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Social Media Marketing for Equity Crowdfunding: Which Posts Trigger Investment Decisions?

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Abstract

Based on 26,883 investment decisions, we examine the influence of social media marketing on crowd participation in equity crowdfunding. We distinguish between different types of informative and persuasive posts on Facebook and Twitter. Informative posts provide investors with information about the crowdfunding campaign; persuasive posts do not, but rather aim to directly influence an investor's decision-making process. We find that both types of posts have a positive impact on the number of investments. However, persuasive posts also increase the amount of an investment if they contain a statement about the previous investment success of the campaign and signal the crowd that they are not investing alone.

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"Now is the time! Our crowdfunding is still open for your investment!"

Post on Twitter during the Fraisr Campaign on Seedmatch

1   Introduction

Signaling theory suggests that if information is asymmetrically distributed between entrepreneurs and investors, the entrepreneur can deliberately send effective signals to investors to ensure them that she is of high quality. To be effective, these signals need to be observable and costly, because otherwise the signal could be easily faked or imitated by low quality competitors. In equity crowdfunding, in which a large group of investors supports a startup over the Internet, information asymmetries are particularly high, since on-site screening and due diligence are rare (Hornuf et al., 2022). Thus, entrepreneurs often send effective signals via their project page on the equity crowdfunding platform, which acts as a gatekeeper and creates a trustworthy signaling environment (Block et al., 2018). However, the gatekeeper function largely falls away when startups seeking equity crowdfunding use social media platforms such as Facebook or Twitter to promote their crowdfunding campaigns.

Assuming that potential investors need credible and diagnostic information before investing in crowdfunding campaigns, the use of social media marketing seems less promising at first glance. However, startups also target different types of investors; for example, less sophisticated investors who may primarily use intuition for their investment decisions (Agarwal and Ambrose, 2018, Hornuf et al., 2022, Snow and Rasso, 2017). As the Twitter post by Fraisr above suggest, social media posts promoting crowdfunding campaigns do not always entail effective signals in the spirit of Spence (1973). Accordingly, recent research shows that even non-informative social media content—under certain circumstances—can actually have a positive influence on investment decisions (Bertrand et al., 2010, Madsen and Niessner, 2019, Tsai and Honka, 2021). We investigate which content startups post on social media platforms and whether these posts have an impact on crowd participation during an equity crowdfunding campaign.

According to the marketing literature, advertising can serve two main functions: an informative and a persuasive function (Santilli, 1983, Tsai and Honka, 2021). The informative function is to provide consumers with information about products so that they can make reasoned purchase decisions. The persuasive function, on the other hand, focuses on changing consumer preferences without necessarily providing decision-relevant information. Advertising is then less about an appeal to reason and more about an appeal to intuition (Bertrand et al., 2010).

In crowdfunding practice, startups use informative posts and persuasive posts when promoting their campaigns on social media platforms. The content of informative posts is comparable to the content typically published on crowdfunding platforms, such as the funding limit, the development of the campaign, or basic information about the startup's business model. Examples are: "New sales expert on board: @fraisr strengthens its sales team with Ex-Daily Deal Key Account Manager!," "Fundinglimit at Seedmatch increased to €300.000." or "BetterTaxi was voted App of the Week at telefon.de." By contrast, persuasive posts do not contain any specific information about the crowdfunding campaign or the startup itself. They are primarily aimed at directly influencing the cognitive stages an investor goes through during the decision processes, such as creating awareness, interest, desire, and purchase intentions for the startup, the campaign, and its products (Lavidge and Steiner, 1961, Tsai and Honka, 2021). The specific configurations of these posts can be quite diverse, ranging from a call to action, for example to invest in the startup or to purchase its products, to posts that are primarily intended to build a relationship with potential and existing investors. Examples are: "Do you want to participate in the success of interactive audio dramas? Then invest in Audiogent now!," "Now you can order your best movinary videos as DVD." or "Lottohelden.de wishes you a Merry #Christmas!"

