralcheva and Roosenboom, 2016) or no (Ahlers et al., 2015; Kleinert et al. 2018) effect on funding campaign success.

Business angel and venture capital investors typically conduct moderate or extensive due diligence on their prospective investment targets (Fried and Hisrich, 1994; Van Osnabrugge, 2000). Consequently, ventures that have already secured business angel or venture capital investors are more likely to successfully raise funding in equity crowdfunding campaigns, as the presence of these more experienced investors helps mitigate the adverse effect of information asymmetries between prospective investors and the fundraising entrepreneurs (Kleinert et al., 2018; Mamonov and Malaga, 2018).

Vismara (2018b) presents evidence that ecologically and sustainably oriented ventures attract larger numbers of equity crowdfunding investors than other ventures, possibly because they appeal to the community and cooperation values prevalent among small investors. However, as larger or professional investors tend to prefer other ventures, the sustainability orientation does not predict the probability of campaign success (Vismara, 2018b).

Prospective equity crowdfunding investors have been shown to seek ambiguity reduction by discounting entrepreneurs who have previously experienced a business failure, unless the investors receive evidence that the failure was due to bad luck and that the entrepreneur is

skilled (Zunino et al., 2017). In this sense, entrepreneurs' past business success can breed future success in their fundraising efforts through equity crowdfunding.

Finally, Mahmood et al. (2019) suggest that ventures that have complex visual logos can use them to signal innovativeness to prospective investors and are thereby more likely to attract investors in equity crowdfunding campaigns.

Other investors' actions

In the context of the public equity markets, the equity crowdfunding investment process features a rather unique level of transparency and progress visibility. For example, in initial public offerings, investors do not know before the end of the offering how much money has already been subscribed and by how many other investors (Vismara, 2016). On most equity crowdfunding platforms, however, users can see the number of investments or investors, the total amount already invested in the campaign, and investment-related comments written by other users (Ahlers et al., 2015; Hornuf and Schwienbacher, 2018; Lukkarinen et al., 2016). Accordingly, when making their investment decisions with inevitably imperfect information, investors observe not only the pre-existing characteristics of the campaign and the venture, but also the within-campaign funding dynamics, thereby at least partially relying on the behavior of others to complement their decision criteria. Later investors, in particular, have the opportunity to take the behavior of previous investors into account when making decisions (Vismara, 2018a).

Campaigns with a larger number of early investors are more likely to become successful, possibly because early investments send a signal of trust and confidence to prospective later investors and because early investors may contribute to the word-of-mouth around the campaign (Lukkarinen et al., 2016; Vismara, 2018a; Vulkan et al., 2016). Furthermore, the size of previous investments is a positive predictor of subsequent investment activity at campaign level, as large investments may send a signal that the investor possesses such knowledge of the campaign that others do not (Hornuf and Schwienbacher, 2018; Vulkan et al., 2016; Åstebro et al., 2018). Similarly, the amount of time that has passed since the most recent investment has a negative effect on the likelihood and size of investment, as an absence of investments can

be indicative of a lack of investors who would possess good private signals of the campaign (Åstebro et al., 2018). Investors tend to herd towards expert investors in particular (Wick and Ihl, 2018). Herding behavior has also been evidenced in the context of auction-type equity crowdfunding, where the amount that has already been invested on the same day is positively related to investors' willingness to pay for the investment (Hornuf and Neuenkirch, 2017).

Positive comments made by previous investors also have a positive effect on investing activity, as they may contain positive information about the attractiveness of the product, market, or the venture overall (Hornuf and Schwienbacher, 2018).

Investor motivations

Fundamentally, what drives individuals to perform actions, such as to invest in equity crowdfunding campaigns, are their motivations. Motivations can be intrinsic, in which case the action is undertaken because it is inherently rewarding, or extrinsic, in which case the action is undertaken because it leads to a separable outcome (Ryan and Deci, 2000).

Research into investor motivations in equity crowdfunding has suggested that investments would be motivated mainly by an aim to earn financial returns (Cholakova and Clarysse, 2015), mainly by intrinsic reasons such as obtaining personal satisfaction (Schwienbacher and Larralde, 2012), or by a combination of both (Collins and Pierrakis, 2012; Daskalakis and Yue, 2017). Further research has suggested that while equity crowdfunding investors can be motivated by several factors such as the ability to receive recognition, to influence to create an online image, and to receive returns or rewards, their motivations would not include altruistic motives (Bretschneider and Leimeister, 2017). Indeed, the motivations underlying investments in equity crowdfunding are very heterogeneous (Niemand et al., 2018). While some equity crowdfunding investors invest for financial motivations, others are motivated by a willingness to help the entrepreneur or to be part of the phenomenon underlying the venture. The motivations vary strongly by investor and by campaign (Lukkarinen et al., 2017).

3.2. Micro funders

Micro funders, or micro angels, can be defined as informal early-stage investors who contribute limited amounts of their personal financial and human capital resources to purchase equity in entrepreneurial ventures that are majority owned by others (Avdeitchikova, 2008; De Clercq et al., 2012; Szerb et al., 2007). The concept dates back to before the time of online crowdfunding can typically take place in offline contexts, often through personal relationships. The space of micro funders consists of many types of investors that differ from each other in terms of demographics, investment amounts, entrepreneurial skills, and the strength of potential connections to the entrepreneurs (Maula et al., 2005; Szerb et al., 2007).

While investors with family connections to the target venture are often excluded from the definition of informal venture capital investors (Avdeitchikova, 2008), many researchers include family investors into their definition of micro funders (De Clercq et al., 2012; Lahti, 2011; Maula et al., 2005). Accordingly, I define micro funders to include family, friends, as well as more distant “foolhardy” investors (De Clercq et al., 2012; Maula et al., 2005).

Micro funders are an important source of funding for new ventures that cannot raise money from more formal or professional investors, such as venture capital firms, because of a lack of legitimacy or experience (De Clercq et al., 2012). The motivations underlying micro investments vary by investor and by investment. While investments in family members' companies are often motivated by altruism and even by necessity, investments in more distant companies can be more highly motivated by an aim for financial returns (De Clercq et al., 2012; Maula et al., 2005).

Individuals have been shown to be more likely to make micro investments if they know entrepreneurs personally, even if the entrepreneurs they know are different from the ones whose ventures they invest in (Maula et al., 2005; Szerb et al., 2007). Personal knowledge of entrepreneurs can be associated with a more positive attitude and lower perceived barriers towards investing new ventures (Maula et al., 2005).

Although the venture evaluation process of micro funders can be very limited especially in the presence of family connections, micro funders tend to require that the ventures they invest in

portray true business opportunities, realistic assumptions, and credible baseline information (De Clercq et al., 2012; Maula et al., 2005). In addition to financially driven criteria, micro funders can incorporate social and environmental criteria to their decision making (Etapé-Dubreuil et al., 2016).

Before making an investment, micro funders maintain varying levels of social connections with the entrepreneurs. These connections may entail requests by the prospective funders for information regarding, for instance, the entrepreneurs' capabilities or the anticipated financial performance of the venture. Close pre-investment connections between funders and investors contribute to lower transaction costs due to lower screening and monitoring requirements (De Clercq et al., 2012).

Micro investors face a high level of risk. In addition to market risk, which is present also in formal venture capital investments, micro funders face a high risk that the entrepreneur's behavior and expertise may not be aligned with the funders' best interest, i.e., agency risk (De Clercq et al., 2012). Some micro funders find it important to agree with the target venture on post-investment monitoring procedures. In particular, micro funders with financial investment motivations are often willing to share their human capital with the venture after the investment (Etapé-Dubreuil et al., 2016).

3.3. Business angels

Although the definition of business angels varies according to context (Avdeitchikova et al., 2008), one common way to define them is as wealthy individuals, typically with personal background as entrepreneurs, who invest their own money in ventures with which they have no family connections (Mason and Harrison, 2008). In addition to entrepreneurial experience, business angels often have experience from corporate and consulting roles (Politis and Landström, 2002).

Traditionally, business angels have offered an important means for ventures to attract equity investments after the venture has utilized the funds available from the entrepreneurs, friends, and family (Scarborough, 2011).

While financial returns are an important motivation underlying business angels' investment activity, returns are not angels' only reason for investing. Business angels are also motivated by a possibility to become part of new ventures' growth processes, by an ability to help and mentor entrepreneurs, and by a feeling of enjoyment (Harrison and Mason, 2007; Morrisette, 2007; Sudek, 2006; Van Osnabrugge, 2000; Wilson and Testoni, 2014). Indeed, while business angels differ vastly in their level of involvement in the companies they have invested in, many take relatively active roles as board members, consultants, or mentors (Fili and Grünberg, 2016; Sørheim and Landström, 2001).

