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Assessing the Sustainability of Crowdfunding in Social Media and Google Trends

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Abstract. This paper aims to assess the degree to which sustainability, namely, economic, social, environmental and institutional dimensions are integrated within the public discourse on crowdfunding in social media and in Google Trends. The utilizing Social Media Analytics and Google Trends search queries, respectively, we track discussions on crowdfunding in user-generated content published in social media and analyse the Google Trends queries. Quantitative methodology, namely, multivariate analysis and econometric models was used, in order nowcast the insights about the importance of the sustainability dimensions in the crowdfunding. The results show an interesting trend of increasing popularity search terms in sustainability dimensions as a *proxi* of marketing strategies to involve the participants in the crowdfunding projects.

Keywords: business models, crowdfunding, Google Trends; social media, Social Media Analytics, sustainability

1 Introduction

In the last decade, the way of financing innovative and entrepreneurial projects has radically changed from the traditional forms of financing such as bank loans, funds, business angels among others, by the emergence and development of crowdfunding platforms, namely, online platforms through which individuals and companies aim at funding their projects by means of open calls, in exchange for rewards, equity, other monetary benefits, or simply an acknowledgment (Belleflamme et al., 2014; Mollick, 2014; Larell et al., 2018). Also, during the last decade there is an increasing interest of the literature about crowdfunding. Results from SCOPUS Database (2018) show an increasing rate of 4500% from publications about crowdfunding on economics/management and social sciences areas.

Besides this development, while crowdfunding platforms have a well-managed, well-managed structure based on profit maximization, the majority of crowdfunding developers and the sponsors don't have any management and marketing experience and acting on their own behalf same campaigns through social media, usually in closed groups (Petruzzelli et al., 2018).

Although, there are an extensive and increasing list of referred publications about crowdfunding in economics, business and social sciences there are few references to the sustainability of the crowdfunding on the media platforms and social media with exception of Laurell et al., (2018); Petruzzelli et al., (2018) and the few references from Calic and Mosakowski (2016); Hörisch (2018); Vasileiadou et al., (2016). More specifically Laurell et al., (2018), had systematically analyzed data from social media concerning the interplay between sustainability and crowdfunding. But no one of the papers was analysed the sustainability by the Google Trends or analyse the institutional component of sustainability of the crowdfunding. This study tries to overcome this gap on the literature.

More specifically, this paper aims to:

- a) To analyze the path of development of the crowdfunding at world level and infer if that development is related with sustainability;
- b) To analyze the current development of the sustainability of the crowdfunding at world level and infer if these presents trend of growth in economics; social; environmental and institutional;

This paper making a threefold contribution in the literature:

- 1) Besides the many development of crowdfunding the reference of sustainability of crowdfunding just remain rare. This paper tries to contribute to the literature in that way;
- 2) This paper uses Google Trends for the first time as data search and also the analysis of Social Media about crowdfunding;
- 3) The paper for the first time analyses the institutional component of the sustainability. The traditional analysis of sustainability usually uses just the three components, namely, economics, social and environmental. But the institutional framework of crowdfunding gives new insights to the research, to the stakeholders and to public decision-makers about the way forward in the promotion and development of the sustainable crowdfunding.

2 Literature review

Crowdfunding is nowadays a new practice for financing projects that has gained popularity in the last decade (Borst et al., 2018). It is defined as “an open call”, on the professional platforms mainly by the Internet, for the provision of financial resources either in form of donation or in exchange for some form of reward and/or voting rights in order to support initiatives for specific purposes (Schwienbacher and Laralde, 2012; Borst et al., 2018). An emerging stream of research confirms that crowdfunding can be a new source of value creation (Aitamurto, 2011; Burtch et al., 2014; Davidson and Poor, 2014; Hills, 2015; Lehner, 2013).

On the other hand, in the Internet era it is undeniable that Internet-based platforms create a crucial role in the rise of the crowdfunding phenomenon as fundraising activities are no longer confined to the geographical area where the creator of the project operates, but it becomes available worldwide for any able to access a crowdfunding platform (Agrawal et al., 2015; Mollick, 2014 and Petruzzelli et al., 2018). In this respect, crowdfunding supports democratization entrepreneurship and access to business finance (Aldrich, 2014, Petruzzelli et al., 2018).

The importance of the sustainable dimensions of the crowdfunding was also referred by many authors have highlighted the potential of crowdfunding, suggesting that it can allow economic growth that encompasses both social and environmental needs (Bartenberger and Leitner, 2013; Petruzzelli et al., 2018). Crowdfunding can potentially have direct consequences sustainability due to the innovative application of networking (Goodman and Polycarpou, 2013). In addition, crowdfunding is particularly interesting for environmental initiatives, as it offers to combine the pursuit of profit with the ability to lead the environment (Bonzanini et al., 2015). Small and young companies were considered much better in incorporating sustainability as part of its business model (Schaltegger and Wagner, 2011).

