

Equity crowdfunding and the role of investor discussion boards

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Equity crowdfunding and the role of investor discussion boards

Simon Kleinert and Christine Volkmann

Bergische Universität Wuppertal, Wuppertal, Germany

ABSTRACT

Start-ups are increasingly using equity crowdfunding to raise necessary funding at an early stage. In this rather new form of financing, potential investors communicate with each other and the entrepreneurs typically through the discussion boards of mediating online platforms. Using a mixed-methods approach, this explorative study analyses the role of investor-initiated discussions in equity crowdfunding. First, we develop a framework and categorize 574 interactions between potential investors and entrepreneurs posted on the project-related discussion boards of the Crowdcube equity crowdfunding platform. The framework is built on deductive criteria from the context of business angels and inductive criteria that are unique to the equity crowdfunding context. Five discussion topics stand out in relevance: valuation, financial snapshot, likely returns, shareholder rights, and market risk. Exploring the qualitative data reveals that investors are concerned about high information asymmetries and agency risks. Second, we use panel data of 2,258 funding days to analyse whether discussions signal endorsement and increase funding success. The econometric results show that discussions generally propel investments. However, discussions on topics like market risk and shareholder rights harm funding success. The study highlights the complementarity of discussion boards as an information source for investors, providing a more nuanced picture of the investor perspective in equity crowdfunding and proposing avenues for future research.

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Entrepreneurial finance; crowdfunding; equity offerings; discussion boards; signalling theory

1. Introduction

Acquiring financial resources is a fundamental challenge for entrepreneurs (Cassar 2004; Gompers and Lerner 2004). For decades, start-ups have relied on financing from professional equity investors, notably venture capitalists (VCs) and business angels (BAs), to align with growth aspirations at an early stage (Harrison 2013; Mason and Harrison 1992). Since 2010, equity crowdfunding has evolved to become a viable alternative to the established forms of early stage equity financing (Block et al. 2018). This form of funding allows start-ups to raise capital from many private investors in return for equity or profit stakes via mediating online platforms (Ahlers et al. 2015). Information asymmetries are severe problems in the context of

CONTACT Simon Kleinert  kleinert@wiwi.uni-wuppertal.de  Bergische Universität Wuppertal, Gaußstraße 20, Wuppertal 42119, Germany

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equity crowdfunding (Vismara 2018b). To overcome these asymmetries, entrepreneurs can signal quality to investors through information provided in their project description; for instance, studies demonstrate that equity retention and information on human capital can increase the likelihood of successful equity crowdfunding (Piva and Rossi-Lamastra 2017; Vismara 2016; Ahlers et al. 2015). These signals typically are provided by entrepreneurs before the launch of a campaign and do not change over the course of a campaign. In this study, we take a dynamic perspective to analyse the role of discussions initiated by potential investors during a campaign.

Third-party endorsements can complement entrepreneur-originating signals to alleviate information problems between entrepreneurs and potential investors (Stuart, Hoang, and Hybels 1999). While entrepreneurs may behave opportunistically and misrepresent information to convince potential investors, third-parties can credibly inform about the founders' skills and abilities to exploit an entrepreneurial opportunity (Shane and Cable 2002). In equity crowdfunding there is a unique source of third-party endorsement: potential investors can comment on a project on campaign-related discussion boards. Thus, studying the role of discussions in equity crowdfunding is highly relevant (Mochkabadi and Volkmann 2018). While VCs and BAs meet the founder team in person to address questions and discuss business models (Harrison, Mason, and Smith 2015; Boulton, Shohfi, and Zhu 2018), crowd investors typically communicate with entrepreneurs through the online platform (Agrawal, Catalini, and Goldfarb 2015). In this regard, the discussion board, which is accessible to all registered investors, might be an important complement to information conveyed through the project description that is provided by entrepreneurs. For example, if a project description is silent on competition or includes flaws, such as unrealistic financial projections, these topics might be addressed on the discussion board. Moreover, discussions might reveal opinions of better informed investors whose views can be considered as peer-generated evaluations (Rindova, Petkova, and Kotha 2007) and inform other less sophisticated investors (Vismara 2018a). Initial evidence underlines the relevance of discussion groups for investors in equity crowdfunding; Estrin, Gozman, and Khavul (2018) find that the majority of interviewed crowd investors learn from the expertise of other investors through participation on discussion boards. In this regard, crowd investors describe communication with their peers and entrepreneurs via equity crowdfunding platforms as an important part of their due diligence process. We therefore propose the following research question: what is the role of investor-initiated discussions in equity crowdfunding?

To answer this research question, we use a mixed-method research design to assess discussions posted by investors on project-related discussion boards. Evaluating interactions of investors and entrepreneurs is a technique that is also used in the BA context (Maxwell, Jeffrey, and Lévesque 2011; Jeffrey, Lévesque, and Maxwell 2016; Boulton, Shohfi, and Zhu 2018). Our approach is twofold. First, we use qualitative techniques to analyse the content of discussions and relevance of topics that investors raise on the discussion boards. In this regard, we build on the BA literature to introduce a framework on discussion topics in the context of equity crowdfunding (Harrison, Mason, and Smith 2015; Mason and Stark 2004; Maxwell, Jeffrey, and Lévesque 2011). The framework is used to categorize 574 discussions that potential investors initiated across 47 campaigns on Crowdcube, the leading equity crowdfunding platform in the United Kingdom. We provide descriptive statistics to assess the relevance of different discussion topics based on the number of

discussion postings, views, and replies. On this basis, we introduce a ranking and use content analysis to explore the most relevant topics in more detail. Second, we use quantitative techniques to study how discussions on different topics affect investment behaviour during a campaign. Hence, we use panel data to assess how the discussions and specific topics influence funding success on 2,258 campaign days.

This study makes several contributions to the literature. First, we add to the research on early stage investors and extend prior frameworks on potential evaluation criteria to the context of equity crowdfunding (Harrison, Mason, and Smith 2015; Mason and Harrison 2002; Mitteness, Baucus, and Sudek 2012; Maxwell, Jeffrey, and Lévesque 2011). We do so by introducing a framework that provides a holistic overview of relevant discussion topics in equity crowdfunding and can guide future research in this context. Second, the study adds to the contemporary crowdfunding literature where equity crowdfunding has received considerably less attention than the other forms (Vismara 2018a). In particular, the role of discussion boards has received little attention in the literature on equity crowdfunding so far, even though it is the primary communication channel for investors and entrepreneurs. Mochkabadi and Volkmann (2018), after systematically reviewing the literature on equity crowdfunding, suggest that the role of discussion boards is a promising, but underexplored, field of research. Our results confirm that discussion boards complement other information sources in equity crowdfunding. In particular, specific discussion topics are relevant: valuation, financial snapshot, likely return, shareholder rights, and market risk. Our quantitative results add to the growing literature on success factors and signalling in equity crowdfunding (Ahlers et al. 2015; Vismara 2016; Piva and Rossi-Lamastra 2017; Lukkarinen et al. 2016; Kleinert, Volkmann, and Grünhagen 2018). While discussions, in general, have a positive influence on the number of investments, the effect depends on the discussion topic. For example, discussions on market risk and shareholder rights harm the success of campaigns and reveal agency conflicts that prevail in equity crowdfunding where investors have limited control rights and possess only minority shareholdings (Bellavitis et al. 2017).