Although business angels are typically discussed as one investor category, they possess diverse features. Sullivan and Miller (1996) divided business angels into three motivation-based clusters. Angels in the first cluster are solely motivated by economic benefits, whereas the second cluster consists of angels who emphasize the enjoyment aspect of investing, and angels in the third cluster invest for altruistic reasons. Highlighting the heterogeneous nature of informal investors, Sørheim and Landström (2001) divided them into four categories based on their levels of competence and investment activity. These categories differ from each other in terms of investors' entrepreneurial experience, capital available to invest, investment horizons, and investor networks. In addition to investor-level differences, individual business angels can act in different manners in the context of different investments (Avdeitchikova et al., 2008).

At an aggregate level, the most important investment decision criteria for business angels are related to the lead entrepreneur and the management team. These include the entrepreneur's passion, commitment, and trustworthiness, as well as the quality of the full team. Further criteria include the reliability of the business plan, the company's revenue potential, market attractiveness, valuation, and exit opportunities (Prowse, 1998; Sudek, 2006).

Many business angels belong to business angel networks, which offer angels access to screening and monitoring skills as well as co-investing opportunities (Bonini et al., 2018). For instance, the investment guidelines of the European Business Angel Network (EBAN) propose the following requirements for investment targets: proof of demand, a product in development, a sufficiently clear exit path, and an appropriate return on investment (EBAN, 2014). The network encourages business angels to compare potential investment targets in terms of their

products, markets, teams, financial projections, and business plans (Sophia Business Angels, 2011).

3.4. Venture capitalists

Venture capital firms are professional investors that raise money from third-party individuals and investors to invest in high-potential entrepreneurial ventures (Sahlman, 1990). The motivation underlying venture capitalists' investment activity is financial, as earning returns on their investments and fulfilling internal and external return requirements is generally the fundamental reason for the existence of venture capital funds (Sudek, 2006). Their staff typically consists of investment professionals with background from banking, consulting, or the industry (Wilson and Testoni, 2014).

The origination of investment opportunities has three main sources. Prospective funding targets may contact the venture capital firms directly, the venture capital firms may actively look for targets, or prospective targets are referred to the venture capitalists by third parties, such as other venture capital firms or personal acquaintances (Tyebjee and Bruno, 1984). Venture capitalists are often introduced to the entrepreneurs in relation to the specific deal opportunity, although the probability of investment is higher in the presence of direct or indirect social ties (Fried and Hisrich, 1994; Shane and Cable, 2002).

Because venture capitalists invest relatively large sums with the aim of earning financial returns, they dedicate significant time and resources to evaluate the target and its return potential (Van Osnabrugge, 2000). Venture capitalists typically find decision criteria related to the target's team to be of primary importance (Streletzki and Schulte, 2013). In addition, they are usually interested in products that offer competitive advantage, innovativeness, proprietary protection, proven market acceptance, a sufficiently advanced status, and attractive market size and growth. In terms of financial criteria, they look at expected return and exit opportunities. The lifecycle stage of investment targets is also relevant for venture capitalists, who may prefer not to invest in companies that they perceive as too early-stage (MacMillan et al., 1985; Streletzki and Schulte, 2013).

Tyebjee and Bruno (1984) used a survey of venture capitalists to build five factors to find the key dimensions along which venture capitalists evaluate targets: market attractiveness, product differentiation, managerial capabilities, environmental threat resistance, and cash-out potential. Similarly, MacMillan et al. (1985) found that the key investment criteria for venture capitalists are the entrepreneur's personal characteristics and experience. Other criteria relate to the product, the market, and financial potential. They also identified three different types of venture capitalists based on their evaluation criteria. The first cluster, *purposeful risk managers*, seeks to find investment targets that satisfy their requirements along a broad spectrum of evaluation criteria. The second cluster, *eclectics*, is willing to assess and evaluate most kinds of targets without strictly adhering to predetermined criteria. The third cluster, *parachutists*, is ready to finance most companies for which they see a proper exit opportunity.

The investment evaluation phase is characterized by close communications between the venture capital fund and the venture, including several meetings between the venture capitalists and venture management aiming to improve the fund's understanding of the quality of business and management competence (Dimov and Milanov, 2010; Fried and Hisrich, 1994; Van Osnabrugge, 2000). Although venture capitalists' evaluation process are systematic, they have been shown to suffer from similarity bias, with assessors favoring teams whose educational, professional, or ethnic backgrounds are similar to their own (Bengtsson and Hsu, 2015; Franke et al., 2006).

A deal is realized if the parties reach a mutually acceptable agreement, which usually includes covenants offering protection and control to the venture capitalists. Indeed, after the investment, venture capitalists typically become active owners who aim to maintain control over the venture's operations through formal board positions, decision on managerial appointments, or more informal channels (Tyebjee and Bruno, 1984).

3.5. Comparison of early-stage equity financing forms

This section summarizes and compares the four forms of early-stage equity financing presented in Sections 3.1 through 3.1. In particular, similarities and differences are discussed

along fifteen features related to funder characteristics, venture characteristics, the investment decision process, characteristics of the funding mechanism, and connections between funders and the venture. Table 1 presents a comparative summary of the features, with strong similarities between neighboring forms of financing highlighted in gray.

Table 1. Comparison of different forms of early-stage equity financing

Features	Equity crowdfunding investors	Micro funders	Business angels	Venture capitalists
Funder characteristics				
Typical funder background	Often high education, many with no entrepreneurial background (Lukkarinen et al., 2017)	Often high education, many with entrepreneurial background (Avdeitchikova, 2008)	High education, previous experience from entrepreneurship, consulting, and industry (Politis and Landström, 2002)	Previous experience from finance, consulting, and industry (Wilson and Testoni, 2014)
Heterogeneity of funder space	Very high (Block et al., 2018b; Moritz et al., 2015)	High (Maula et al., 2005; Szerb et al., 2007)	Relatively high (Sørheim and Landström, 2001; Sullivan and Miller, 1996)	Low, although categories exist (MacMillan et al., 1985)
Source of funds	Own money (Wilson and Testoni, 2014)	Own money (De Clercq et al., 2012)	Own money (Mason and Harrison, 2008)	Others' money pooled into venture capital fund (Sahlman, 1990)
Centrality of investing activity for funder	Not central; limited contributions of time and money (Estrin et al., 2018)	Not central; limited contributions of time and money (Szerb et al., 2007)	Often central (Mason and Harrison, 2008; Politis and Landström, 2002)	Very central; key purpose of venture capital firm (Tyebjee and Bruno, 1984)
Venture characteristics				
Risk level	Very high risk (Signori and Vismara, 2016; Walthoff-Born et al., 2018)	Very high risk (De Clercq et al., 2012)	High risk (Avdeitchikova, 2008; Landström, 1993)	Rather high risk (De Clercq et al., 2012; Van Osnabrugge, 2000)
Lifecycle stage	Very early-stage, early-stage, or advanced early-stage (Cumming and Vismara, 2017; Rossi, 2014)	Very early-stage; earlier than business angels (Avdeitchikova, 2008)	Early-stage; earlier than venture capital (Mason and Harrison, 2008)	Advanced early-stage; later than business angels (Mason and Harrison, 2008)

Features	Equity crowdfunding investors	Micro funders	Business angels	Venture capitalists
Investment decision process				
Motivations for investing	Various, including intrinsic and extrinsic (Collins and Pierrakis, 2012; Lukkariinen et al., 2017)	Various; including intrinsic and extrinsic (De Clercq et al., 2012; Maula et al., 2005)	Financial returns important, but also intrinsic motivations (Van Osnabrugge, 2000)	Financial returns highly important (Sudek, 2006; Wilson and Testoni, 2014)
Extent of target evaluation	Limited (individual) / medium (platform) (Ahlers et al., 2015; Guenther et al., 2018)	Limited; conducted by individual (Maula et al., 2005)	Medium; conducted by individual, possibly with support from angel network (EBAN, 2014)	Extensive; involves staff and often external advisors (Fried and Hisrich, 1994; Wilson and Testoni, 2014)
Key investment criteria	Rapid-to-observe venture and campaign features (Block et al., 2018b; Lukkariinen et al., 2017; Ordanini et al., 2011)	Financial, social, and environmental venture and team features (De Clercq et al., 2012; Estapé-Dubreuil et al., 2016)	Entrepreneur, team, product, market, business plan, exit opportunities (Prowse, 1998; Sudek, 2006; Van Osnabrugge, 2000)	Product, market, entrepreneur, team, expected returns, exit opportunities (MacMillan et al., 1985; Streletzki and Schulte, 2013)
Funding mechanism characteristics				
Role of digitalization	Central; all or most activity via platform, allowing for high volumes and visibility (Horvát et al., 2018; Kim and Viswanathan, 2018)	Limited; in-person interactions via personal connections or organizations (Estapé-Dubreuil et al., 2016; Maula et al., 2005)	Limited but emerging; face-to-face contacts important; some are starting to use platforms (Brown et al., 2018; Van Osnabrugge, 2000)	Limited; social networks, direct contacts and proactive outreach important (Tyebee and Bruno, 1984)
Transaction costs	Very low (Hornuf and Schmitt, 2017; Löher, 2017)	Low (De Clercq et al., 2012)	Relatively low (Avdeitchikova, 2008; Landström, 1993)	High (Van Osnabrugge, 2000)
Bargaining power of individual investors	Very low; deal terms pre-determined by venture (Hornuf and Schmitt, 2017)	Medium; small investments but opportunity for requests (De Clercq et al., 2012)	Relatively high (Van Osnabrugge, 2000)	Very high (Tyebee and Bruno, 1984; Van Osnabrugge, 2000)
Connections between funders and the venture				
Pre-investment relationship	Often no relationship (Guenther et al., 2018; Vismara, 2018a)	Rather often a pre-existing family or friendship relationship (De Clercq et al., 2012; Maula et al., 2005)	Often a relationship or prior knowledge of the entrepreneur (Avdeitchikova, 2008)	Only occasionally prior knowledge of the entrepreneur (Fried and Hisrich, 1994; Tyebee and Bruno, 1984)