3 Material and methods

3.1 Data

Data was collected from two different forms: 1) The first was based on the social media Facebook. In that case the collection data on a dairy baseline from 1 October 2018 to final of January 2019. In the present at the beginning we search groups at Facebook related with the word “Crowdfunding”. We find a vast and diverse number of groups that fulfil this word. The majority of the groups were closed. We ask for permission from about 150 closed groups that have the “crowdfunding” as a title. After in average 15 days our request was allowed and we are invited to see the information among the “closed members of the group”. The main goal is collecting terms referred to sustainability in social; economics; environmental and institutional.

The second way of collecting data was done by the Google Trends search and the data search includes: 1) Google Trends (GT) data was collected online (Google Trends, 2018) from the 2004 to the final year of 2018 at a monthly baseline. The choice of keywords and terms to search in GT is, crucial for any study (Fondeur & Karamé, 2013; Dos-Santos, 2018). This search was used to analyze the online interest on the

terms crowdfunding and crowdfunding related words of sustainability, namely, “Crowdfunding” (C), “crowdfunding economics” (CE), “equity crowdfunding” (EC) “social crowdfunding” (SC), and, “environmental crowdfunding” (ENC). We don’t use the term institutional, because this analysis was done mainly by the crowdfunding platforms analysis. The search was done at world level, and multiples choices of combination of world search related with sustainability of crowdfunding were eliminated due the absence of data at world level. However, around the world there are few data isolated by country, in some years/months, but not in a permanent way to form a trend of analysis. The search includes at first “all the categories at the Google Trends (web pages; news; shopping and YouTube) and after includes just “google chopping” in order to infer about commercial importance of crowdfunding.

3.2 The sample

The sample size of the “Facebook closed groups on Crowdfunding” was determined by the ungrouped-on stage random likelihood sampling method according to Kilic et al., (2009) and Dos-Santos 2017):

$$n=(t^2*p*q)/E^2 \quad (1)$$

where:

n - the sample size

t - the significance level (assumed to be 90%)

p - the probability of the topic being searched (for the present study the probability assumed is 50%)

q - the probability of the participants on crowdfunding campaign ($1 - p$)

E - the accepted statistic error (assumed to be 10%).

3.3 Methods

To analyse the integration of the dimensions of the sustainability of the crowdfunding in the public discourse on crowdfunding in Social Media, Social Media Analytics (SMA) was employed according to Laurell et al., (2018).

To explore the sustainable orientation dimensions within the crowdfunding Google Trends search we use the percentilized hits associated.

Let C_{ti} ; CE_{ti} ; EC_{ti} ; SC_{ti} ; and ENC_{ti} be the weekly hits of the downloaded Google Trends data for the terms “Crowdfunding” (C), “crowdfunding economics” (CE), “equity crowdfunding” (EC) “social crowdfunding” (SC), and, “environmental crowdfunding” (ENC). Searches of the i -th region and time, with representative data along time and countries, where:

C_{tpi} ; CE_{tpi} ; EC_{tpi} ; SC_{tpi} ; and ENC_{tpi} define, respectively, the percentilized weekly hits of their respective normalized Google searches, using Equations (2) to (6) according Dos-Santos (2018).

$$C_{tpi} = \frac{C_{ti}}{C_{ti}+CE_{ti}+EC_{ti}+SC_{ti}+ENC_{ti}} \quad (2)$$

$$CE_{tpi} = \frac{CE_{ti}}{C_{ti}+CE_{ti}+EC_{ti}+SC_{ti}+ENC_{ti}} \quad (3)$$

$$EC_{tpi} = \frac{EC_{ti}}{C_{ti}+CE_{ti}+EC_{ti}+SC_{ti}+ENC_{ti}} \quad (4)$$

$$SC_{tpi} = \frac{SC_{ti}}{C_{ti}+CE_{ti}+EC_{ti}+SC_{ti}+ENC_{ti}} \quad (5)$$

$$ENC_{tpi} = \frac{ENC_{ti}}{C_{ti}+CE_{ti}+EC_{ti}+SC_{ti}+ENC_{ti}} \quad (6)$$

Due the limited information about the components of sustainability the multivariate methods wasn't used. In order to analyze the general trend of sustainability of crowdfunding was used the general simple autoregressive models augmented by the Google Trends (Choi and Varian; 2012; Dos-Santos, 2018):

$$Y_t = \alpha_0 + \alpha_{12} y_{(t-12)} + \beta X_t + \gamma \text{TREND} \quad (7)$$

where y_t is the value of the series under investigation in month t ; y_{t-1} is the value of that series in the previous month; y_{t-12} is the value of the series 12 months earlier; and x_t is the value of the Google Trends query index for the term associated with the series that included a normal time trend (TREND) and the value of the relevant search term (labelled x in general) (Hand, and Judge, 2012; Dos-Santos, 2018):

4 Results and discussion

4.2 Results from Social media analysis

The results from social media analysis are composed by the analysis of the social media "private groups" at Facebook and content analysis.