Furthermore, the study provides practical implications for entrepreneurs and platform managers. For entrepreneurs, it is crucial to better understand the discussion board and those topics that are relevant for crowd investors. The results provide insights on aspects that concern crowd investors and that entrepreneurs should address when designing an equity crowdfunding campaign. It is also important for platforms to better understand investor concerns when providing suitable investment conditions.

This paper proceeds as follows. In [section 2](#), we compare equity crowdfunding and BA financing, introduce signalling as our theoretical framework and propose hypotheses. Then, we present the methods applied and show our qualitative and quantitative results. The study concludes with a discussion of the results, contributions, and implications.

2. Theoretical background

2.1. Differentiation of equity crowdfunding and angel investing

Crowdfunding has rapidly emerged as an alternative financing source for young ventures. There are four different crowdfunding models: donation, reward, lending, and

equity (Kuppuswamy and Bayus 2015). In all forms, entrepreneurs make an open online call for financing to a large audience of private individuals, each contributing only a small amount of funding (Belleflamme, Lambert, and Schwienbacher 2014). The forms differ with respect to the returns for financing a project. Only the equity form involves participation in the success and growth of new ventures. Moreover, in comparison to the other crowdfunding forms, equity crowdfunding raises larger average amounts of funding for entrepreneurs (Vulkan, Åstebro, and Sierra 2016).

Of the four models, equity crowdfunding is the most similar to BA financing. Crowd investors also have an economic motive to invest and receive an equity share in return for an investment (Cholakova and Clarysse 2015). Moreover, unlike VCs, both crowd and angel investors are informal investors, investing on their own behalf (Mason and Harrison 2008; Moritz, Block, and Lutz 2015; Landström 1992). Nevertheless, even with its commonalities, equity crowdfunding is distinctly different from BA financing. In equity crowdfunding, a large pool of investors invests rather small average funding amounts. A 2018 report on the UK business angel market documents that commitments of angel investors vary widely (British Business Bank 2018), with the median BA investment equalling £25,000 in initial funding rounds and around 28% of BAs investing more than £100,000, while 53% invest less than £50,000. Vulkan, Åstebro, and Sierra (2016) analyse campaigns posted on the UK-based Seedrs platform from 2012 to 2015 which shows that the individual crowd investor commits a median of £279. Nevertheless, they also document large outliers, which is reflected in an average maximum single pledge in a campaign of £48,755. Such comparably sizeable individual funding amounts may be committed by other investor types, such as angel investors. For example, Vismara (2018a) shows that there is a small fraction of public profile investors in equity crowdfunding who are considered as sophisticated investors and guide the decision making of other investors. In contrast to business angel financing, success in equity crowdfunding generally depends on the number of investors; successful projects attract an average of 158 investors with average total funding of £221,223 (Vulkan, Åstebro, and Sierra 2016). Another difference is that, due to the small individual funding amounts, the average crowd investor holds only minority shareholdings in firms. Moreover, crowd investors do not negotiate the terms of investment but rely on standardized contracts provided by the mediating platforms (Löher 2016). Estrin, Gozman, and Khavul (2018) interview entrepreneurs to identify the reasons for adopting equity crowdfunding: in addition to raising finance, entrepreneurs turn to equity crowdfunding to access a large pool of investors, raise the awareness of their company, and retain greater control compared to other forms of entrepreneurial equity financing.

2.2. Information asymmetries and signalling in equity crowdfunding

In equity crowdfunding, information asymmetries are more severe than in other entrepreneurial finance markets (Vismara 2018b). Crowd investors, who are often unsophisticated, are susceptible to market risks because not only do they have little expertise to evaluate business models, but also fewer capabilities and resources to perform thorough due diligence (Agrawal, Catalini, and Goldfarb 2015; Estrin, Gozman, and Khavul 2018). Moreover, investors have imperfect information because entrepreneurs are reluctant to fully disclose information online due to the risk of imitation and competition (Hall 2002; Hornuf and Schwienbacher 2016). Crowd investors also face agency risks as they usually

do not have voting rights on account of their minority shareholdings (Hornuf and Schwienbacher 2014). For entrepreneurs, it is challenging to build trust due to geographic distances and because they usually do not meet the investors in person, instead mainly communicating through the platform (Günther, Johan, and Schweizer 2018; Agrawal, Catalini, and Goldfarb 2015).

Signalling theory proposes one solution to overcome information asymmetries (Spence 1973). An informed party (signaller) can send a signal to a less informed party (receiver) to resolve information asymmetries (Connelly et al. 2011). In his seminal work on the labour market, Spence (1973) illustrates how high-quality employees can distinguish themselves from low-quality employees by a costly signal of higher education. In this way, employers can overcome their lack of information regarding the quality of job applicants to better identify and select high-quality employees. There are two conditions that a credible signal needs to fulfil. First, the signal must be observable: in other words, an uninformed party must be able to notice the signal. Second, the signal has to relate to some form of signalling cost (Kirmani and Rao 2000). Signalling theory is highly relevant in the context of entrepreneurial finance, with several studies discussing how entrepreneurs can credibly signal quality to investors to raise financing (Janney and Folta 2006; Busenitz, Fiet, and Moesel 2005; Cohen and Dean 2005).

A growing literature applies signalling theory to the context of equity crowdfunding. In this regard, studies show that investors consider human capital signals, for example, the number of board members, the education of the management team, and entrepreneurial experience (Piva and Rossi-Lamastra 2017; Ahlers et al. 2015). In addition, investors consider the entrepreneur's social capital as a signal of quality and the amount of equity retained as a signal of founder commitment (Vismara 2016; Lukkarinen et al. 2016). Further, Löher, Schneck, and Werner (2018) show that financial commitments by entrepreneurs can signal quality and increase campaign success. Moreover, investors learn from the investment decisions of other more sophisticated investors (Vismara 2018a). As existing studies are typically on the project level, the dynamics of campaigns have received less scholarly attention. Block, Hornuf, and Moritz (2018) and Hornuf and Schwienbacher (2017) provide initial empirical evidence on the dynamic behavior of crowd investors, showing that entrepreneurs can signal quality by disclosing new information during a campaign.

2.3. Hypotheses development

2.3.1. The effect of investor discussions on the funding success

Studies on equity crowdfunding unambiguously show that entrepreneurs can provide signals of quality that increase the likelihood of funding success. In addition to signals originating from the entrepreneur, third-party endorsements can inform investors about the credibility of founders and firm quality (Podolny 1993; Stuart, Hoang, and Hybels 1999). Entrepreneurs may act opportunistically and are incentivized to misrepresent their information in order to convince investors (Shane and Cable 2002), making it even more challenging for investors to discern high from low quality ventures. Thus, endorsements by third-parties might provide an especially credible signal. In this vein, literature documents that affiliation with prominent partners or venture capitalists can indicate the value of a firm to outside investors in an entrepreneurial finance context (Gompers 1996; Stuart, Hoang, and Hybels 1999; Colombo, Meoli, and Vismara 2019).¹