Features	Equity crowdfunding investors	Micro funders	Business angels	Venture capitalists
Communication during investment process	Usually no personal communication (Guenther et al., 2014; Moritz et al., 2015)	Varying levels (De Clercq et al., 2012)	Active, including face-to-face meetings (Van Osnabrugge, 2000)	Very active, including many face-to-face meetings (Fried and Hisrich, 1994; Van Osnabrugge, 2000)
Post-funding involvement of funders	Very limited, passive (Brown et al., 2018; Walthoff-Born et al., 2018; Wilson and Testoni, 2014)	Varied but often limited and light, sometimes passive (Avdeitchikova, 2008 ; Estapé-Dubreuil et al., 2016)	Often active via board position or advisory roles (Mason and Harrison, 2008; Sørheim and Landström, 2001)	Active via board position or advisory roles; control (Tyebjee and Bruno, 1984; Van Osnabrugge, 2000)

3.5.1. Funder characteristics

Typical funder background

While both business angels and venture capitalists often have experiences from consulting and the industry (Politis and Landström, 2002; Wilson and Testoni, 2014), business angels are also typically characterized by a strong background as entrepreneurs (Mason and Harrison, 2008). Indeed, the prevalence of entrepreneurial backgrounds distinguishes business angels from the three other forms of financing. In a Sweden-based dataset by Avdeitchikova (2008), 78% of business angels and 47% of micro funders had entrepreneurial experience, with both proportions higher than the 26% of equity crowdfunding investors found in the Finland-based dataset gathered for this dissertation research (for survey details, see Lukkarinen et al., 2017). In terms of education, 90% of business angels, 61% of micro funders, and 60% of equity crowdfunding investors have been found to have a university degree (Avdeitchikova, 2008; Lukkarinen et al., 2017).

Heterogeneity of funder space

Equity crowdfunding investors form a highly heterogeneous group of individuals, with both the public availability of investment opportunities and large investor numbers contributing to the heterogeneity (Block et al., 2018b; Moritz et al., 2015). Similarly, micro funders are a heterogeneous group with varying demographic backgrounds, investment amounts, skills, and

connections to the entrepreneurs (Maula et al., 2005; Szerb et al., 2007). While business angels tend to have several unifying characteristics in terms of their background and wealth, diversity exists also among them in terms of competence, motivations, and investment activity (Sørheim and Landström, 2001; Sullivan and Miller, 1996). Categorizations developed for business angels (Sullivan and Miller, 1996) and for equity crowdfunding investors (Lukkarinen et al., 2017) have notable similarities, with both investor types having financially oriented as well as altruistically motivated subgroups. Venture capitalists represent the most homogeneous group, consisting of firms unified by an aim to earn profits and efforts to hire staff with suitable backgrounds – although different categories can be observed even among venture capitalists (MacMillan et al., 1985).

Source of funds

Equity crowdfunding investors, micro funders, and business angels alike utilize their personal funds when investing in entrepreneurial ventures (De Clercq et al., 2012; Mason and Harrison, 2008; Wilson and Testoni, 2014). This is in contrast to venture capitalists, who pool their funds from third-party investors (Sahlman, 1990).

Centrality of investing activity for funder

As the act of investing as an equity crowdfunding investor or as a micro funder is not a professional role, and as the invested amounts tend to be small (Estrin et al., 2018; Szerb et al., 2007), micro investing and equity crowdfunding can be assumed to have non-central roles in the context of the general professional and investing activities of the investors. In contrast, investing in and being actively involved with entrepreneurial ventures can be a full career phase for business angels (Politis and Landström, 2002), which entails that the role can be a significant one for an individual in terms of its time and resource requirements and personal importance (Mason and Harrison, 2008). Furthermore, as making profitable investments is the key purpose of venture capital funds, and as the work roles of investment professionals are full-time jobs, investing is highly important for venture capitalists (Tyebjee and Bruno, 1984).

3.5.2. Venture characteristics

Risk level

Overall, all types of equity investments in entrepreneurial ventures are risky, as it is challenging to reliably assess the business potential and future performance of early-stage ventures (Signori and Vismara, 2016). However, clear differences between investment forms can be observed. Equity crowdfunding investments and micro investments both carry very high agency risk as well as market risk (De Clercq et al., 2012; Signori and Vismara, 2016; Walthoff-Borm et al., 2018). The risk can be seen as somewhat lower for business angels who, however, tend to invest in higher-risk targets than venture capital firms (Avdeitchikova, 2008). Business angels are only partly motivated by financial returns and they allocate only a fraction of their wealth to unlisted companies, which supports their ability to make higher-risk investments than venture capital firms (Avdeitchikova, 2008; Landström, 1993). Furthermore, while both business angels and venture capitalists aim to reduce agency risks (Van Osnabrugge, 2000), venture capitalists take effective measures against agency risk, leaving their concerns mostly with market risk (De Clercq et al., 2012).

Lifecycle stage

Equity crowdfunding, micro funding, and business angel investments typically offer entrepreneurial ventures an opportunity to gather equity financing before gaining sufficient size and achieving sufficient reductions in uncertainty to become candidates for venture capital investments (Avdeitchikova, 2008; Cumming and Vismara, 2017). Micro funders invest smaller sums, and consequently typically at earlier company lifecycle stages, than business angels (Avdeitchikova, 2008). Business angels, in turn, make smaller investments and at earlier company stages than venture capitalists (Mason and Harrison, 2008). These stages are only indicative, however, with no clear boundaries. Equity crowdfunding, for instance, can take place at a very early seed stage, at a stage where business angel or venture capital investing is also topical, or as a final financing step before an initial public offering (Lukkarinen et al., 2016; Rossi, 2014). Indeed, an increasing number of equity crowdfunding campaigns are seeing business angels or venture capital firms investing alongside the crowd as lead investors (Itenbert and Smith, 2017).

3.5.3. Investment decision process

Motivations for investing

Equity crowdfunding investors and micro funders both portray a wide spectrum of motivations for investing, ranging from pure altruism to a wish for high returns (Collins and Pierrakis, 2012; De Clercq et al., 2012; Lukkarinen et al., 2017; Maula et al., 2005). In contrast, the investments of both venture capitalists and business angels are motivated by financial returns, although returns are less critical for business angels who also invest for intrinsic reasons (Van Osnabrugge, 2000), whereas financial returns are of very high importance for venture capital firms (Sudek, 2006; Wilson and Testoni, 2014).

Extent of target evaluation

While the due diligence performed by equity crowdfunding investors and micro funders alike is very limited (Ahlers et al., 2015; Maula et al., 2005), the evaluation that precedes equity crowdfunding campaigns conducted by the respective platforms is typically relatively extensive (Guenther et al., 2018). The decision making processes of business angels and venture capitalists are, in turn, lengthier and more complex (Fried and Hisrich, 1994; Van Osnabrugge, 2000). Inevitably, the extent of target evaluation is related to the amounts invested. As equity crowdfunding investors and micro funders invest sums that are small relative to their income level or wealth, it would not be economically rational for them to spend similarly long periods of time evaluating each investment opportunity as business angels or venture capitalists (Ahlers et al., 2015). The due diligence processes of venture capital firms are more extensive and lengthier than those of business angels, with differences present in the extent of industry research, gathering of references on the entrepreneur, analyzing financials, and using external advisors (Van Osnabrugge, 2000). For instance, a survey of investors in the United Kingdom found that while 90% of venture capitalists calculate expected rates of return, only 32% of business angels do so (Van Osnabrugge, 2000). Furthermore, while equity crowdfunding investors and micro funders typically perform evaluation activities by themselves, business angels can rely on some support from business angel networks (EBAN, 2014), and venture capitalists often use external advisory services (Wilson and Testoni, 2014).