Often persuasive posts contain so-called heuristic cues, which are intended to further trigger investment decisions (Grewal et al., 1996). Drawing on the information processing literature (e.g., Chaiken, 1980, Petty and Cacioppo, 1986), these cues are based on the assumption that consumers are not always motivated to process information systematically, but instead rely on heuristics to make inferences about the attractiveness of advertised

objects (Eisenbeiss et al., 2015). Heuristic decision behavior is especially likely when the decision period is limited (Coulter and Roggeveen, 2012), as is naturally the case with crowdfunding campaigns. A long stream of research in the literature has identified a number of heuristic cues that impact consumer value perceptions. Among the most popular ones that are particularly frequently used in social media marketing of crowdfunding campaigns are selling history and time limit.

The selling history represents a statement about previous demand, for example in terms of previous shares sold or the number of previous investors. In general, the marketing literature argues that consumers tend to use these cues as a heuristic to assess the quality or value of an object (Dean and Lang, 2008, Hellofs and Jacobson, 1999). Thus, the greater the previous demand, the more positive the assessment of an object. This is also why firms like Costco, Amazon, Best Buy, and Circuit City make bestseller information available to consumers. Applied to equity crowdfunding, the presence of a selling history cue in a persuasive post may serve as a form of social validation for the crowdfunding campaign, which signals regular crowd investors an attractive investment opportunity (Coulter and Roggeveen, 2012). Examples of persuasive posts including a selling history cue are: "422 #microinvestors convinced by @swabr. Now take the last opportunity for #crowdinvesting on @Companisto." or "Our #crowdinvesting on @Companisto: 326 people invest € 45,200 and 38 days remain. Secure shares now."

A time limit represents a special type of a purchase constraint by limiting an offer's availability (Inman et al., 1997). Previous research argues that consumers use unavailability or limited availability as a heuristic cue that the object is scarce (Coulter and Roggeveen, 2012). Scarcity typically induces action by playing upon consumers' fear of missing out an attractive offer (Cialdini, 2007, Coulter and Roggeveen, 2012). Accordingly, previous studies show that time limits accelerate purchases, decrease the likelihood of searching for better alternatives, as well as lead to greater willingness to buy (Aggarwal and Vaidyanathan, 2003, Eisenbeiss et al., 2015, Inman et al., 1997). Moreover, psychological research suggests that "people find objects and opportunities more attractive to the degree that they are scarce, rare, or dwindling in availability" (Cialdini, 1999, p. 92).

Thus, applied to equity crowdfunding, the presence of a time limit in a persuasive post may trigger investment decisions by playing upon investors' fear of missing out an attractive investment opportunity. Examples are: "The countdown is on - seven days left! Until then, you can still invest in our campaign on Companisto." or "Today last chance - Secure your shares now! Here you can find the auction."

In summary, our theoretical considerations suggest that not only informative but also persuasive social media posts have an impact on investment decisions during an equity crowdfunding campaign. In the context of persuasive posts, the presence of selling history and time limit cues could be of particular importance. To investigate whether and to what extent our expectations can be confirmed empirically will be determined by an empirical analysis of investment decisions on three large German equity crowdfunding platforms.

2 Method

2.1 Data

We analyze 26,883 investment decisions resembling a funding volume of € 18.56 million, which we hand-collected from November 6, 2011, to August 28, 2014, from the equity crowdfunding platforms Companisto, Innovestment, and Seedmatch. In line with Block et al. (2018) and Hornuf and Schwienbacher (2018), we aggregate the investments that a startup received on a single day. We thus get a panel data structure with the duration of the campaign in days as the time dimension, while the cross-sectional dimension relates to the campaigns. We further collected 2,583 Twitter and 1,816 Facebook posts for the startup in our sample during and seven days before the start of the respective campaign.[1]

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[1]For simplicity, we pool the information from Facebook and Twitter posts in our empirical analysis.

