

Exploring online crowdfunding innovation, networks and locations: Small businesses in Indiegogo.com

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Objectives: This exploratory study aims to investigate the nature of innovation, funding networks, and location of online crowdfunding projects for small businesses. What is more important is reflecting on the relationships between different network elements for identifying business opportunities and changes in the fundraising environment.

Prior Work: Online crowdfunding has emerged as an opportunity to raise entrepreneurship finances for projects, start-ups and small businesses (Schwienbacher, Larralde 2010). Previous studies from economics (Agrawal, Catalini et al. 2013), marketing (Ordanini, Miceli et al. 2011) or information systems (Estellés-Arolas, González-Ladrón-de-Guevara 2012) offer interesting insights. This study focuses on virtual entrepreneurship networks for small businesses, challenging the long-standing view that small firms are constrained by the amount of internal finance (Carpenter, Petersen 2002).

Approach: This is a qualitative study of 2239 small business projects using Indiegogo.com for online crowdfunding, collected in March 2014. The research is based on a grounded (Strauss, Corbin 1994) interpretivist (Schwandt 1994) approach, considering its exploratory nature. Mixed-method such as textual meta-analysis and descriptive statistics are used to explore three selected units of analysis: innovation, network and location.

Results: First, although many businesses claim to create something new, innovation is often related to the network of funders. Secondly, the study shows some relationship between the size of the funding networks and whether projects can receive full funding. Finally,

regardless of a wide geographical spread of projects, most of them are based in the USA and rely on US Dollars.

Implications: The new online crowdfunding system flips the traditional model of angel investors, venture capital funds or banks having large amounts of money available for lending to smaller businesses, thus changing the fundraising environment. The study discusses innovation perceived in social more than technical terms among funders, identifies a range of optimal project size related to successful funding, and pinpoints geographic clustering around traditional hubs in relative proximity to funders, fundraisers and the origin of the online platform itself.

Value: Only a few studies have managed to explore the nature of online crowdfunding project for small businesses by combining qualitative and quantitative data to explore the nature of their innovations, networks and locations. Taking a grounded approach this study concludes by suggesting Actor Network Theory as a suitable alternative for interpreting online crowdfunding networks. The analysis of innovation, networks and locations can be interesting for researchers as well as practitioners alike.

Keywords: crowdfunding, open innovation, collaborative networks, entrepreneurship financing.

I. INTRODUCTION

.On March 3, 2014, Kickstarter passed \$1 BILLION pledged by 5,708,578 people in 224 countries and territories (Kickstarter 2014). With many other platforms in the market, online crowdfunding seems to be on the rise.

Two models can be identified: The first is the donation-based where the funders collaborative on a project in return for products or perks. The second that followed later due to initial lack of regulation and risk (Cohn 2012) is investment crowdfunding. Just to name a few, Kickstarter, Indiegogo, Rockethub, or Crowdwise fall within the first, while Somolend in US (Barnet 2013) or Crowdcube in UK fall within the second.

The different online crowd funding platforms initially defined the nature of the communities around them by specifying their purpose. However, the project-specific

communities could potentially transform not only the enterprises they engaged with, but also the platforms themselves in being responsive to the aggregate demands of the crowds. Indiegogo.com, for example, has adopted its categories' list by having one named 'entrepreneurial' and a sub-category named 'Small Business' within it, besides the initial ones for supporting art projects.

The research on innovation related to online crowdfunding environments is new and scarce, but there is some valuable work done in the past that can inform this research. Schumpeter (1934, 1942) summarised his ideas about creative destruction forces into five types of innovation: 1) the introduction of a new good or service; 2) the introduction of a new method of production; 3) the operation in a new market; 4) the use of new sources of supply; 5) the creation of a new type of organisation.

Since then there has been substantial research on innovation based on this approach (Marvel, Lumpkin 2007, Harris, Trainor 1995, Winter 1984, Drejer 2004). While most of these studies focus on industries and clusters characterised by intensive research and development, Schumpeter's (1934) view of five sources of innovation remains a valid starting point also for this study. However, this research will try to examine the nature of online crowdfunding innovations for small businesses by taking a grounded theory approach.

The reason for selecting small businesses in an online crowdfunding platform generally known for donation-based financing is because here the differences between donators and investors become blurred. This should give us a better understanding of recent trends and future directions for research on social entrepreneurship through online crowdfunding and open innovation. Therefore, the goal of this study is: ***To explore the role of innovation, funding network and location in online crowdfunding small businesses.***

This goal will be addressed by first investigating the short description of 2239 small businesses raising finances in Indiegogo.com. This will be followed by an analysis of the relationships between the size of funding, the number of funders, and the geographic distribution of these projects. The literature review in the next section will provide a discussion on how this study builds on previous research, and positioning it among different perspectives.