Key investment criteria

When making their investment decisions, equity crowdfunding investors tend to focus on such features of the venture and the campaign that are easy to observe and to absorb rapidly (Block et al., 2018b; Lukkarinen et al., 2017; Ordanini et al., 2011). Micro funders have often financial, but also social and environmental investment criteria (De Clercq et al., 2012; Estapé-Dubreuil et al., 2016). Micro funders can place more emphasis on societal and environmental aspects than business angels or venture capital firms, because they are less focused on the necessity of the target venture to grow fast and to offer a profitable exit to the investor (Estapé-Dubreuil et al., 2016). When making their investment decisions, both business angels and venture capitalists assess the entrepreneur, the management team, the product, the market, expected returns, and exit opportunities (MacMillan et al., 1985; Streletski and Schulte, 2013; Prowse, 1998; Sudek, 2006). Angels can, however, place more emphasis on the lead entrepreneur, whereas venture capitalists may focus more on product and market characteristics alongside the team (Van Osnabrugge, 2000).

3.5.4. Funding mechanism characteristics

Role of digitalization

A key differentiator between equity crowdfunding and more traditional forms of early-stage equity financing is the digital nature of equity crowdfunding, which makes it possible to gather investments from large numbers of people without personal entrepreneur-investor interactions and with a high amount of visibility for investors (Horvát et al., 2018; Kim and Viswanathan, 2018). Micro funders who have family or friendship relationships with the entrepreneurs can be assumed to come across the investment opportunities through these personal connections (Maula et al., 2005). Certain micro funders have active organizations whose target identification and other activities are based on personal connections and get-togethers (Estapé-Dubreuil et al., 2016), with limited relevance of online tools. Similarly, business angels and venture capitalists typically identify investment targets through social networks, personal connections, or referrals, and transactions take place via personal interactions (Tyebee and Bruno, 1984; Van Osnabrugge, 2000). However, business angels, in

particular, have begun to increasingly make use of the easily accessible online equity crowdfunding platforms when searching for and investing in suitable investment targets (Brown et al., 2018).

Transaction costs

Due to standardized and automated processes and the online nature of any communications, transaction costs are very low for equity crowdfunding investors (Hornuf and Schmitt, 2017; Löher, 2017). The transaction costs of micro funders can also be expected to be low because of a lack of formal processes or administrative requirements, and because micro funding activity prevails especially in environments that promote close personal relationships and the implied lower transaction costs (De Clercq et al., 2012). Although higher than for the two aforementioned investor types, business angels incur lower administration and transaction costs than venture capital funds (Van Osnabrugge, 2000), which contributes to the ability of business angels to invest smaller amounts and in higher-risk ventures (Avdeitchikova, 2008; Landström, 1993; Mason and Harrison, 2008).

Bargaining power of individual investors

As the terms of equity crowdfunding offerings are determined beforehand by the fund seekers, equity crowdfunding investors have very low bargaining power compared to traditional providers of early-stage equity financing (Hornuf and Schmitt, 2017; Itenbert and Smith, 2017; Wroldsen, 2013). Micro funders can be expected to have somewhat more negotiation power than equity crowdfunding investors because the micro funding processes of ventures typically involve only a limited number of investors. This is reflected in the ability of micro funders to maintain personal communications with the entrepreneurs and to make information requests before deciding on an investment (De Clercq et al., 2012). Venture capital firms and business angels alike conduct negotiations with prospective investment targets before a deal. However, venture capitalists typically exert more negotiation power than business angels do. They have more formal contract formulation processes, tend to invest larger amounts, opt for higher equity stakes, and take more time for the negotiation process than business angels (Tyebjee and Bruno, 1984; Van Osnabrugge, 2000).

3.5.5. Connections between funders and the venture

Pre-investment relationship

Entrepreneurs who conduct equity crowdfunding campaigns have often no prior social ties with most investors (Guenther et al., 2018; Vismara, 2018a). By definition, many micro funders have prior family or friendship relationships with the ventures, or otherwise personal knowledge of entrepreneurs (De Clercq et al., 2012; Maula et al., 2005). Micro funders tend to place particular value to strong pre-investment relationships with the entrepreneurs, because their contractual arrangements are less detailed than those of formal venture capital investors (De Clercq et al., 2012). The majority of micro funders do not, however, typically have prior relationships with the venture. In the dataset of Avdeitchikova (2008), the majority (76%) of business angels had a relationship with the entrepreneur or otherwise knowledge of the entrepreneurial venture prior to the investment. This is in sharp contrast to micro investors, 35% of whom had such prior knowledge. This proportion, in turn, is much higher than the 3% of equity crowdfunding investors who are reportedly connected to the ventures they fund (Guenther et al., 2018). Although direct as well as indirect social ties with entrepreneurs have a positive influence on venture capitalists' investment decisions (Shane and Cable, 2002), venture capitalists have a prior direct relationship with the entrepreneurs only occasionally, with their deal origination activities relying on well-defined processes that are more structured and efficient than those of business angels (Fried and Hisrich, 1994; Tyebjee and Bruno, 1984; Van Osnabrugge, 2000).

Communication during investment process

Unlike traditional providers of early-stage equity financing, equity crowdfunding investors do not usually communicate directly with the entrepreneurs when evaluating the investment opportunity or making the investment (Guenther et al., 2014; Moritz et al., 2015). Micro funders can have varying levels of social connections with the entrepreneurs during the decision process (De Clercq et al., 2012), whereas business angels and venture capitalists undergo several face-to-face meetings with the entrepreneurs, with venture capitalists typically having more numerous and structured meetings than business angels (Fried and Hisrich, 1994; Van Osnabrugge, 2000).

Post-funding involvement of funders

The passive role of most equity crowdfunding investors continues after the investment, as they do not proceed to hold formal roles with the venture and often do not have voting rights (Brown et al., 2018; Walthoff-Borm et al., 2018; Wilson and Testoni, 2014). The post-investment involvement of micro funders varies. Some are present in the entrepreneurs' lives via prior family or friendship relationships, offering them indirect opportunities to be involved, and some set up post-investment monitoring procedures with the venture (Etapé-Dubreuil et al., 2016). However, as the financial and knowledge contributions of micro investors are typically small (Avdeitchikova, 2008), any formal post-investment involvement with the venture can be expected to be unlikely or very limited. Both business angels and venture capitalists tend to be involved actively through board membership or advisory roles. Venture capitalists, in particular, tend to maintain a contractual opportunity to exert control via, for instance, the authority to make managerial appointments (Mason and Harrison, 2008; Sørheim and Landström, 2001; Tyebjee and Bruno, 1984; Van Osnabrugge, 2000).

3.5.6. Synthesis

While several similarities exist between the different forms of early-stage equity financing, the various differences between the forms highlight the unique nature of each form in general, and equity crowdfunding in particular. Equity crowdfunding investors have been described in literature as having strong similarities with small business angels or micro funders (White and Dumay, 2017). In several respects, equity crowdfunding investors do bear resemblance to traditional providers of early-stage equity financing, micro funders in particular. Both make relatively small, high-risk investments using their own money, with this investing activity not being their main occupation. While some of their investments are motivated by returns, they also often invest out of a willingness to support the venture. They both use very limited efforts to evaluate the target, although equity crowdfunding investors often know that the platform has conducted a more thorough target evaluation beforehand. However, the digital nature of equity crowdfunding gives rise to many important differences between equity crowdfunding and other forms of early-stage financing, especially in relation to funding mechanism

characteristics and funder-venture connections. The digital nature of equity crowdfunding platforms makes this form of financing unique in terms of investor volumes, transaction costs, and limited personal interactions.

It is worth noting in this context that, from the viewpoint of an entrepreneurial venture, the different forms of financing need not be mutually exclusive, nor is their sequential order invariable. Ventures that have successfully secured financing through equity crowdfunding have been shown to be more likely to attract investments from business angels or venture capitalists in follow-up funding rounds (Hornuf et al., 2018). In addition to the possibility of using different sources of funding at different points along the new venture's early lifecycle, ventures can use several forms simultaneously. Complementarities, such as a possibility of co-investing in deals, have been previously identified between venture capital funds and business angels (Harrison and Mason, 2000). Similarly, equity crowdfunding campaigns have begun attracting investments not only from the crowd but also from venture capital funds and business angels, with business angels making use of the digital screening and investing opportunities offered by equity crowdfunding platforms, and with venture capitalists acting as lead investors in high-volume deals (Brown et al., 2018; Itenbert and Smith, 2017).