2.2 Variables

Following Block et al. (2018), we use three distinct but complementary dependent variables to operationalize investment decisions in a relatively broad way: the number of investments per day as a measure of crowd participation (*Investments(#)*), as well as the funding volume on a given day (*Amount(€)*) and the average investment amount per day (*Avg. amount(€)*) to capture the magnitude of an investment.

To investigate which social media posts affect investment decisions, we first classify posts into informative or persuasive posts based on their content. For a more nuanced analysis, we further distinguish between different manifestations of informative and persuasive posts. Within the informative posts, we differentiate between the categories *Startup*, *External Certification*, and *Campaign Development*.[2] While all informative posts provide information that investors might consider relevant for decision-making, they evidently differ in the nature of the information. Within the persuasive posts, we distinguish between *Product Advertising*, *Investment Advertising*, and *Follower Communication*. While all persuasive posts aim to influence the investment decisions, the main differences among them are in the way the influence is exercised. Table A.1 in the Online Appendix contains variable definitions and Table A.2 provides coding examples. Figure 1 shows the distribution of all posts in our dataset across the six categories. In our dataset, more than 82 % of all posts on social media contain persuasive content. For each of the six categories, we calculate the percentage of posts per startup that fall into this category on a given day. For example, if a startup publishes ten posts in one day and two of them fall into the investment advertising category, the *Investment Advertising* variable takes the value of 0.2.

In addition, we document whether startups use selling history and time limit cues in their investment advertising posts. We find that around 15.8 % of all investment advertising

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[2]Note that we also searched for other categories of informative posts as classified by Block et al. (2018). However, these categories only play a minor role in social media posts. Therefore, we summarized the categories Team (2.2 %), Business Model (0.3 %), Product Development (0.6 %), Cooperation Projects (1.0 %), New Funding (0.05 %), and Business Development (0.9 %) under the label *Startup*.

Figure 1: Distribution of Social Media Posts to the Individual Content Categories
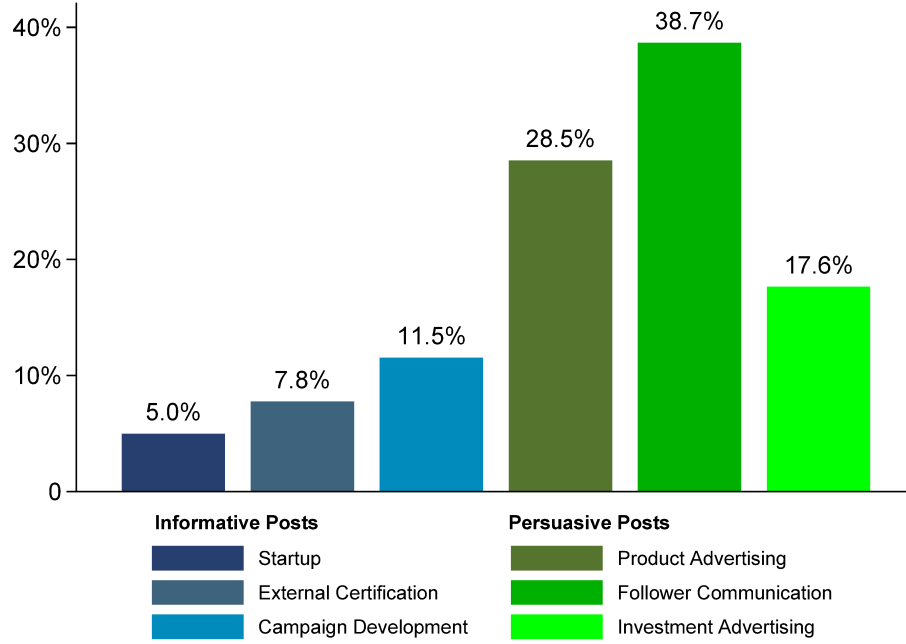
Note: This figure shows the distribution of the 4,399 social media posts across the individual content categories. Since one post can contain content on several categories, the sum of the individual shares is greater than 100 percent.

posts contain selling history cues and 13.0 % include time limits.[3] To analyze the impact of cues on investment decisions, we create the two variables *Selling History* and *Time Limit*, each indicating the proportion of investment advertising posts that contain the respective cues.