Equity crowdfunding platforms facilitate a unique source of third-party endorsement by providing project-related discussion boards where potential investors can share their private information and ask questions over the course of a campaign. This kind of third-party endorsement may alleviate information asymmetries, thus contributing to funding success. Courtney, Dutta, and Li (2016) find that backer sentiments, as expressed on the discussion boards of Kickstarter, a reward-based crowdfunding platform, serve as third-party endorsements and raise the likelihood of successful funding. In equity crowdfunding, investors have a financial motive (Cholakova and Clarysse 2015) with the goal of identifying promising investment opportunities. Hence, the discussion board may be particularly valuable in this context: it enables potential investors to learn from the information conveyed through comments and to better assess the growth potential of a project. For example, early customers may post comments and report their experience on the technical feasibility of product features (Courtney, Dutta, and Li 2016). The literature also shows that some sophisticated investors are on equity crowdfunding platforms (Vismara 2018a). These investors are considered to have more knowledge with respect to evaluating business models and may share their expertise and assessment of investment proposals on the discussion board. Initial empirical evidence supports the relevance of investor-initiated discussions as an information source in equity crowdfunding. Estrin, Gozman, and Khavul (2018), interviewing crowd investors, find that they learn from the knowledge of other investors by engaging with the discussion boards, with their interviewees describing their search for information on discussion boards as a part of their due diligence process. In another study which conducted interviews with crowd investors, Moritz, Block, and Lutz (2015) also noted that investors consider the information conveyed through the discussion board. A survey of Nesta (2014) on alternative financing suggests that 69% of the investors find comments posted by other investors important. Hornuf and Schwienbacher (2017) analyse the funding dynamics in equity crowdfunding and show that investors consider the information provided by other investors when deciding on an investment. As discussion boards are fully transparent, it may contain valuable complementary information for the potential crowd investor and reduce information asymmetries. We therefore hypothesise:

H1: Discussions posted during an equity crowdfunding campaign have a positive effect on funding success.

2.3.2. The role of the discussion topics

Geographically dispersed investors and entrepreneurs communicate mainly through the mediating crowdfunding platforms (Agrawal, Catalini, and Goldfarb 2015). While BAs meet the founder team in person to discuss the specifics of business models and negotiate the terms of investment (Harrison, Mason, and Smith 2015), crowd investors might instead rely on the discussion board. In this regard, investors may use the board to ask questions and request specific information about the business proposal. The topics that crowd investors address on the discussion board are unexplored. We draw on the BA literature to identify topics that might be relevant for crowd investors. Studies suggest various criteria that angel investors consider and discuss with the entrepreneurs when deciding on an investment (an overview is provided by Maxwell, Jeffrey, and

Lévesque 2011). For example, BAs not only evaluate criteria related to financial numbers, market acceptance, and patent protection (Mason and Stark 2004), but also potential financial returns (Harrison, Mason, and Smith 2015). Further, BAs are concerned about agency risks (Harrison and Mason 2017; Van Osnabrugge 2000) and, thus, put a particular emphasis on criteria related to the entrepreneur, including, for example, skills, experience, and track record (Haines, Madill, and Riding 2003; Mason and Stark 2004). Other studies suggest that BAs consider subjective criteria, such as trustworthiness (Harrison, Dibben, and Mason 1997; Maxwell and Lévesque 2014), presentation skills (Mason and Harrison 2003; Clark 2008), shared personal characteristics (Boulton, Shohfi, and Zhu 2018), and realistic firm valuations (Haines, Madill, and Riding 2003; Maxwell, Jeffrey, and Lévesque 2011). BAs use such evaluation criteria as heuristics to “filter out no hopers” (Harrison, Mason, and Smith 2015, p.531) and identify “fatal flaws” (Maxwell, Jeffrey, and Lévesque 2011, p.216) to focus in on the most promising opportunities.

Potential crowd investors may start discussions on similar topics. We propose that the effect of discussions on funding success depends on the discussion content. Better informed parties can have both positive and negative private information and can communicate this information to outsiders. Accordingly, signals can also have an adverse effect (Connelly et al. 2011). On the one hand, discussions may provide an endorsement effect, reducing information asymmetries. However, on the other hand, investors may also uncover discrepancies in a business model and communicate this on the discussion board, thereby raising awareness of the flaws and discouraging further investments. We formulate the following explorative hypothesis:

H2: The effect of discussions on the funding success depends on the discussion topic.

3. Method

3.1. Data

The study draws on observational data collected from February through July 2015 on Crowdcube, a British equity crowdfunding platform. As of May 2018, Crowdcube has successfully helped 674 ventures to raise around £434 million of capital. The platform works in the traditional “all-or-nothing” fashion (Cumming, Leboeuf, and Schwenbacher 2014). To be successful in raising funding, projects must reach their funding goal. Investors must invest a minimum of £10 but there is no maximum limit on their investment. All published projects are required to present a minimum set of information regarding the idea and team. In addition, investors can request a full business plan. This has no mandatory form and so differs for each project. Each project has its own discussion board where investors can directly communicate with entrepreneurs and other investors. In this study, we are interested in the discussions posted on these boards. While project descriptions and business plans provide information on project-level and are available before the launch of a campaign, discussions only start during the funding cycle of campaigns. Accordingly, it is necessary to observe projects over the course of a campaign. We tracked all available projects on a daily basis from their

start day through campaign closure, resulting in 2,258 daily observations of 47 campaigns. Over this time span, 574 discussions were started.

3.2. Research method

To test our hypotheses by exploring the content of discussions, we used a mixed-method approach, including both qualitative and quantitative elements. This section introduces the techniques used to categorize the qualitative data (574 discussions) and then describes the variables and the estimation approach used in our quantitative analysis (panel data of 2,258 funding days).

3.2.1. Qualitative approach

First, we use qualitative techniques to explore relevant discussion topics for crowd investors. A comparable approach is used in studies of the BA context. These studies analyse interactions and negotiations between investors and entrepreneurs to understand the evaluation process of BAs (Maxwell, Jeffrey, and Lévesque 2011; Jeffrey, Lévesque, and Maxwell 2016; Boulton, Shohfi, and Zhu 2018). For our qualitative analysis, we draw on all 574 discussions that were posted during the 2,258 funding days. A discussion thread always includes a title and usually corresponding comments. Moreover, Crowdcube provides information on the number of discussion views.

We develop a coding system that is based on both a deductive and inductive approach (Fereday and Muir-Cochrane 2006) to systematically categorize and interpret discussion topics relevant for crowd investors (Punch 2013). The coding was an iterative and recursive process that involved several steps (Gioia and Pitre 1990). Based on 100 random discussions, two researchers developed an initial deductive code list, using the discussion title and, if applicable, the comments.² The codes were built on validated frameworks and prior studies of BAs (Harrison, Mason, and Smith 2015; Mason and Stark 2004; Maxwell, Jeffrey, and Lévesque 2011). The initial codes did not fully capture the topics of all discussions. Therefore, the initial code list was expanded to include additional inductive categories. In the next step, both researchers summarized, added, deleted, and redefined codes in an iterative process until no further modifications were needed to categorize each discussion. Finally, we merged similar categories and created a codebook consisting of nine higher dimensions (first order) and 23 categories (second order) (Gioia, Corley, and Hamilton 2013; Gioia and Pitre 1990). Both researchers assessed and categorized all discussions based on this framework. Moreover, based on the codebook, all discussions were coded independently by a third external researcher with experience in crowdfunding research. The average inter-coder reliability of Cohen's Kappa for the categories was 0.68, indicating a substantial agreement (Landis and Koch 1977). To achieve higher inter-coder reliability, the coding system was once again discussed with the external researcher focusing, in particular, on categories with an agreement below the average of 0.68. In this process, similar categories were again merged and redefined. Afterwards, one of the authors and the external researcher again coded all of these categories independently. We re-calculated the Cohen's Kappa as a statistical measure for the inter-coder reliability: Cohen's Kappa was increased to an average of 0.83 and ranged from 0.69 to 0.91 for the individual categories, suggesting an almost perfect agreement with the external researcher. The final framework consists of 9

higher dimensions and 19 categories. [Table A1](#) in the appendix describes all 19 codes and references for the deductive categories. In the study, 104 discussions were assigned to more than one category, as investors can address more than one topic in one discussion. Results of the qualitative analysis are presented in [section 4.1](#). In this section, we also provide descriptive statistics for the categories, introduce a ranking of relevance based on the number of discussions, views, and replies, and then explore the most relevant categories in more detail.