II. LITERATURE REVIEW

Online crowdfunding or crowd-sourcing means relying on the Internet to directly seek financial support from the general public (Schwienbacher, Larralde 2010, Kleemann, Voß et al. 2008, Lambert, Schwienbacher 2010, Mollick 2013, Geiger, Seedorf et al. 2011, Voelker, McGlashan 2013). This offers an alternative to traditional funding opportunities for innovative entrepreneurs that find it difficult to raise finances via the traditional methods (Ordanini, Miceli et al. 2011), engaging supporters and potential customers in the business development process.

Online crowdfunding means looking for opportunities beyond angel investors, venture capitalists or bank loans (Schwienbacher, Larralde 2010). Since the size of collateral is often proportional to the size of the business, small firms are less likely to be given a loan; therefore more likely to fail due to credit constraints (Cressy 2012: 262, Yallapragada, Bhuiyan 2011). Mollick (2013) gives very comprehensive recent study of 48,500 crowdfunding projects in Kickstarter, analysing their success and failure based on location, size of network, number of friends, amount of funding etc. While Mollick's research is positivist and quantitative, this tries explore some of the underlying dynamics of online crowdfunding networks via a qualitative interpretivist approach.

One of the reasons why start-ups and small businesses would want to use crowdfunding is the information asymmetry with traditional investors (Cosh, Cumming et al. 2009). It is beyond the scope of this research to study how fundraising small businesses interact with the funders to update them. However, it can be observed in Indiegogo.com and other online crowdfunding platforms that they are designed to encourage such interactions via online social networks such as Facebook, Twitter, Google+, or others.

From a marketing perspective, the motivation behind online crowdfunding, however, is not only to raise finances, but also to interact with the funders and redefine customers as collaborators (Ordanini, Miceli et al. 2011). Research shows that fundraisers refine their ideas through feedback from the funders, but also share and interact in a community with similar interests, naming this process motivational crowd-work (Gerber, Hui et al. 2012). A qualitative study of 47 entrepreneurs identify that the communities around enterprises provide mentorship to novices and give feedback on campaign presentation (Hui, Greenberg

et al. 2014). This explains to a certain degree the highly innovative and often inspiring nature of the projects inclined towards social enterprises than pure profit-oriented businesses.

From an economics perspective, research on the geographic dispersion of investment in online crowd funding shows a slightly different picture since funding decisions are often based on personal relationships and existing networks in response risk, uncertainty, and information asymmetry (Agrawal, Catalini et al. 2013). The distance friction are diminished, but not because the entrepreneurs are not early stage, to the contrary (Agrawal, Catalini et al. 2011). Instead, Agrawal et al. (2011) argue based on their research that this happens thanks to the platform that provides an environment purposely designed for early stage entrepreneurs where they can showcase prototypes, present a business plan and interact directly with the crowd. In this research both the geographic clustering argument and the dispersion argument are discussed by looking at some graphical data.

As research on online crowdfunding grows, there is increasing interest to categorise the different concepts and perspectives in this field. As a result there are some rigorous works on online crowdfunding definitions (Estellés-Arolas, González-Ladrón-de-Guevara 2012) and processes (Geiger, Seedorf et al. 2011). Interestingly these works come from researchers with a background on information systems, interested also on the socio-technical interactions with the online platforms.

This study takes an entrepreneurship perspective, challenging the long-standing view that small firms are constrained by the amount of internal finance (Carpenter, Petersen 2002, Butters, Lintner 1945). Online crowdfunding provides an innovative opportunity for small firms to reach external finances beyond the 10% mentioned in earlier studies (Brealey, Myers 2000, Table 14.1), and sometimes even more than what they ask for, as this study revealed.

Entrepreneurship theory and research shows that small businesses usually receive support from their local networks (Mason 2007, Zook 2002, Sorenson, Stuart 2005, Wong 2002, Sohl 1999), so geographic distance does matter. This is especially true in high-tech, or research and development areas (Powell, Koput et al. 2002, Florida, Kenney 1988) where clustering of businesses, sources and funding and other resources can be noticed. Entrepreneurship research continues to increase and scholars are increasingly interested in studying new ventures and international entrepreneurship (Ireland, Reutzler et al. 2005). This study

contributes in this direction to the field of study, by focusing on the innovation and network dynamics of online crowdfunding. Due to the multitude of actors and interactions, online crowdfunding remains a complex area of research and only a few studies have managed to look deeper into the projects and their contextual crowdfunding networks for innovation. This study intends to give some contribution in this direction, but before it is necessary to identify the different lenses being used to research online crowdfunding, and the different methodological approaches they take.

III. METHODOLOGY

A. Mixed methods research approach

This is a qualitative study that takes a grounded (Strauss, Corbin 1994) interpretivist (Schwandt 1994) approach, considering its exploratory nature. This can accommodate the use of multiple-method applied on this study, being flexible on the paradigm dimensions (Ardichvili, Cardozo et al. 2003) to allow examining the dynamics of online crowdfunding from multiple perspectives.