4. Data and methods

4.1. Empirical setting

The empirical context of this dissertation is focused on the Finnish market, which can be seen as one of the forerunners in the field of alternative finance. Despite the country's small population and limited number of platforms, the Finnish alternative finance market was the fifth largest in Europe in 2016, with the Finnish equity crowdfunding market representing 13% of the European market (Ziegler et al., 2018).

I have conducted this doctoral research in cooperation with the financial technology company Invesdor Oy. It operates one of the first and largest equity crowdfunding platforms in Europe, allowing companies from the European Economic Area to collect funding from investors worldwide. The first equity crowdfunding campaign conducted via Invesdor took place in May 2012, after which over two hundred further campaigns and over ten thousand investments have taken place during the empirical time frame of this research.

Before allowing a venture to raise funding through their platform, Invesdor assesses the venture against several criteria in an effort to ensure a consistently high quality of investment opportunities. This process results in only a small fraction of all applicant ventures eventually proceeding to conduct a campaign via Invesdor. If approved, the venture designs a fundraising campaign, which typically includes company and financial information, a business plan and other documents, a video, as well as explicitly stated features of the equity offering, including the funding target range and the duration of the campaign.

Most campaigns begin with a hidden phase, during which the venture and Invesdor market the investment opportunity to their private networks. After the campaign has gathered sufficient momentum, it becomes visible on Invesdor's website and available for the general public to

invest in. Once a campaign is public, all users are able to see the number of investments and the amount of money already invested. Typically, the majority of funds and investors are collected during the public phase. Invesdor uses the all-or-nothing model. If a campaign does not reach its minimum funding target during the pre-determined campaign time frame, it closes as unsuccessful, in which case all invested funds are returned to the investors. If the campaign reaches its minimum funding target, the invested funds are transferred to the venture, and investors receive a certificate of share purchase. Invesdor's approach to the crowdfunding process, which makes use of a hidden phase and the all-or-nothing model, is typical of many equity crowdfunding platforms (Vismara, 2016; Wick and Ihl, 2018; Åstebro et al., 2018).

4.2. Data sample

The data used in this dissertation consists of two main datasets: data extracted directly from the platform's database, and survey data specifically collected for this research. The platform data consists of campaign-level, investor-level, and investment-level data.

Research paper 1 is based on campaign-level data on 60 equity crowdfunding campaigns conducted between May 2012 and September 2014, which together attracted 1,742 investments. The majority of the data were extracted from Invesdor's internal database by an Invesdor representative, who then passed on the data to me. The dataset was complemented with rating data from an external expert, who, upon the request of our research group, assessed each campaign along six dimensions on a scale from one to five. In addition, I collected data manually on each company and campaign from the companies' social media sites and from the equity crowdfunding campaign pages.

Research paper 2 utilizes data from an investor survey that was conducted in September 2015. I created the content, structure, and layout of the survey with the survey research tool Webropol, access to which was provided by Aalto University. Before publishing the survey, I piloted it with researchers, Invesdor representatives, and with investors. Based on feedback collected in face-to-face and telephone interviews, I modified and finalized the survey. I then

sent survey invitations to 4,992 individuals who had invested via the platform. Full responses were received from 943 respondents, representing a response rate of 19%. After conducting a multi-step reliability assessment, I retained 911 responses for analysis. To ensure the sample's representativeness, I compared several sample statistics with those available for the entire investor population. In addition, when Invesdor conducted another investor survey in 2017, I asked them to include some of the same questions I had included in the 2015 survey. Response distributions were similar in the two surveys, offering a further indication of reliability.

Research paper 3 utilizes campaign-, investor-, and investment-level data from all equity crowdfunding campaigns that were conducted via Invesdor between May 2012 and September 2017. The data used in the analyses includes 11,024 investments made by 7,895 investors. Most data were sourced from the Invesdor database by a member of Invesdor's development team and passed on to me. In addition, I sourced company data from the Business Information System BIS provided by the Finnish Tax Administration and Finnish Patent and Registration Office, Balance Consulting, company websites, and LinkedIn. I also sourced geographical data from HERE Technologies and gender data from the United States Social Security Administration as well as Finnish Open Data, which is an open data and interoperability tool steered by the Finnish Ministry of Finance and maintained by the Finnish Population Register Centre.

Overall, the time period covered by the entire dataset used for this dissertation ranges from the start of the first campaign in May 2012 to the end of the data extraction period in September 2017. The full dataset includes all crowdfunding campaigns that were conducted through the platform, totaling 201 campaigns and all investors who invested in any of the campaigns, totaling 18,665 investments made by 13,015 different investors. The total value of the investments was 34.5 million euros.

Due to the nature of the data, several measures regarding data protection, including contractual arrangements, anonymization or pseudonymization, and information security measures, were taken to ensure a high level of privacy protection for all data subjects.

4.3. Analytical methods

This dissertation addresses the research questions through quantitative analysis. Research paper 1 uses campaign and venture attributes to predict the number of investors and the amount raised in a campaign. The dependent variables are scale variables, whereas the independent variables include scale variables, indicator variables, and ratings treated as scale variables. As multiple linear regression is typically well suited for situations with a continuous dependent variable and categorical and continuous independent variables (Dobson and Barnett, 2008), it was selected as the method used in the paper. Logarithmic transformations of variables were used where necessary in order to reduce the skewness of variable distributions, to improve model fit, and because, for some variables, relative changes were more relevant than absolute changes.

Research paper 2 uses a three-phase analytical procedure. First, two-step cluster analysis was used to group investors based on their intrinsic and extrinsic motivations. This method was selected for two main reasons. As we had no prior expectations regarding the number of clusters, the ability of the algorithm to automatically determine the most appropriate number of clusters was suitable for the situation. Also, two-step cluster analysis uses a distance measure that is well suited for continuous as well as categorical variables (Chiu et al., 2001), which was suitable for our situation where motivations were measured with a five-point Likert scale.

Second, exploratory factor analysis was used to reduce the dimensions of investors' decision criteria. This method was selected over confirmatory factor analysis because, as with the motivation clusters, we did not have prior expectations about the decision criterion factors.

Third, one-way analysis of variance (ANOVA) was used to assess whether there are statistically significant differences between the decision factor means of the motivation clusters. This method was suitable for the situation because the dependent variable, namely factor scores, is continuous while the independent variables, namely motivation clusters, form three independent groups. Furthermore, Games-Howell post hoc tests were conducted to assess how

the motivation clusters differ from each other in terms of their mean factor scores (Games and Howell, 1976, as cited in Toothaker, 1993).

Research paper 3 first utilizes univariate tests to compare the group means of one-time and returning investors along different variable attributes. Second, as binomial logistic regression can be used to predict the likelihood of a variable value falling in either of the two categories of a dichotomous variable in the presence of categorical and continuous independent variables, I used it to predict the likelihood that a first-time investor would return to make subsequent investments. Third, I used Poisson regression, which can be used to analyze count data, to predict the total number of investments made by each investor (Coxe et al., 2009).

The analytical procedures were implemented with the statistical tools SPSS and Stata. Table 2 presents a summary of the variables, data, and statistical methods used in each research paper.

Table 2. Summary of methods

	Research paper 1	Research paper 2	Research paper 3
Title	Success drivers of online equity crowdfunding campaigns	Investor motivations and decision criteria in equity crowdfunding	Does the performance of first investments predict investors' later activity in equity crowdfunding?
Level of analysis	Campaign	Investor	Investor, investment
Dependent variables	Number of investors Amount raised	(Decision criterion factors) Campaign specifications Target company attractiveness Familiarity with the target company Campaign scale Personal acquaintance	Returning investor Number of investments
Independent variables	Investment opportunity ratings: team, markets, concept, scalability, terms, stage Funding target Minimum investment Campaign duration Provision of financials Early funding from private networks Social media networks Understandability	(Investor motivations) Earning a return upon selling Earning dividends Being part of a phenomenon or ideology Helping the entrepreneur or team	Company operational Offering successful Investment experience Investment size Distance to platform Age Gender Education Financial motivation Risk taking
Data sources	Investor's database Ratings by external expert Social media websites Campaign websites	Investor survey Investor's database	Investor's database Investor survey Business Information System BIS Balance Consulting Company websites LinkedIn HERE Technologies United States Social Security Administration Finnish Open Data
Sample size	60 campaigns	911 investors	7,895 investors
Statistical methods	Multiple linear regression	Two-step cluster analysis Exploratory factor analysis Analysis of variance (ANOVA)	Univariate tests Logistic regression Poisson regression

4.4. Reflection on empirical choices

When planning the empirical approach for this dissertation, I faced a trade-off between breadth and depth. I could either conduct broader research on multiple platforms and multiple countries, or drill down deeper into data from one platform.