3.2.2. Quantitative approach

Second, to test our hypotheses, we develop a panel dataset consisting of 2,258 funding days. The time dimension refers to the duration of a campaign, ranging from one to 90 days. The cross-sectional dimension refers to one of the 47 campaigns (Block, Hornuf, and Moritz 2018). In the following discussion, we introduce the variables used for the regression analysis and present the statistical model applied. The results of the quantitative analysis are presented in [section 4.2](#).

3.2.2.1. Variables. *Dependent variable:* To analyse funding success, we define the dependent variable *Funding Raised* on day t in campaign j . Because of the panel nature of our data, we use a daily success measure. Crowdcube only provides information on the daily number of investments, not on daily funding amounts. To create *Funding Raised*, we take the daily number of investors times the average funding amount per project (total funding raised/total number of investors). This approach allows us to consider not only the number of daily investments but also differences in the size of investments. Hence, in our dataset, average investments differs per project with a minimum of £383 and a maximum of £9,726.

Explanatory variables: We create a variable *Discussions* that measures the number of new discussions that potential investors initiate concerning a particular campaign j on a given day t . Moreover, we also create variables for the number of discussion views (*Discussion Views*) and the number of discussion replies (*Discussion Replies*). Based on the qualitative analysis, we also create variables for the most relevant topics addressed in the discussion board. Thus, we operationalise the discussion categories that are identified in the qualitative analysis. Moreover, to account for the reaction of entrepreneurs to discussions, we create the variable *No Entrepreneur Reply*. This dummy variable takes the value 1 if entrepreneurs do not respond to a comment, and 0 if they respond. It is conceivable that the absence of entrepreneur replies would be a negative signal for potential investors.

Control variables: To control for other possible dynamic factors that explain the funding success, we incorporate several control variables. Herding patterns and information cascades are an essential driver of investment behaviour during crowdfunding campaigns (Vismara 2018a; Burtch, Ghose, and Wattal 2013). Hence, platforms transparently show if and when other investors invest in a campaign. Investments by other investors are generally considered as a signal of quality (Zhang and Liu 2012). In this regard, we create a variable *Investor Frequency_{t-1}* which measures how many investors have invested in campaign j before day t . More precisely, it considers the accumulated number of investors in a given campaign divided by the campaign days $t-1$. For example, a project may have attracted 100 investors in the first five funding days, in

which case the *Investor Frequency*_{*t-1*} would equal 20 on the sixth campaign day. Other studies use similar measures to analyse herding behaviour in crowdfunding (Burtch, Ghose, and Wattal 2013). We also control for the number of simultaneously *Competing Projects* on Crowdcube (Parker 2014). The variable *Updates* indicates whether entrepreneurs post an update on a particular day on project-related update boards, as this is shown to affect success during a campaign (Block, Hornuf, and Moritz 2018).

Moreover, the panel nature of the data allows for the specification of fixed effects to control for unobservable characteristics (Cameron and Trivedi 2013). In this regard, we use project fixed effects to remove any unobserved time-invariant heterogeneity across campaigns (Block, Hornuf, and Moritz 2018). Time invariant characteristics relate to any information conveyed through the project description that does not change throughout the funding cycle. Importantly, characteristics and signals that are time invariant (e.g., information provided in project descriptions and business plans on human capital, patents or industry, etc.) are collinear with the project fixed effects and, thus, are controlled for by our statistical model. This approach is frequently used in panel studies on crowdfunding (Kuppuswamy and Bayus 2017; Burtch, Ghose, and Wattal 2013; Block, Hornuf, and Moritz 2018; Zhang and Liu 2012) as project fixed effects are essential for addressing endogeneity problems (Wooldridge 2010); i.e., some projects are more likely to attract investments because of higher quality or popularity. In addition to project fixed effects, we use fixed effects for the days of the funding cycle to control for investment behaviour related to specific campaign days; for example, projects usually attract more investments during the initial days (Hornuf and Schwiendbacher 2017).

3.2.2.2. Statistical model. The dependent variable is a count measure that can only take positive values. Poisson regression is therefore an appropriate model (Wooldridge 2010) and is used in related crowdfunding studies (Kuppuswamy and Bayus 2017). Hausman tests are in support for fixed effects rather than random effects and in line with other panel studies in crowdfunding (Kuppuswamy and Bayus 2017; Block, Hornuf, and Moritz 2018; Zhang and Liu 2012).

4. Results

4.1. Qualitative results – an exploration of investor discussions

Table 1 presents the categorization of all 574 discussions. There are nine higher dimensions – *Product, Market, Financial Considerations, Route to Market, Resources, Investor Relations, Campaign Specific, Unspecific, and Announcement by Entrepreneur* – along with 19 corresponding categories. Table 1 also shows the descriptive statistics on the discussion categories, including the total number of discussions that investors initiated in a category, the average number of discussion views, and the average number of discussion replies. Regarding the higher dimensions, we note that most discussions surround the financials. These discussions are also viewed more often and receive more replies on average. The high frequency of comments on this dimension could be related to the fact that Crowdcube does not oblige entrepreneurs to report financial information in the project description.

Table 1. Discussion categories.

Categories	# Discussions	Average # Views	Average # Replies	Relevance
1) Product	61	121	2.5	
Product Adoption	43	123	2.6	0.95
Product Status	20	108	2.3	0.66
2) Market	89	171	2.8	
Market Need and Potential	39	123	2.4	0.89
Market Risk	66	201	3	1.37
3) Financial Considerations	129	379	4.2	
Financial Snapshot	70	183	2.9	1.36
Valuation	51	630	5.8	2.28
Likely Return	21	429	3.1	1.31
Funding	34	201	3.1	1.05
4) Route to Market	56	167	2.6	
Key Activities	24	139	2.8	0.81
Revenue Model	17	169	3.0	0.82
Customer Relations	17	196	1.9	0.73
5) Resources	74	159	2.6	
Human Capital	34	202	3.4	1.09
Intellectual Capital	24	98	1.9	0.64
Social Capital	26	121	1.9	0.69
6) Investor Relations	76	177	2.4	
Shareholder Rights	63	187	2.7	1.28
Investor Communication	17	119	1.5	0.55
7) Campaign Specific	63	166	2.9	
Campaign Organization	29	140	2.7	0.85
Reward	20	166	2.3	0.76
Tax Incentive	18	188	3.5	0.92
8) Unspecific	33	108	2.3	
9) Entrepreneur Announcement	32	204	2.3	
Average Total (by category)	33	192	2.7	

Note: Discussions can relate to more than one category. Thus, higher dimensions may exhibit values that deviate from the categories. Relevance indicates a category's mean of number discussions/average total + average number views/average total + average number replies/average total.