To control for media weight (Macinnis et al., 2002), we also generate the variable *#Posts*, which measures the number of social media posts by a startup on a given day. We also include the number of active campaigns and the total number of investments across all competing campaigns on the same day. Moreover, we consider a dummy variable that equals one if the funding goal of the campaign has been reached and control for the number of investments and the investment amount that a startup obtained up to the previous day. Finally, we include dummies for two of the three crowdfunding platforms as well as day

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[3]In addition, we investigated whether startups use quantity limits or sales promotion cues in their investment advertising. However, both cues play a minor role and appear in only 2.4 % (quantity limits) and 1.9 % (sales promotion) of all investment advertising posts.

Table 1: Descriptive Statistics

	mean	sd	min	max	count
Crowdfunding campaign data					
Investments (#)	6.62	21.97	0	579	3887
Amount (€)	4386.85	22622.79	0	869000	3887
Ln(Amount (€))	5.22	3.60	0	14	3887
Avg. amount(€)	674.23	2065.41	0	50000	3887
Ln(Avg. amount(€))	4.23	2.91	0	11	3887
Duration	64.82	33.76	2	126	3887
Funding goal	47834.22	22469.96	25000	150000	3887
Ln(Amount)$_{0 \to t-1}$	10.82	2.11	0	14	3891
# Investments$_{0 \to t-1}$	273.35	346.29	0	1981	3891
Post funded	0.68	0.47	0	1	3887
Active campaigns	5.91	2.98	1	12	3887
Competing investments	36.42	57.55	0	1122	3887
Social media data					
#Posts	0.96	2.09	0	43	3887
Startup	0.02	0.12	0	1	3887
External Certification	0.03	0.16	0	1	3887
Campaign Development	0.04	0.18	0	1	3887
Product Advertising	0.12	0.29	0	1	3887
Investment Advertising	0.05	0.19	0	1	3887
Follower Communication	0.13	0.30	0	1	3887
Time Limit	0.01	0.11	0	1	3887
Selling History	0.02	0.14	0	1	3887

Note: This table shows the main descriptive statistics (mean, standard deviation, minimum, and maximum) for the 3,887 campaign-day observations.

of the week and month of the year dummies. Table 1 shows descriptive statistics for the 3,887 campaign-day observations.

3 Results

We present our regression results in Table 2. Columns (1) to (2) show the results of fixed-effects negative binomial regressions with the number of investments as dependent variable. We report incident rate ratios, which can be interpreted as multiplicative effects. Columns (3) to (6) show the results from OLS fixed effects regressions with the funding volume on a given day as well as the average investment amount per day as dependent variable, which have been log-transformed respectively.