The broader approach would have entailed examining campaign-level data from many platforms. While several studies have examined externally available campaign-level data, they have typically only focused on one or two platforms (e.g., Ahlers et al., 2015; Block et al., 2018b; Vismara, 2018a; Walthoff-Borm et al., 2018). An understanding spanning across platforms and countries can, however, be built by reviewing and synthesizing this stream of research (Martínez-Climent, 2018).

As I had an opportunity to build a close platform cooperation relationship that would yield access beyond externally available data, I chose to adopt the deeper and more focused approach of utilizing unique and scarcely available investor- and investment-level data. Research based on this approach is rarer and offers opportunities for unique insights and contributions (Guenther et al., 2018; Hervé et al., 2017). This approach allowed me to complement top-down campaign-level findings with bottom-up examinations of investors and their investment behavior. Furthermore, while some research has sought to understand investors through research settings that use hypothetical crowdfunding campaigns or investments (Cholakova and Clarysse, 2015; Niemand et al., 2018), I found it important to focus on actual investors and their actual investments in order to gain an understanding as reflective of the true mechanisms underlying the equity crowdfunding phenomenon as possible.

5. Key findings

This section first presents the key findings of each of the research papers and then proceeds to synthesize the findings.

5.1. Success drivers of online equity crowdfunding campaigns

The first research paper assesses the success drivers of online equity crowdfunding campaigns. Leveraging findings from adjacent fields of equity financing, it draws from research on venture capital (MacMillan et al., 1985; Streletzki and Schulte, 2013) and business angel (Prowse, 1998; Sudek, 2006) investing as well as rewards-based crowdfunding (Colombo et al., 2015; Mollick, 2014) to hypothesize that investment criteria traditionally used by venture capital and angel investors, on the one hand, and certain crowdfunding campaign and venture elements, on the other, are relevant in predicting equity crowdfunding campaign success.

Rather surprisingly, the results indicate that the investment criteria traditionally used by venture capital funds and business angels are not statistically significant predictors of campaign success in equity crowdfunding. Key business-relevant features of the venture, including the characteristics of the team, market attractiveness, the product concept, scalability, and company stage, are not of prime importance for predicting campaign success.

Instead, the success of equity crowdfunding campaigns is related to such observable campaign characteristics as the funding target, the minimum accepted investment, campaign duration, and the provision of financials. In addition, ventures' willingness and ability to leverage their networks for fundraising by personally approaching their contacts and by utilizing social media is related to campaign success.

5.2. Investor motivations and decision criteria in equity crowdfunding

The second research paper looks at the motivations and decision criteria of equity crowdfunding investors. While previous literature has investigated both elements, it has tended to treat investors as one homogeneous group and, perhaps because of this, yielded partly contradictory findings (Cholakova and Clarysse, 2015; Collins and Pierrakis, 2012; Ordanini et al., 2011; Schwenbacher and Larralde, 2012). Building on the self-determination theory of motivation (Ryan and Deci, 2000) and assessments of investor heterogeneity from adjacent fields of early-stage equity financing (Mitteness et al., 2012; Sullivan and Miller, 1996), the paper hypothesizes that equity crowdfunding investors form clusters with differing intrinsic and extrinsic motivations and that investors in the different clusters utilize different types of investment criteria.

Using survey data from respondents who have made at least one equity crowdfunding investment, the paper splits investors into three distinct clusters that differ from each other in terms of their motivations, decision criteria, and investment targets. The clusters are named donation-oriented supporters, return-oriented supporters, and pure investors. Investments by investors in the first cluster are motivated by a willingness to help the fundraising entrepreneurs or to be part of the phenomenon underlying the venture, with no aims for financial returns. The key decision criterion factor for these investors is familiarity with the target company, its products, or its people. Indeed, campaigns with survival narratives most typically attracted investors from the first cluster. On the contrary, investors in the third cluster are primarily motivated by financial returns. They emphasize traditional investment decision criteria and campaign specifications when making investment decisions. Accordingly, campaigns portrayed as strong investment cases gathered their largest proportion of investors from this cluster. The motivations and decision criteria of investors in the second cluster have features from both of the two more extreme clusters. Investors in the second cluster have both intrinsic and extrinsic motivations for investing. They typically invested in companies that were presented as growth ventures seeking support.

The findings indicate that equity crowdfunding investors form a heterogeneous group with varying motivations and investment criteria. Each investor cluster tends to invest in campaigns with a certain type of narrative. The findings therefore support the need to move from assessing investors as a homogeneous group (Cholakova and Clarysse, 2015) towards further investor-level granularity (Åstebro et al., 2018).

5.3. First investment performance and subsequent investor activity

The third research paper assesses how the performance of equity crowdfunding investors' first investments is related to their subsequent investment activity on the focal platform.

While the recurring investment behavior of household investors has been studied by many in the context of the public stock markets (Kaustia and Knüpfer, 2008; Khan et al., 2017; Strahilevitz et al., 2011), similar studies exploring investments in unlisted equities have remained scarce, perhaps due to a lack of centralized data on unlisted equity investments by household investors. Unlisted equities represent, however, a significant portion of the equity market (Organisation for Economic Co-operation and Development, 2017; United States Census Bureau, 2017).

The emergence of equity crowdfunding platforms offers a venue to explore the recurring investment behavior of household investors in the unlisted stock markets. Public stock investors have been shown to overweight their previous investment experiences when making subsequent investment decisions (Kaustia and Knüpfer, 2008; Khan et al., 2017). As the equity crowdfunding context is characterized by high information asymmetries and high risks, one could expect that personal experiences would influence investor behavior also in equity crowdfunding. Therefore, the paper hypothesizes that a similar pattern of reinforcement learning applies for equity crowdfunding investors as for investors in the public stock markets.

The paper finds that, contrary to what has been found for listed equities, the performance of an investor's first equity crowdfunding investment, when measured by whether the investment target is still operational and by whether the respective crowdfunding campaign was successful, is not a significant predictor of the investor's subsequent investing activity on the

focal equity crowdfunding platform. The paper also shows that investors' general experience with different investment vehicles, financial motivations for investing, and investors being male are positive predictors of the investors returning to make further investments in other campaigns.

The findings suggest that those equity crowdfunding investors who invest for financial reasons are likely aware of the high-risk nature of their investing activities and that they incorporate this awareness into their investment strategies. This has reassuring implications for equity crowdfunding platforms and for policymakers responsible for regulation.

Although the paper only utilizes data from one platform, the findings can be seen to provide a decent approximation of the equity crowdfunding activity of any individual investor for three reasons. First, the platform held a near-monopoly position in the focal geographic market during the sampled time frame. Second, equity crowdfunding is still a largely local phenomenon. Third, the majority of the investors of the focal platform have not used any other platforms to make equity crowdfunding investments (Invesdor, 2017).

Table 3 presents a summary of the research questions, hypotheses, and key findings of each paper.

Table 3. Summary of research questions, hypotheses, and key findings

	Research paper 1	Research paper 2	Research paper 3
Title	Success drivers of online equity crowdfunding campaigns	Investor motivations and decision criteria in equity crowdfunding	Does the performance of first investments predict investors' later activity in equity crowdfunding?
Research question	What are the key success drivers of online equity crowdfunding campaigns?	What are the motivations and decision criteria of equity crowdfunding investors and how are they related to each other?	Does the performance of first investments predict investors' later activity in equity crowdfunding?
Hypothesis 1	Investment criteria traditionally used by venture capital and angel investors are relevant in predicting equity crowdfunding campaign success. Not supported.	Equity crowdfunding investors can be grouped into distinct clusters according to the level of their intrinsic and extrinsic motivations. Supported.	Equity crowdfunding investors whose first investment target exhibits better post-investment performance become more active in investing than investors whose first investment target exhibits worse post-investment performance. Not supported.
Hypothesis 2	Pre-selected campaign characteristics predict the success of equity crowdfunding campaigns. Supported.	Intrinsically motivated investors place more importance on non-financial and non-commercial investment decision criteria than extrinsically motivated investors. Supported.	Equity crowdfunding investors whose first investment is in a successful offering become more active in investing than investors whose first investment is in an unsuccessful offering. Not supported.
Hypothesis 3	The availability and use of networks is relevant for equity crowdfunding campaign success. Supported.	Extrinsically motivated investors place more importance on financial and commercial investment decision criteria than intrinsically motivated investors. Supported.	-
Hypothesis 4	Equity crowdfunding campaigns providing more understandable offerings are more successful. Supported.	-	-
Key findings	Equity crowdfunding campaign success is driven by pre-determined campaign characteristics and by the use of networks, rather than by decision criterion elements typically used by venture capital funds and business angels.	Investors form three motivation-based clusters (donation-oriented supporters, return-oriented supporters, and pure investors) which use different sets of criteria when making investment decisions.	The performance of investors' first investments via the focal platform does not predict subsequent investment activity on the platform at investor level in the focal sample.