We calculate the importance of individual categories by comparing how each category fares in comparison to the average number of discussion postings, views, and replies. The five most important discussion topics are *Valuation*, *Market Risk*, *Financial Snapshot*, *Likely Return*, and *Shareholder Rights*, respectively. In the following discussion we explore these five categories in more detail with the aim to advance our understanding of why investors start discussions on a specific topic.

4.1.1. Valuation

Our data suggest that valuation is by far the most important topic addressed on the discussion boards. There are 51 discussions that centre on valuation, with discussions on this topic viewed more than three times as often as the average category (630 vs. 192) and receiving more than twice as many replies on average (5.8 vs. 2.7). Potential investors start discussions on the valuation mainly to express critical concerns about high and unjustified firm valuations. For investors, the valuation determines the price they pay to invest in a firm and, ultimately, their return. For entrepreneurs, the valuation determines how much ownership they give up for a certain amount of funding, influencing the firm's control structure (Cumming and Dai 2011). Thus, as the valuation is essential for both the investors and the entrepreneurs, it is a contentious point of

negotiation for equity investors (Hsu 2004; Collewaert and Manigart 2016). However, in equity crowdfunding, investors cannot negotiate the valuation. While Crowdcube indicates to provide guidance in valuations, it is the entrepreneur's decision to set a price. The goal of Crowdcube is to leave the decision to the crowd whether they are willing to invest at a certain price or not. Excessively high firm valuations disadvantage investors. Comments in this category indicate a concern by investors that they do not understand how entrepreneurs estimate their valuation and hence perceive the valuation as unjustifiably high (for example C1, C2, Table A2, appendix). Some potential investors even assume that certain valuations would only attract unsophisticated investors (C1, Table A2, appendix). Discussions on the valuation reveal a perceived agency conflict where entrepreneurs act opportunistically and disregard the interests of investors.³

4.1.2. Market risk

In total, 66 discussions relate to market risk. The comments in this category deal with the competitive situation, entry barriers, and other environmental risks for the business model. Investors mainly initiate discussions in this category to articulate concerns about competitors (for example C3, C4, Table A2, appendix). While comments in this category relate to the market risk, several discussions also display an agency risks, with concern that entrepreneurs have withheld information to falsely present a stronger market position (for example C4, Table A2, appendix). Most comments contain a critical tone as the market risk may pose a threat to successful development. Specifically, the comments indicate a concern about the lack of detailed information disclosures about the competitive landscape.

4.1.3. Financial snapshot

The most common way in which potential investors start discussions is on the financial snapshot. Thus, 70 discussions deal with the financial numbers including historical figures and revenue projections, underlining the financial motive of crowd investors (Estrin, Gozman, and Khavul 2018). Discussions on the financial snapshot often adopt a critical tone because investors feel insufficiently informed about the financials. Most comments indicate similar concerns where investors express a perceived lack of information and disbelief in the financial forecasts provided by entrepreneurs (for example C5 and C6, Table A2, appendix). Investors have concerns about excessively optimistic and polished financial figures. The discussions also reveal a potential agency conflict where entrepreneurs provide overly optimistic projections to convince investors.

4.1.4. Likely return

Equity crowd investors participate in ventures for financial gain (Cholakova and Clarysse 2015). Discussions in this category receive especially large numbers of views (429 vs. an average of 192). Discussions on the likely return deal mainly with questions regarding a possible exit strategy and dividends. Investors often request further information regarding the return expectations. Many comments in this category reveal that investors often lack an understanding of the return potential from equity crowdfunding (for example C7, Table A2, appendix). The discussions show that crowd investors place a high level of importance on return expectations and that information on this issue is often lacking (for example C8, Table A2, appendix).

4.1.5. Shareholder rights

The third most frequently started discussions by potential investors concern shareholder rights (63). This inductive category seems to be of different relevance for crowd investors than for other equity investors, such as VCs or BAs who usually have stronger control rights. Because of small average funding amounts, crowd investors are generally only minority shareholders. Additionally, entrepreneurs can offer B-shares without voting and pre-emption rights on Crowdcube. Discussions on shareholder rights reflect concerns about the weak control rights of investors in equity crowdfunding. Investors articulate strong concerns about the possible dilution of their shares. Some comments indicate that weak shareholder rights discourage investors from making a large investment. One forum commentator suggests that “the ordinary man could be taken for a ride” (C10, Table A2, appendix). Discussions in this category are predominantly negative, providing a clear picture about perceived agency concerns. The comments illustrate that investors fear the opportunistic behaviour of entrepreneurs and insufficient protection against potential moral hazards (for example C9, C10, Table A2, appendix).

Overall, the qualitative analysis of the five most important discussion topics reveals that crowd investors use the discussion board mainly to request further information on the specifics of a project. In particular, investors raise awareness of inconsistencies in the information provided by entrepreneurs and articulate a perceived lack of information regarding different topics. Moreover, the discussion content suggests that investors are often concerned about an agency risk. Thus, they fear moral hazards due to undisclosed information, weak shareholder rights, and limited *ex-post* control mechanisms. In the next section, we turn to the quantitative analysis and elaborate on the effects of discussions on funding success.

4.2. Quantitative analysis – the effect of discussions on funding success

We use quantitative analyses to assess the impact of discussions on the daily funding behaviour. Table 2 shows the descriptive statistics.⁴ The success level of the observed projects ranges between £8,000 and £5,140,000 and the number of investors between 12 and 2,952. Our dependent variable *Funding Raised* varies widely across the funding days and respective campaigns with a mean of £13,550 and a standard deviation of £37,530. The average number of investors is 6.36 per funding day and the average investment is £2,268 per project. At the project level, the median number of discussions is 10 per project with a maximum of 67 discussions. Only one project did not receive any discussion. Over the course of a campaign, an average of 12 discussions are started. The average discussion views (if discussion>0) is 322 with a standard deviation of 893, indicating considerable differences in the popularity of specific discussions. The number of discussion replies ranges between 0 and 119 with a mean of 4.5. The descriptive statistics suggest that entrepreneurs answer the vast majority of discussions. Entrepreneurs did not respond to discussions in only 24 cases (if discussion>0).

Multicollinearity poses concerns for two variables: discussion views and discussion replies (Table A3, appendix). Variance inflation factors (VIFs) for discussion views and replies are 7.57 and 9.85, suggesting a high correlation. Thus, we exclude both variables from the regression analysis. The other VIFs are below 2.43. We report incident rate

Table 2. Descriptive statistics.

Variable	Mean	Std. dev.	Min.	Max.	N Obs.
Funding Raised/1000	13.55	37.53	0	912.51	2,258
Investor Frequency	8.46	26.51	0.18	524	2,258
Competing Projects	22.14	7.02	1	30	2,258
Updates	0.18	0.38	0	1	2,258
Discussions	0.25	0.75	0	13	2,258
Discussion Views	52.41	378.68	0	14,490	2,258
Discussion Replies	0.74	3.87	0	119	2,258
No Entrepreneur Reply	0.01	0.1	0	1	2,258

ratios (IRRs) for the coefficients, which can be interpreted as multiplicative effects. To account for the lagged variables, we exclude the first funding day in all models. Table 3 shows the regression results. Models 1 and 3 present the results of the discussions initiated on the same day, while Models 2 and 4 show the discussion variables cumulated for the last seven days as investors might not immediately read or react to discussions.