Table 2: The Effect of Social Media Posts on Crowd Participation

	Investments (#)		Ln(Amount(€))		Ln(Avg. amount(€))	
Variable lag	Model 1 None	Model 2 1 day	Model 3 None	Model 4 1 day	Model 5 None	Model 6 1 day
Explanatory variables (lags according to table head)						
Informative content categories:						
Startup	1.105	1.276*	0.364	1.276*	0.220	0.187
	(0.103)	(0.171)	(0.293)	(0.171)	(0.260)	(0.342)
External Certification	1.000	1.220**	−0.063	1.220**	−0.013	0.308
	(0.064)	(0.118)	(0.260)	(0.118)	(0.234)	(0.205)
Campaign Development	1.222**	1.102	−0.067	1.102	−0.352	0.049
	(0.102)	(0.104)	(0.318)	(0.104)	(0.261)	(0.217)
Persuasive content categories:						
Product Advertising	1.073	1.032	0.290	1.032	0.240	0.051
	(0.068)	(0.053)	(0.179)	(0.053)	(0.173)	(0.162)
Follower Communication	1.045	1.038	0.017	1.038	0.025	−0.061
	(0.070)	(0.063)	(0.165)	(0.063)	(0.141)	(0.177)
Investment Advertising	1.361***	1.290***	0.177	1.290***	−0.009	0.022
	(0.129)	(0.126)	(0.370)	(0.126)	(0.354)	(0.184)
Investment advertising cues:						
Time Limit	0.948	0.983	0.126	0.983	0.007	−0.495
	(0.155)	(0.151)	(0.605)	(0.151)	(0.520)	(0.483)
Selling History	1.099	1.016	1.251***	1.016	1.184***	1.138***
	(0.091)	(0.141)	(0.433)	(0.141)	(0.417)	(0.300)
#Posts	0.997	0.996	−0.068**	0.996	−0.067**	−0.017
	(0.012)	(0.011)	(0.033)	(0.011)	(0.027)	(0.037)
Control variables (no lags included)						
$\text{Ln(Amount}_{0 \to t-1})$	1.215***	1.223***	0.312**	0.330**	0.290**	0.317**
	(0.064)	(0.067)	(0.140)	(0.144)	(0.136)	(0.138)
$\text{\#Investments}_{0 \to t-1}/ 100$	0.883***	0.881***	−0.369***	−0.351***	−0.154***	−0.137***
	(0.039)	(0.039)	(0.076)	(0.074)	(0.051)	(0.051)
Post funded	1.027	0.999	0.179	0.152	0.223	0.192
	(0.147)	(0.143)	(0.343)	(0.346)	(0.282)	(0.281)
Active campaigns	1.007	1.010	−0.042	−0.037	−0.037	−0.033
	(0.026)	(0.027)	(0.049)	(0.050)	(0.039)	(0.039)
Competing investments	1.002***	1.002***	0.002***	0.002***	0.001	0.001
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Fixed effects						
First and last seven days	Yes	Yes	Yes	Yes	Yes	Yes
Day-of-week	Yes	Yes	Yes	Yes	Yes	Yes
Month-of-year	Yes	Yes	Yes	Yes	Yes	Yes
Portal	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-7791.939	-7802.714	-9311.362	-9312.697	-8943.779	-8944.780
Observations	3887	3887	3887	3887	3887	3887

Note: The dependent variable in columns (1) to (2) is the number of investments, in columns (3) to (4) the Ln(Amount) of investments, and in columns (5) to (6) the Ln(Avg. amount) of investments in a specific campaign and day. The data takes panel data structure. The method of estimation in columns (1) to (2) is the negative binomial fixed effects panel estimator and in columns (3) to (6) the OLS fixed effects panel estimator. In all models, we include the same control variables as in Table 2. Standard errors are shown in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Our findings indicate that informative social media posts positively affect the number of investments. While the effect for *Campaign Development* occurs on the same day, social media posts containing external certification or information about the startup have an

effect with a delay of one day.[4] If the share of campaign development posts increases by 10 percentage points, the number of investments would increase by 2.2 % (p<0.05). In this respect, social media posts also differ from updates on crowdfunding platforms, where no immediate effects were identified on the same day (Block et al., 2018). Posts on social media platforms apparently offer startups a tool to reach the crowd in a timelier manner. One reason for this is that potential investors might unintentionally obtain information about the equity crowdfunding campaign on social media. In contrast, they only receive updates on crowdfunding platforms if they actively search for it on the platforms' websites.

When analyzing the impact of persuasive posts, we find that the two content categories, *Product Advertising* and *Follower Communication*, do not affect investment decisions at all. However, persuasive posts in the form of investment advertising exert a highly significant and positive effects on the number of investments. If the share of investment advertising posts increases by 10 percentage points, the number of investments would increase by 3.6 % (p<0.01) on the same day and 2.9 % on the following day (p<0.01). Thus, *Investment Advertising* has a considerably stronger overall effect on the number of investments than any type of informative posts. In other words, when investors are attracted by social media marketing, it is not so much through information, but through intentional persuasion.