6. Discussion

6.1. Synthesis and discussion of findings

Using three levels of analysis, this dissertation was structured as a continuum in which the findings from each paper find support and reason in the subsequent paper, with the aggregate findings building towards a coherent conclusion. This section begins with a summary of the key findings of each paper and then presents the conclusion.

The first paper assesses equity crowdfunding activity at the aggregate campaign level. Showing that campaign specifications and the utilization of networks are more important in predicting campaign success than traditionally used investment criteria, it finds that equity crowdfunding investors pay attention to a somewhat different set of investment opportunity features than business angels and venture capital funds.

The second paper drills down from campaign to investor level, through which it provides further support and justifications for the findings of the first paper. The second paper shows that many investors – while being sophisticated and experienced – have non-monetary motivations underlying their investment decisions. Because most investment criteria used by business angels and venture capital funds are focused on assessing the financial return potential of a venture, this observation contributes to explaining why equity crowdfunding campaign success cannot be predicted solely with traditional investment criteria.

The third paper adopts a further perspective on the phenomenon by looking at the individual investments of each investor. It provides initial evidence that investors in equity crowdfunding are not easily discouraged by negative performance events, as the performance of their first investments may not predict investors' later investment activity. Thus, not only do equity

crowdfunding investors seem to behave somewhat differently from traditional early-stage investors, they also seem to behave differently from investors in the public stock markets.

Figure 3. Synthesis of the main findings

A synthesis of the main findings is presented in Figure 3. At the aggregate level, tangible and rapidly observable campaign features and the use of networks predict campaign success rather than traditional investment criteria, such as monetary return indications (research paper 1). Indeed, most (of the sampled) investors' motivations are not financial, but rather stem from a willingness to be part of a phenomenon or to help a venture (research paper 2). Therefore, at the aggregate level, investors appear to make their decisions about whether to return to make further investments regardless of the performance of their previous investments (research paper 3). However, investment decision criteria vary at investor level according to each investor's intrinsic and extrinsic motivations for investing, with different campaigns catering for different motivations and criteria (research paper 2). While many investors are not seeking financial returns, there exists also a sizeable subgroup of financially oriented investors who use traditional investment criteria, although aggregate campaign- or venture-level results may not accurately reflect the behavior of this subgroup (research paper 1). Therefore, the – perhaps surprising – finding of research paper 1 that traditional investment criteria do not predict campaign success, may be explicated by the finding of research paper 2 that, at the aggregate

level, equity crowdfunding investors have exhibited stronger intrinsic than extrinsic motivations for investing, making them focus less on financial criteria. The campaign- and investor-level heterogeneity also extends to investment behavior, as assessed in research paper 3. Intrinsically motivated investors invest typically in a certain campaign that they wish to support, and they are less likely to return to make further investments. Extrinsically motivated investors, on the other hand, invest in ventures that they foresee as prospective sources of financial returns. They appear to pursue diversification strategies more actively than intrinsically motivated investors without being easily discouraged by possible performance issues of their individual investments (research paper 3).

The findings can also be interpreted in the context of different forms of entrepreneurial equity financing. Research paper 1 suggests that the determinants of new ventures' funding success are different in equity crowdfunding than in venture capital or business angel financing. Research paper 2 observes that many equity crowdfunding investors are less driven by financial returns than venture capital funds or business angels, thereby also offering support to the findings of research paper 1. Research paper 3 turns the point of comparison to the public stock markets, offering indicative evidence that equity crowdfunding investment decisions may be less influenced by previous personal experiences than investment decisions in the public stock markets. This observation may be partly driven by the findings of research paper 2: when financial returns are less significant motivators for investing, investment performance may be less significant in predicting subsequent investment decisions.

To conclude, equity crowdfunding investors appear to possess a rather unique combination of investment behavioral characteristics. Despite often having a lot of experience in investing in different forms of financial instruments, many equity crowdfunding investors have intrinsic motivations for diversifying their investment portfolios into equity crowdfunding, which are manifested in their investment behavior regarding both initial and subsequent investments.

It is worth noting in this context that the data samples used in research papers 1 and 2 include campaigns and investments from the early years of existence of the online equity crowdfunding industry. They were characterized by a steep learning curve, during which the industry and platforms were shaping up, establishing their respective positions, and often moving towards

larger campaigns (Vulkan et al., 2016). Indeed, over time, the focal platform has been increasingly moving from investment cases with fan and survival narratives towards larger funding rounds that are increasingly positioned as financially appealing investment cases. This shift may entail gradual changes to the aggregate-level success criteria and the sizes of respective motivation-based investor clusters.

It should also be highlighted that although this dissertation discusses the behavior and decision making of equity crowdfunding investors, being an equity crowdfunding investor is usually only one of several investor roles adopted by an individual. The same individual generally has also other roles, most typically as an investor in public stocks or in mutual funds. The findings of this dissertation, when combined with research on other forms of investing (Kaustia and Knüpfer, 2008), suggest that the same investor likely adopts somewhat different behaviors and motivations when investing in different financial instruments.

6.2. Contributions to literature

The equity crowdfunding research field can be described through the stakeholder groups depicted in Figure 3. Each of the three research papers of this dissertation was among the first to address its respective topic. When excluding the regulatory perspective, the largest body of equity crowdfunding research lies currently in assessments of the venture and campaign perspectives (Mochkabadi and Volkmann, 2018). Research paper 1 belongs to this group. It was one of the first to assess equity crowdfunding campaign success drivers, thereby contributing to the then-nascent field of research (Ahlers et al., 2015; Li et al., 2016; Lukkarinen et al., 2016; Vismara, 2016; Vulkan et al., 2016) and building a foundation for more specific research on campaign performance (e.g., Block et al., 2018b; Chen et al., 2018; Horvát et al., 2018; Li et al., 2018; Mahmood et al., 2019; Malaga et al., 2018; Mamonov and Malaga, 2018; Oo et al., 2018; Piva and Rossi-Lamastra, 2018; Sokolova and Perez, 2017; Trinidad et al., 2017) and for research investigating individual-level decision making (Hsieh and Liu, 2017; Lukkarinen et al., 2017; Mahmood et al., 2019; Xiao and Yue, 2018) in different forms of crowdfunding.

Indeed, the perspective of individual investors forms another key equity crowdfunding research theme (Mochkabadi and Volkmann, 2018). Research paper 2 is one of the few papers that address investor-level motivations and decision criteria in equity crowdfunding through survey (Bretschneider and Leimeister, 2017; Lukkarinen et al., 2017) or experimental (Bapna, 2017; Bernstein et al., 2017) data about actual investment decisions collected from actual investors. A few other survey-based articles have approached the investor perspective by surveying more broadly defined groups of people who are familiar with the concept of crowdfunding (Daskalakis and Yue, 2017; Moysidou and Spaeth, 2016), who follow a crowdfunding platform (Guenther et al., 2014; Kang et al., 2016), or who would be willing to invest in crowdfunding (Zunino et al., 2017). In addition, one paper has used an experimental survey design with hypothetical investment scenarios (Cholakova and Clarysse, 2015). However, the unique reliability of research paper 2 is supported by its focus solely on actual investments made by actual investors and further corroborated by the paper's globally unprecedented sample size of 911 usable responses, as other equity crowdfunding surveys have had between 136 and 610 respondents (Mochkabadi and Volkmann, 2018).

Research paper 2 addresses the seemingly contradictory previous findings about the motivations of equity crowdfunding investors (Bretschneider and Leimeister, 2017; Cholakova and Clarysse, 2015; Collins and Pierrakis, 2012; Daskalakis and Yue, 2017; Ordanini et al., 2011; Schwenbacher and Larralde, 2012). The findings of research paper 2 substantiate the existence of several motivation-based investor clusters, thereby indicating that the reason for the differing findings among the previous research articles may lie in the heterogeneity of the space of equity crowdfunding campaigns, investors, and investments. Against this backdrop, research paper 2 suggests that equity crowdfunding research develop from aggregate analyses (e.g., Ahlers et al., 2015; Block et al., 2018b; Lukkarinen et al., 2016) towards more granularity by treating, when possible, campaigns, ventures, and investors in sub-groups or as individuals in a manner that allows for individual- or cluster-level variation in campaign objectives, venture characteristics, and investor motivations (Wallmeroth, 2018). Research paper 2 suggests that equity crowdfunding investors form different segments, similarly to business angels (Sullivan and Miller, 1996) or contributors in rewards-based crowdfunding (Ryu and

Kim, 2016). It is also, to the authors' best knowledge, the only paper to have assessed how the different motivations of equity crowdfunding investors link to investors' decision criteria.