Regarding our control variables, the results support findings from other studies, for example, on herding (Vismara 2018a) and the signalling effect of updates (Block, Hornuf, and Moritz 2018). Greater competition among projects decreases the investments.

Models 1 and 2 show our main effects. Our results support hypothesis 1 that discussions have a positive and significant impact on the funding raised on a given day ($\beta=1.09$, $p<.01$) and over the course of a week ($\beta=1.03$, $p<.01$). One additional discussion increases the funding by a rate of 9% on a given day. Over the course of a week, the effect remains significant and positive but decreases to 3%. If the entrepreneur does not react to a discussion over the course of a week, this has a negative effect on the daily funding success ($\beta=0.93$, $p<.01$). Hence, the dependent variable *Funding Raised* decreases by a rate of 7% (Model 2).

In the next step, to test hypothesis 2, we turn to the discussion categories and explore the effect of the five most relevant categories on the daily funding raised. The

Table 3. Multivariate regression analysis.

Variable	Model 1	Model 2	Model 3	Model 4
Ln(Investor Frequency t-1)	1.28*** (0.02)	1.29*** (0.02)	1.26*** (0.03)	1.2*** (0.02)
Competing offers	0.97*** (0)	0.97*** (0)	0.97*** (0)	0.97*** (0)
Updates	1.45*** (0.02)	1.58*** (0.02)	1.43*** (0.02)	1.56*** (0.02)
Discussions	1.09*** (0)	1.03*** (0)	1.12*** (0.01)	1.04*** (0)
No Entrepreneur Reply	1.02 (0.04)	0.93*** (0.02)	1.03 (0.03)	0.88*** (0.02)
Valuation			1.02 (0.02)	0.99 (0.01)
Market Risk			0.94** (0.02)	0.94*** (0.01)
Financial Snapshot			0.88*** (0.02)	1.06*** (0.01)
Likely Return			1.03 (0.05)	1.4*** (0.03)
Shareholder Rights			0.96** (0.02)	0.93*** (0.01)
Project fixed effects	Yes	Yes	Yes	Yes
Funding days fixed effects	Yes	Yes	Yes	Yes
Observations	2,211	2,211	2,211	2,211
Log likelihood	-9558	-9633	-9542	-9436
Pseudo (r^2)	0.731	0.729	0.732	0.735

Note: Dependent variable is *Funding Raised/1000*. Models 1 and 3 show the effects of *Discussions* and *No Entrepreneur Reply* posted on the same day; Models 2 and 4 show the effects of *Discussions* cumulated, and *No Entrepreneur Reply* cumulated over the last seven days. Standard errors are presented in parentheses.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

results show that the effect of discussions depends on the discussion topic. Hence, discussions on market risk, financial snapshot, and shareholder rights significantly decrease the investments on a given day, that is by 6%, 12%, and 4%, respectively. Over the course of a week, the effect remains negative for discussions on market risk and shareholder rights. These results are in line with the qualitative findings, highlighting the relevance of potential agency concerns that investors express regarding undisclosed competitors and the risk of dilution. Discussions on the financial snapshot become positive over the course of a week. Thus, entrepreneurs may be able to provide an acceptable response to these discussions. It is of note that discussions on the likely returns increase the investments over the course of a week.

5. Discussion

5.1. *Elaborating on the role of the discussion board*

Equity crowdfunding is an important source of early stage equity financing (Drover et al. 2017; Cumming and Johan 2017) but little known about the discussion board – the primary communication channel among investors and between investors and entrepreneurs (Mochkabadi and Volkmann 2018). The goal of this study is to shed light on the role of investor-initiated discussions in equity crowdfunding. For this purpose, we use a mixed-method approach consisting of qualitative and quantitative elements. First, we draw on the content of 574 interactions from project-related discussion boards. Overall, we find that the discussion board complements other information sources in equity crowdfunding. Investors post comments to request specific information, address concerns, and reveal opinions. We develop a framework based on deductive and inductive criteria to systematically categorize investor comments and assess the relevance of different discussion topics. Discussions were assigned to 19 categories. Five categories stand out in importance: valuation, market risk, financial snapshot, likely return, and shareholder rights. These discussion topics receive most discussion postings, views, and replies. An in-depth analysis of discussions on the five topics reveals that crowd investors perceive significant information asymmetries. Investors feel insufficiently informed by entrepreneurs on topics such as the competitive landscape or the return potential via equity crowdfunding. In addition to comments about the availability of sufficient information, crowd investors use the discussion board to articulate concerns about agency risks. In particular, investors are concerned that entrepreneurs are not just withholding information about potential competitors, but also providing unjustified valuations and overly optimistic financial figures. The qualitative analysis reveals that firm valuations are the subject of especially controversial debate. Crowd investors cannot negotiate the terms of investment, resulting in doubts about arbitrary firm valuations. Shareholder rights are also a significant issue for crowd investors who raise on the discussion board about the weak *ex-post* campaign protection from a potential dilution of shares. These concerns are generic in the context of equity crowdfunding, where investors are usually minority shareholders with limited power, thus fully exposed to self-interested actions by entrepreneurs.

Second, we study the effect of discussions on funding success during a campaign. We propose two hypotheses. First, we argue that discussions provide a third-party

endorsement and enhance campaign success. While entrepreneurs may act opportunistically and misrepresent information, discussions initiated by investors can provide credible information about the founders and project quality. Results of our panel regressions confirm our argument, indicating that discussions generally increase daily funding success. Second, we suggest that the effect depends on the discussion topic. Discussions can also reveal the opinions of better informed investors and uncover flaws or inconsistencies in the business model. In this regard, our quantitative results suggest that discussions on specific topics, such as on the market risk, financial snapshot, and shareholder rights, can also reduce investments. These quantitative findings are in line with the qualitative content analysis, thereby highlighting the importance of discussion boards as an information source for crowd investors.

The focus of this study is on the investor perspective, as they initiate the discussions and determine the discussion topics. However, entrepreneur responses also play an essential role in resolving information asymmetries. While a detailed analysis of the entrepreneur replies goes beyond the scope of this study, we also discuss the potential role of the entrepreneur reactions in the discussion board. Our data reveals that only 4.2% of the investor comments remain unanswered, suggesting that entrepreneurs take investor discussions seriously. Moreover, we observe that entrepreneurs put considerable effort into addressing questions and concerns, providing detailed replies with an average of 161 words and a maximum of 1587 words. Moreover, our quantitative results underline the necessity of offering responses in order to not harm funding success; if entrepreneurs do not reply to a comment, this reduces funding success on the days after a comment is posted. In addition, we observe that the adverse effect of discussions on the financial snapshot turns positive over the course of a week. One possible explanation is that entrepreneurs offer convincing answers that dispel investor concerns. We further address the replies of entrepreneurs in our discussion of limitation and avenues for future research.

5.2. Theoretical contribution and practical implications

This study makes several contributions to the literature on equity crowdfunding within the body of entrepreneurial finance research and provides implications for entrepreneurs and platform managers.