Finally, the results show highly significant and positive effects of *Selling History* on both the funding volume and the average investment amount per day. If the share of selling history posts increases by 10 percentage points, the number of investments would increase by 24.9 %[5] (p<0.01) on the same day and 22.4 % on the following day (p<0.01); the average investment amount would increase by 32.7 % (p<0.01) on the same day and 21.2 % (p<0.01) on the following day. According to our theoretical considerations, investors use a selling history cue as a form of social validation to invest larger amounts. Interestingly, this is the only post category with a significant effect on the magnitude of investments, while other post categories only increase the number of investments.

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[4]Our results show that social media posts have no effect on crowd participation after four days.
[5]Calculated as $e^{1.251} - 1 = 249.4$ % for a 100-percentage point increase in selling history posts.

4 Conclusion

This article studies the impacts of social media posts on investment decisions in equity crowdfunding. Based on hand-collected investment data from three large German equity crowdfunding platforms, we find that entrepreneurs use social media to communicate in many different forms. The following conclusions can be drawn: First, effective signals via informative posts are relatively rare, but trigger the number of investments in a crowdfunding campaign. Particularly effective informational posts are those that provide either information about campaign development or external certifications. Second, persuasive posts are more common, although they are only effective if they also directly promote the crowdfunding campaign through investment advertising. Other manifestations such as product advertising or follower communication remain ineffective. Third, investment advertising works particularly well in social media marketing, once it includes a statement about the campaign's previous investment success, signaling the crowd that they are not investing alone. Thus, start-ups can effectively promote the number of investments and investment amounts though social media.

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Online Appendix

Table A.1: List and Definition of Variables

Variables	Definition
Investments (#)	The number of investments made by crowd investors on day t in campaign i.
Amount (€)	The amount in Euros invested by crowd investors on day t in campaign i.
Ln(Amount (€))	The natural logarithm of the amount in EUR invested by crowd investors on day t in campaign i.
Ln(Avg. amount (€))	The natural logarithm of the average amount in EUR invested by crowd investors on day t in campaign i.
Duration	The number of days elapsed from the start until the end of a campaign.
Post funded	Dummy variable equal to 1 if the campaign has surpassed the Funding Goal, and 0 otherwise.
Funding goal	The minimum funding goal as defined by the startup and portal at $t = 0$.
Active campaigns	The total number of campaigns across three major and one minor German equity crowdfunding portal (Seedmatch, Companisto, Innovestment, and United Equity) accepting investments on day t.
Competing investments	The total number of investments made on day t across all campaigns ran on three major and one minor German equity crowdfunding portal (Seedmatch, Companisto, Innovestment, and United Equity) that where not attracted by campaign i.
Ln(Amount)$_{0 \rightarrow t-1}$	The natural logarithm of the total amount of money in EUR invested by the crowd until the previous day in campaign i.
# Investments$_{0 \rightarrow t-1}$	The total number of investments made by the crowd until the previous day in a particular campaign.
#Posts	The number of social media posts by the startup on day t in campaign i.
Startup	The share of posts containing information about the startup in relation to the total number of posts in campaign i on day t. These post include information about the entrepreneurial team, the business model, product development, new collaborations, new funding or about the business development.
External Certification	The share of posts including external certification in relation to the total number of posts in campaign i on day t. External certification includes, for example, expert opinions, success stories, news about awards received, patent applications, patent approvals as well as press and media coverage about the start-up.
Campaign Development	The share of posts including information about the crowdfunding campaign and its development in relation to the total number of posts in campaign i on day t.
Product Advertising	The share of posts including product advertising and promotions in relation to the total number of posts in campaign i on day t.
Investment Advertising	The share of posts including investment advertising in relation to the total number of posts in campaign i on day t.
Follower Communication	The share of posts containing other social media content such as invitations for personal meetings, sharing information on related topics or updated profile pictures in relation to the total number of posts in campaign i on day t.
Time Limit	The share of investment advertising posts that include time limit cues in relation to the total number of investment advertising posts in campaign i on day t. Time limit cues contain information that the purchase of shares is limited in time.
Selling History	The share of investment advertising posts that include selling history cues in relation to the total number of investment advertising posts in campaign i on day t. Selling history cues contain information about previous demand (e.g., shares sold) in the crowdfunding campaign