Recently, equity crowdfunding researchers have begun venturing into the intersection of investments and investors (Guenther et al., 2018). While two working papers have touched upon the topic of recurring investments in equity crowdfunding (Hervé et al., 2017; Wallmeroth, 2017), research paper 3 is, to my best knowledge, the first to predict recurring investment activity with previous investment performance. As the post-campaign performance of equity crowdfunded ventures and the influence thereof on the markets and subsequent investor activity remain key topics expected to shape the future of the equity crowdfunding field (Mochkabadi and Volkmann, 2018; Signori and Vismara, 2016) the steps taken into this direction by this paper are well called for. The paper also contributes to the nascent stream of research assessing the performance of equity crowdfunding investments (Hornuf et al., 2018; Signori and Vismara, 2016) and shares the finding of a recent working paper by Hornuf et al. (2018) that only a small minority of equity crowdfunded ventures cease operations within a few years after the campaign.

Overall, this dissertation contributes towards building the new base of research on equity crowdfunding. The findings about heterogeneity among campaigns and investors help explicate why previous research at both campaign (Ahlers et al., 2015; Block et al., 2018b; Lukkarinen et al., 2016; Ralcheva and Roosenboom, 2016; Vismara, 2016) and investor (Bretschneider and Leimeister, 2017; Cholakova and Clarysse, 2015; Collins and Pierrakis, 2012; Daskalakis and Yue, 2017; Ordanini et al., 2011; Schwienbacher and Larralde, 2012) level has yielded some seemingly contradictory findings. By suggesting that certain success drivers and investor attributes can be context specific, investor type specific, or venture specific, this dissertation contributes to validating previous research, despite its varied findings, on the one hand, and calls for granularity in further research, on the other hand.

By highlighting similarities and differences between different forms of early-stage equity financing, this dissertation contributes to positioning the emerging field of equity crowdfunding research into the broader and rather segmented field of entrepreneurial finance research (Cumming and Vismara, 2017). Through findings about the unique role and

characteristics of equity crowdfunding as a form of financing, this dissertation supports the ongoing legitimization of equity crowdfunding research as a relevant field within entrepreneurial finance (Mochkabadi and Volkmann, 2018).

This dissertation also contributes to the broader literature on entrepreneurial finance by providing new insights into the drivers of investment activity in entrepreneurial ventures. The findings emphasize that individual investors in entrepreneurial ventures can possess a plethora of motivations, only part of which are financial. In doing so, this dissertation supports literature from micro funding (De Clercq et al., 2012; Maula et al., 2005) and business angel investing (Harrison and Mason, 2007; Morrisette, 2006; Van Osnabrugge, 2000) that has recognized the importance of investors' intrinsic motivations alongside their financial aims. This dissertation thereby supports in a novel context the notion that investors do not act financially rationally as a pure homo economicus (Simon, 1959) and corroborates the applicability of the self-determination theory of motivation (Ryan and Deci, 2000) to research on investor motivations in novel forms of entrepreneurial finance.

Furthermore, this dissertation takes called-for (Mochkabadi and Volkmann, 2018) steps towards extending equity crowdfunding literature to finance research, on the one hand, and towards extending finance research on initial public offerings to unlisted share offerings, on the other hand. The majority of equity crowdfunding research has thus far appeared in entrepreneurship journals (and, regarding the regulatory aspect, law journals), perhaps because of the multidisciplinary nature of the topic (Mochkabadi and Volkmann, 2018). This dissertation follows the few preceding articles (e.g., Bernstein et al., 2017; Moritz et al., 2015; Signori and Vismara, 2018) in exploring pathways towards a common ground with finance literature. Indeed, due to similarities between equity crowdfunding campaigns and initial public offerings (Ivanov and Knyazeva, 2017), more venues may exist for equity crowdfunding research in the context of finance literature. In particular, research paper 3 contributes to finance literature by extending the literature on public stock market investments (Kaustia and Knüpfer, 2008; Khan et al., 2017) to earlier-stage investments in public equity offerings. In particular, one central topic in finance research is the degree of economic rationality in investors' behavior (Kaustia and Rantapuska, 2012). While investors' tendency to overweight

personal experiences in an economically irrational manner has been demonstrated in the context of public share offerings and trading (Kaustia and Knüpfer, 2008; Khan et al., 2017), the topic has, to the author's best knowledge, remained unexplored in the context of unlisted share offerings via equity crowdfunding. This dissertation takes first steps towards addressing this.

6.3. Practical implications

The findings of this dissertation offer insights and decision making support to the different stakeholders involved in equity crowdfunding activity. Managers at equity crowdfunding platforms and entrepreneurs at fundraising ventures can leverage the findings to plan and implement campaigns in a manner that supports the prospects of success. Successful funding campaigns are in the interest of platforms as well as ventures, as campaigns incur planning, implementation, and marketing costs regardless of the outcome. Research paper 1, in particular, offers practical and implementable suggestions on how to improve the success potential of campaigns. The results of research paper 2 may encourage fundraising ventures and equity crowdfunding platforms to target their fundraising efforts to selected investor clusters and to develop campaign narratives and marketing messages that cater for the targeted investor segments. These activities, in turn, can help platforms better match investors and investment targets, thereby diminishing the funding gap faced by many early-stage ventures.

At the same time, the findings can help prospective investors build an improved understanding of the fundamentals and dynamics of equity crowdfunding, the measures ventures use to attract investors, and the role of high information asymmetries in the field. For example, I have communicated the findings through the general media and in industry events to provide individual investors transparent information about considerations regarding risks, return expectations, and investment rationales.

The findings about investors' motivations extending well beyond financial returns and investment frequency, which tends to be low at investor level, can serve as input for regulators who are aiming to establish a balance between investor protection and the promotion of

investment activity. This is topical, as the European Commission has committed to monitoring the development of the crowdfunding industry and subsequently making decisions about regulation as necessary (European Commission, 2017).

Lastly, and most demonstrably, this dissertation work has had concrete implications for the focal platform of the empirical setting of this dissertation, Invesdor. The findings have supported the platform in improving its customer understanding, developing its customer journey planning, and adopting a more data-driven approach to its operations. For example, the platform has used the results on investor motivations and decision criteria to re-design its customer segmentation approach and customer targeting strategy. The investor clusters developed in research paper 2 were given names that better suit the practitioner environment (Donna the Donors, Steve the Supporters, and Michael the Moneymakers), and these segments have become an integral part of the focal platform's internal systems as well as external communications. Finally, through this cooperation, the platform has also become increasingly research oriented and open for collaboration with other researchers.

6.4. Limitations and future research

This dissertation has certain limitations that provide opportunities for further research. One key limitation is that the empirical setting focuses on one equity crowdfunding platform. Conducting similar research on other platforms can help improve the generalizability of the results across platforms and countries. However, the focal platform of this research provides already an attractive research setting in itself due to its large size and international orientation.

Another potential limitation is posed by sample sizes. While the campaign, investor, and investment numbers analyzed in this research are large in the context of the current state of research in equity crowdfunding, they remain small compared to, for instance, research on investing activity in the public stock markets. When more time passes and volumes increase, it becomes possible to use larger samples.

Furthermore, this research does not account for the maturing and changes that have taken place in the equity crowdfunding industry, and at the focal platform, during the sampled time

period. In recent years, the focal platform has begun increasingly focusing exclusively on ventures whose campaigns portray as highly professional and very solid investment cases, with typically relatively large funding targets. This is different from the early years of the platform, during which fundraising ventures tended to represent earlier development stages and look for smaller amounts of funding. Again, when available samples become sufficiently large, it becomes possible to select only certain time periods for analysis.

The findings of this dissertation indicate that investors form motivation-based segments that differ in the campaigns they invest in. However, the findings do not assess possible differences between investments at investor level. As a follow-up research, it would be interesting to assess whether and how the motivations and criteria of each investor vary from one investment to another. Furthermore, I would find it interesting to categorize campaigns into subgroups based on their narratives and assess similarities and differences in campaign success factors within each category. The underlying hypothesis, based on this dissertation, would be that success of a campaign with a survival narrative is driven by different elements than the success of a campaign with an investment case narrative.

Finally, the performance of equity crowdfunding investments was measured in this research with two variables indicating whether the venture remains operational and whether the campaign was successful. This variable selection was justified because of the illiquidity and long investment horizons inherent in equity crowdfunding. At present, there are no return measures available for the majority of the sampled campaigns, as the companies still operate but have not been acquired, conducted an initial public offering, or publicly available valuations of prospective subsequent funding rounds. However, once more data becomes available on realized returns in the form of follow-on funding rounds, listings, acquisitions, or dividends, it becomes possible to measure investment performance in a more accurate manner.

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