First, we contribute to the growing literature on information disclosure and signalling in equity crowdfunding. We shed light on an underexplored topic – the discussion boards where investors can share their knowledge and communicate with other investors and entrepreneurs over the course of a campaign (Mochkabadi and Volkmann 2018). Our study provides empirical evidence on the importance of discussion boards as an information source for potential investors. Until now most studies deal with entrepreneur-originated signals, such as human capital, social capital, and updates (Ahlers et al. 2015; Vismara 2016; Vulkan, Åstebro, and Sierra 2016; Lukkarinen et al. 2016; Block, Hornuf, and Moritz 2018). Our study explores the discussion board as a potential source of third-party endorsement, showing that discussions can increase funding success. However, our results also indicate that the effect depends on the discussion topic which can be a critical factor that damages the likelihood of success.

Second, we provide a framework for the discussion topics that may be used to study the evaluation process of crowd investors. The role of evaluation criteria of early stage investors is one of the central research fields in the context of entrepreneurial finance (MacMillan, Siegel, and Narasimha 1985; Baum and Silverman 2004; Mason and Stark 2004; Sudek 2006; Landström 1998; Franke et al. 2008; Van Osnabrugge 2000; Maxwell, Jeffrey, and Lévesque 2011; Boulton, Shohfi, and Zhu 2018). This study adds to the debate by exploring topics that are relevant to a new type of investor – the crowd investor. We integrate frameworks on the decision-making of BAs into the equity crowdfunding context. Three of the most relevant discussion categories – all relating to the financials – for equity crowdfunding investors are also of importance for other equity investors. However, several criteria that are unique to equity crowdfunding are also identifiable. For example, concerns about equity dilution and shareholder rights are of considerable importance in equity crowdfunding. These contrasts with both VCs and BAs who negotiate the terms of investment and have stronger control rights compared to crowd investors (Mason and Stark 2004; Landström 1992). Further, VCs can reduce information asymmetries between the entrepreneur and the investor *ex-post* through monitoring and advising services and taking up board positions (Narayanan and Lévesque 2018; Amit, Brander, and Zott 1998). Crowd investors do not have equivalent ways in which to reduce information asymmetries and, consequently, are particularly concerned about agency risk.

The findings provide practical implications for both entrepreneurs who seek equity crowdfunding and the mediating crowdfunding platforms. Entrepreneurs need to recognise that crowd investors face an information deficit and therefore seek additional information from project-related discussion boards. However, discussions can be a double-edged sword for entrepreneurs. On the one hand, entrepreneurs might be able to use the discussion boards as a way in which to reduce information asymmetries. On the other hand, the results also show that discussions on specific topics can have negative effects on the collective evaluation of a project, thereby creating a broader awareness of concerns. Specifically, discussions on market risk, the financial snapshot, and shareholder rights can damage the prospects for a successful crowdfunding campaign. Richer information in the general project description might prevent these concerns from arising. Entrepreneurs should therefore consider presenting not only financial figures, but also elaborate on the assumptions used, in order to overcome investor concerns. In particular, entrepreneurs might benefit from fully disclosing the competitive landscape, as potential investors do not just fear the risk of competitors but are also concerned about agency risk from withheld information.

The study also has implications for equity crowdfunding platforms. Platforms have an incentive to prevent adverse selection and, thus, concerns about information asymmetries and agency. If platforms do not adequately address such matters, their business model might not succeed. Platforms should offer a more transparent process, for instance, by providing detailed information on their due diligence process (Löher 2016; Cumming and Johan 2013). They could also require greater information disclosure by entrepreneurs to reduce information asymmetries, especially regarding competition and financial assumptions. Platforms might also need to more rigorously challenge a firm's own valuation or involve investors in the process. This study also sheds light on the significant concerns of shareholder rights as perceived by crowd investors.

Platforms are a neutral mediator between investors and entrepreneurs. It remains to be seen whether this is sufficient or whether platforms need to take a stand on behalf of investors to protecting them against the risk of dilution.

5.3. Limitations and avenues for future research

This paper has limitations which open up avenues for future research. First, this study concentrates on the investor perspective, largely disregarding the responses of entrepreneurs. The role of entrepreneur replies might be central to the story. Entrepreneurs might overcome investor concerns by providing timely and compelling responses on the discussion boards. In our data set, there are only a few outliers where entrepreneurs did not respond to investor discussions. However, our empirical results also show that discussions that were unanswered by entrepreneurs harm funding success. A similar effect might occur if entrepreneurs take excessive time to reply. Further, the effort and detail of replies might have a positive effect the perceptions that investors have of entrepreneurs. A promising avenue for future research is to analyse the responsiveness of entrepreneurs on the discussion boards. In particular, investigating how entrepreneurs deal with critical questions on different discussion topics and how this relates to the investment decisions of investors could reveal significant insights about how crowdfunding works.

Second, we do not consider the presence of additional information, such as information provided in the project descriptions or the business plans of entrepreneurs. Hence, discussions may be more or less valuable depending on how detailed the other information sources are. For example, if entrepreneurs provide comprehensive information on the competitive landscape, it is conceivable that discussions on this topic would be of less concern for other investors. Future research should investigate the effect of additional available information on discussions.

Third, our quantitative results have to be taken with caution because of potential causality issues. More successful and popular projects are likely to receive more discussions. While our explorative study provides the first step to better understand this under-explored topic, future research should assess the quantitative effect of discussions in a more robust setting.

Fourth, the data used in this study does not provide information about the investors who start discussions. For instance, they might be more sophisticated investors. Therefore, the concerns and categories identified in this study may incur a self-selection bias. Because of the rather small sample size, we do not consider the sentiments of comments. It is possible that positive investor sentiments are perceived as a stronger third-party endorsement, while negative comments may incur an opposite effect. Future research should collect larger data sets and investigate the role of sentiments in different discussion categories (Courtney, Dutta, and Li 2016).

We also encourage future research to build on the framework developed in this study to assess the relevance of individual criteria outside of the discussion boards. Hence, studies might elaborate on the firm valuation, an aspect that had received scholarly interest in the BA and VC contexts (Collewaert and Manigart 2016). The exploration of discussion boards reveals that investors are concerned about dilution due to weak

shareholder rights. Exploring whether crowd investors are more likely to accept weak shareholder rights (e.g., B-shares or no pre-emption rights on Crowdcube) for better developed firms and vice versa might be a promising avenue for research. It is important to establish whether concerns on dilution are justified and if investor shareholdings in firms that raise equity crowdfunding are diluted in subsequent funding rounds.

6. Conclusion

Equity crowdfunding is becoming increasingly relevant in theory and practice. Within the growing literature on this financing form, the role of discussion boards is under-researched. This study uses a mixed-methods approach to shed light on the role of the discussion boards in equity crowdfunding. Our results indicate that discussion boards are an important complementary information source for potential investors and a vehicle to address open questions and information asymmetries. While discussions generally increase daily funding success, controversial discussion topics can also discourage investments. This study provides insights for entrepreneurs who seek equity crowdfunding and encourages future research.

Notes

1. A recent study by Kleinert, Volkman, and Grünhagen (2018) shows that affiliations with third parties, such as with venture capitalists, can also signal quality in an equity crowdfunding context.
2. One of the authors and an external researcher with experience in qualitative content analysis.
3. According to Crowdcube, there was a case when a firm lowered its valuation after controversial comments on the discussion board.
4. The descriptive statistics are presented for the total data set, i.e. 2,258 campaign days. On most campaign days no discussion was initiated and, thus, the means and standard deviation of discussion views and replies have to be taken with caution.