Table A.2: Definition and Examples of Social Media Post Coding

Coding of posts	Examples
Startup: The posts contain information about the startup. These include information about the entrepreneurial team, the business model, product development, new collaborations, new funding or about the business development.	a) "New sales expert on board: @fraisr strengthens its sales team with Ex-Daily Deal Key Account Manager!" b) "Business angels invest six-figure sum in *Meine-Spielzeugkiste*! - Check it out!" c) "It is a great pleasure for us to introduce to you today a new, important cooperation partner of ours: Lobetaler Bio. With their fantastic quality and strong social commitment, they have more than convinced us."
External Certification: The posts include external certification such as expert opinions, success stories, news about awards received, patent applications, patent approvals as well as press and media coverage about the start-up.	a) "BetterTaxi was voted App of the Week at telefon.de!" b) "VentureCapital magazine has now also reported on Companisto in its print edition. I wonder if this has something to do with the fact that the online article about Companisto was the most clicked news item in June..." c) "We are now in the Wall Street Journal Germany! What do you think?"
Campaign Development: The posts include information about campaign updates or announcements that the funding limit has been changed.	a) "Yeah! Thanks to you we have reached the minimum threshold!" b) "Fundinglimit at Seedmatch increased to € 300.000 – join us and invest in the future of nuts" c) "The funding threshold for the @OvulaRing has just been reached: http://t.co/F0WPJdXqdr Congratulations to the team!"
Product Advertising: The posts contain product advertising and promotions.	a) "Book a tour with us until 31.03. and save up to 50 %! More info on this at..." b) "Now you can order your best movinary videos as DVD." c) "Are you looking for sportswear that combines the special with the functional? Then take a look at the offers from..."
Investment Advertising: The posts include investment advertising without providing specific information on the status of the corporate funding campaign.	a) "Now is the time! Our crowdfunding is still open for your investment!" b) "Time to join the other investors! Read more on..." c) "Do you want to participate in the success of interactive audio dramas? Then invest in Audiogent now!"
Follower Communication: The share of posts containing other social media content such as invitations for personal meetings, sharing information on related topics or updated profile pictures in relation to the total number of posts in campaign i on day t.	a) "In this sense we wish you a good start into the week and a nice evening! ;)" b) "The German women's handball team secured an important victory for the 2014 European Championship qualification! Despite..." c) "Lottohelden.de wishes you a Merry #Christmas!"
Time Limit: Investment advertising post contains information that the purchase of shares is limited in time.	a) Today last chance - Secure your shares now! Here you can find the auction: http://t.co/2csGeOVW. Have a nice sunday :) b) The countdown is on - seven days left! Until then, you can still invest in our campaign on Companisto. Never before have so many people participated in a cultural medium via crowdinvesting! c) Only 4 days left...! Take your chance and participate in the success of #OvulaRing via #Crowdfunding.
Selling History: Investment advertising post includes information about previous demand (e.g., shares sold) in the crowdfunding campaign.	a) Crowdfunding already reached € 150,000 ! Thank you for your investment in KERNenergie ! b) Our #crowdinvesting on @Companisto: 326 people invest € 45,200 and 38 days remain. Secure shares now. c) 422 #microinvestors convinced by @swabr. Now take the last opportunity for #crowdinvesting on @Companisto.