Table 1. Identified hashtags in Facebook and associated frequency per sustainability dimension.

Sustainability dimension	Hashtags	Frequency
Economics	#equity	28
	#money	35
	# withdrawal	26
	Bitcoin	10
Social	#helpme	56
	#health	58
	#cancer	54
	#educacion	24
Environmental	#green	12
	#organicfood	15

	#clean	12
	#greenlightyourself	
Institutional	#financialfreedom	14
	#millions	45
	#platform	21

4.2 Results from Google Trends search

Results of the crowdfunding Google trends percentilized terms prove that just the term “crowdfunding” revels importance just from 2014, while the others percentilized terms, namely, CE, EC, SC, and ENC don’t have relevant results. Before that from 2004 to 2014 all the searched terms don’t have statistical importance. Besides that, the results also confirm that “crowdfunding” Google trends search presents an increasing trend.

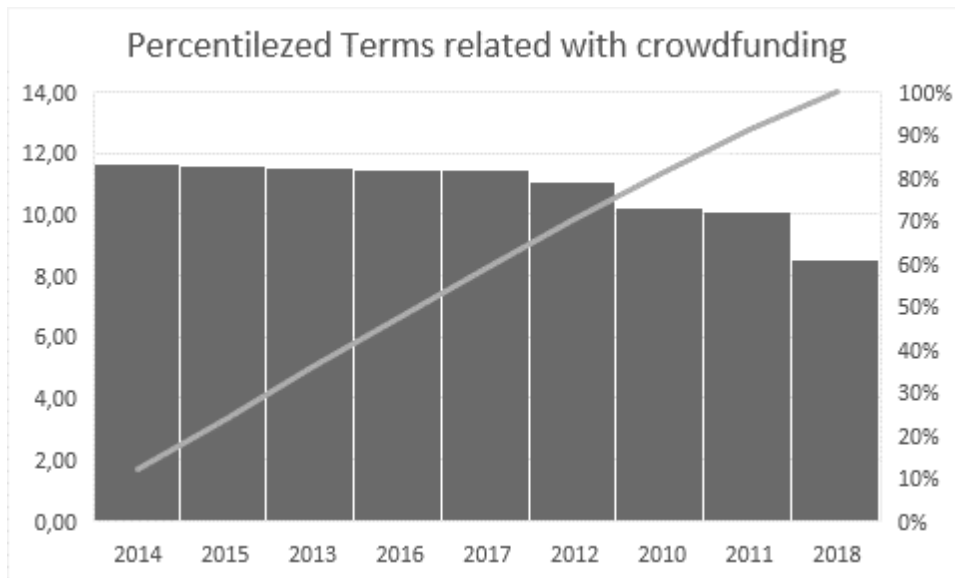


Fig. 1. Percentilized terms “crowdfunding”; Crowdfunding Equity; “Economics crowdfunding”; Social crowdfunding” “environmental crowdfunding”. Source: Results of the authors, 2018.

The absences of search queries about the terms related with economic; social and environmental crowdfunding don’t allow develop the econometric model general simple autoregressive. The results just show an increasing linear trend:

$$Y_y = \alpha + \beta X_t + \varepsilon_{it} \dots \dots \dots (8)$$

$$Y_t = 0.0712 + 0.085X_t + \varepsilon_{it} \dots \dots \dots (9)$$

With:

R^2	0.75
Adjusted	0.0007(**)
Prob> t	

(**) at 0,001

Besides the good adjustment from the model to the data that confirms an increasing trend of grows just for crowdfunding search and importance. That results were also confirmed by the SCOPUS database (2018).

Conclusion

Besides the increasing importance at research level; at business and at social media the development of sustainable crowdfunding and the direct reference of economics; social and environmental parts of sustainability are still rare in crowdfunding. However, results from Social Media also show an interesting trend of increasing popularity in the crowdfunding search terms in sustainability dimensions as a *proxi* of marketing strategies to involve the participants in the crowdfunding projects. The institutional component is present mainly at the platforms and the economics terms are present more in informal groups of Social Media.

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