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Appendix

Table A1. Discussion categories.

Categories	Description	Exemplary Research
1) Product		
<i>Product Adoption</i>	Benefits, functioning, and feasibility of the product	Mason and Harrison (2002)
<i>Product Status</i>	Development process and risk, prototyping, and development of new product features	Maxwell, Jeffrey, and Lévesque (2011); Cooper and Kleinschmidt (1987)
2) Market		
<i>Market Need and Potential</i>	Market demand, access to potential customers and traction, growth potential	Landström (1998); Mason and Stark (2004)
<i>Market Risk</i>	Risk of competitors and differentiation from competitors, external risk such as possible regulations or environmental changes	Mason and Stark (2004); Maxwell, Jeffrey, and Lévesque (2011)
3) Financial Considerations		
<i>Financial Snapshot</i>	Financial projections, revenues, and costs	Maxwell, Jeffrey, and Lévesque (2011)
<i>Valuation</i>	Value of equity and worth of business	Feeney, Haines, and Riding (1999); Mason and Stark (2004)
<i>Likely Return</i>	Likely rate of return and exit route possibilities	Van Osnabrugge (2000); Mason and Harrison (2002)
<i>Funding</i>	Financial assets, prior and further funding, use of funds	Mason and Stark (2004)
4) Route to Market		
<i>Key Activities</i>	How is the supply-chain organised, how is the business organised to produce and deliver the product	Mason and Stark (2004); Maxwell, Jeffrey, and Lévesque (2011)
<i>Revenue Model</i>	How are revenues generated and prices set	Mason and Stark (2004)
<i>Customer Relations</i>	What strategy of customer engagement does the business follow	Mason and Harrison (1996)
5) Resources		
<i>Human Capital</i>	Characteristics, experience, CV, and motivation of entrepreneurs and team	Maxwell and Lévesque (2014); Ahlers et al. (2015)
<i>Intellectual Capital</i>	Protection of intellectual properties and data	Ahlers et al. (2015); Sudek (2006)
<i>Social Capital</i>	Strategic alliances, distribution partners, and venture capitalists	Van Osnabrugge (2000); Vismara (2016)
6) Investor Relations		
<i>Shareholder Rights</i>	Rights as shareholder, protection of dilution	n.a.
<i>Investor Communication</i>	Shareholder communication e.g. disclosure of information and reports	n.a.
7) Campaign Specific		
<i>Campaign Organization</i>	Organization of campaign e.g. overfunding, payment terms, and project description	n.a.
<i>Reward</i>	Requirements and conditions for non-equity rewards	n.a.
<i>Tax Incentive</i>	Existence of tax breaks (EIS, SEIS)	Mason and Harrison (2002)
8) Unspecific		
<i>Comments</i>	Comments unrelated to any category	
9) Entrepreneur Announcement		
<i>Announcements</i>	Discussions not initiated by investors. Entrepreneurs have an additional update board, in a few cases they also make announcements on the discussion board	

Table A2. Exemplary discussions.

#	Exemplary discussion	Category
C1	<i>"Clearly this pitch is creating a lot of interest, but also a fair bit of controversy in terms of valuation/returns prospects. I spend a fair bit of time in the beer industry and value beer companies on a frequent basis. A lot of stars need to align for you to hit your 2020 numbers.... In terms of back-up, I echo comments from others that your business plan document does not contain much meat, which would help prospective investors to understand key drivers behind the numbers.... the number of investors who have committed serious money at this type of valuation is probably low (or these people have limited knowledge of the beer industry or basic corporate finance principles)..."</i>	Valuation
C2	<i>"I think your pre-money valuation of £1.5m is too high. How are you justifying a number that large? I think you are trying to capture too much of the (uncertain) future value potential in the current valuation."</i>	Valuation
C3	<i>"I invested in something similar in terms of disruptive edge in the telecoms space and the big players immediately picked up on it as a threat and replicated the idea, destroying any potential value. What's to stop this happening here? If by your own admission the technology is not new, I would imagine the big players would find a way round this quite easily?"</i>	Market Risk
C4	<i>"There is only a small paragraph on YoYo in the BP as competitors – though it is a direct UK competitor that has received USD10m+ of funding and process c. 150,000 monthly transactions...Can you elaborate a bit more on this..."</i>	Market Risk
C5	<i>"I'm unconvinced it will work at the level you predict and your figures after 3 full years of trading do little to suggest it will...Your 2015 sales projection of £451k is almost 300% on 2014. Where will this come from in a market that is getting very very full..."</i>	Financial Snapshot
C6	<i>"...you are forecasting a big jump in profit from the 12 months beginning Mar-17. What will cause the big turnaround? to go from Minus 657k to plus 235k you are putting a lot of pressure on yourself."</i>	Financial Snapshot
C7	<i>"I may be interested in participating, but there are no details of how I will either receive any dividend from my investment, or indeed, how I receive my capital (with hopefully some growth) back..."</i>	Likely Return
C8	<i>"...is there any firm plan or commitment as to how many years before an exit is likely. As the crowd shares are not able to be resold then this to me is a key question..."</i>	Likely Return
C9	<i>"...why no pre-emption rights are attached to the B-shares? I think you are giving away the only protection for investors to avoid any dilution and get their fair share of value in the Company..."</i>	Shareholder Rights
C10	<i>"There is another similar thread but please people think about dilution here which is a major point and why, although I like the idea, I probably won't invest anything more than a tenner... I don't know the investor knowledge of people on here but please be aware of this before putting your money in as the ordinary man could be taken for a ride here. This company will need to raise a lot more money before getting to an exit position so there is a lot of potential for dilution."</i>	Shareholder Rights



Table A3. Correlation matrix.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Funding Raised/1000	1											
Ln(Investor Frequency _{t-1})	0.4397***											
Competing Projects	0.0199	0.1649***										
Updates	0.1496***	0.121***	0.0426**									
Comments	0.4508***	0.38***	0.0263	0.1594***								
Comment Replies	0.2884***	0.2713***	0.0065	0.1164***	0.6032***							
Comment Views	0.2513***	0.2385***	0.0253	0.1044***	0.4184***	0.9134***						
No Entrepreneur Reply	0.1273***	0.092***	-0.0007	0.0326	0.2586***	0.0765***	0.0779***					
Valuation	0.2733***	0.176***	0.0164	0.0716***	0.348***	0.2917***	0.3061***	0.0976***				
Market Risk	0.1417***	0.1354***	0.0156	0.0322	0.4002***	0.2374***	0.1809***	0.0323	0.0857***			
Financial Snapshot	0.1217***	0.1305***	-0.0247	0.0399*	0.4436***	0.2303***	0.1543***	0.1754***	0.2523***	0.1462***		
Likely Return	0.1665***	0.1087***	0.0283***	-0.0215	0.1879***	0.1307***	0.1294***	0.174***	0.1914***	0.0098	0.0843***	
Shareholder Rights	0.2811***	0.2344***	0.009	0.0996***	0.5054***	0.3166***	0.2294***	0.1461***	0.1111***	0.0912***	0.1265***	0.082***

*** p<0.01, ** p<0.05, * p<0.1