Applying mixed methods in management and social research can be challenging in terms of time and energy, but they are valuable to explore problems from multiple perspectives (Creswell 2009, Bryman, Bell 2007, Bryman 2012) Combining qualitative and quantitative data can be useful for networks analysis (Coviello 2005) like in the case of online crowd-funded projects; therefore this study adopts this perspective. Supporting this claim, in a systematic review of 55 articles about international entrepreneurship Coviello and Jones (2004) highlight the need for dynamic research designs that integrate positivist with interpretivist methodologies.

Leitch et al. (Leitch, Hill et al. 2010) propose that quality in an interpretivist entrepreneurship research must be internalised within the underlying philosophy, suggesting a shift from validity as an outcome to validation as a process. Building on this argument the following section introduces a detailed research design that was prepared to guide this research.

B. Research design

On the 12th of March 2014, 2239 records were extracted from the category 'entrepreneurship' and sub-category 'Small Business' in Indiegogo.com, organised based on: 1) Project name, 2) Author, 3) Location, 4) Short description of the project, 5) Amount of funding received, 6) Percentage of completion at the time the data was extracted, 6) Number of funders, 7) Time left.

First the short descriptions were analysed to understand the nature of the projects. First a word frequency analyses was conducted with ATLAS.ti, the qualitative analysis software used in this research. The generated list was prepared for analysis by removing particles, pronouns, numbers and other stop-words, and leaving only nouns, verb forms and adjectives.

The top 20 terms from the filtered list were then used for auto-coding in in ATLAS.ti. In this research they were considered not only as simple terms but as concept-codes. They could be used for a meta-analysis of the short project descriptions based on their frequency (Cooper, Hedges et al. 2009, Kromidha, Cordoba-Pachon 2014) to investigate the nature of innovation. It is assumed here that such key terms bear important meanings for analysis, investigated in this study by looking at their co-occurrences.

In the first stage this list of top 20 terms two were selected as related to innovation, to analyse and discuss the context in which they develop: 'new' and 'create'. The analysis in the next section discusses the concept-code co-occurrences identified to be related to these three terms, and therefore innovation.

The second of this study focused on the relationships between the amount of funding, number of funders and completion rate. Descriptive statistics were applied on these sets of data and their results are discussed in the findings and analysis. In order to understand the nature of the projects the focus was on averages for different sub-sets, such as the fully-funded projects for example. For a better representation and analysis of data, the raised amounts for each project were grouped into frequency bands using geometric frequencies. First a sequence with a multiplying factor of 2 was used, then for a more detailed analysis a sequence with a factor of 1.3. This information is displayed in Figures 1 and 2, and interpreted critically.

The third and final stage of this study was about examining the geographic distribution of online crowd-funded projects. The geographic information taken from Indiegogo.com was filtered based on city, state (whenever this applied) and country. Then this information was mapped using Fusion Tables for creating a Google Map of all the projects and their geographic distribution. The findings and analysis focus on the world spread of the projects and on their centralisation by country. This is discussed based on a diagram map (Figure 3) and on a pie chart (Figure 4) presented for interpretation and analysis.

IV. FINDINGS AND ANALYSIS

A. *The nature of innovation*

The first part of this analysis focuses on the nature of innovation in online crowd-funded businesses. The following table presents how the three concept-codes identified to be related to innovation are related to any of the other top 20 concept coded. Each different format in the table highlights a specific concept or group of concepts discussed in the following paragraphs.

TABLE 1: TOP 20 CONCEPT-CODES IN ONLINE CROWD FUNDING PROJECTS FOR SMALL BUSINESSES (SOURCE: INDIEGOGO.COM - 12 MARCH 2014)

		Concept-codes related to innovation	
Nr.	Concept-code	new	create
1.	help	65	31
2.	need	40	6
3.	new	n/a	11
4.	business	20	7
5.	can	12	9
6.	get	10	4
7.	raise	13	8
8.	community	9	6

9.	make	8	2
10.	<i>open</i>	12	3
11.	start	13	3
12.	art	13	9
13.	build	19	1
14.	small	10	4
15.	support	11	0
16.	shop	16	5
17.	store	18	1
18.	create	11	n/a
19.	local	9	2
20.	funds	10	5
TOTAL		319	117

Considering the interpretivist approach of this qualitative research, the primary role of the researcher is to provide the reader with rich information and descriptions, allowing the latter to form his/her own interpretation and constructs. However, a brief critical reflection is intended to highlight some of the interesting insights that this table gives.

First, it is clear by looking at the last row of totals that ‘new’ is more co-cited than ‘create’. This leads us to think that small businesses asking for online crowdfunding focus more on some relative rather than radical and creative innovation. To continue with this argument, the top three concept-codes in this list are ‘help’, ‘need’ and ‘business’, highlighted in grey in the table. Their stronger co-occurrence relationship with ‘new’ can be interpreted as relative novelty for the supporters’ audiences. This argument is reinforced further by looking at the rows about ‘community’ and ‘support’, highlighted in bold lines. Again, ‘new’ related to innovation shows a concept-code relative to the context and audience of the project network of fundraisers and funders. This is very important to understand the nature of innovation in online crowdfunding small businesses as something often relative and often limited to the boundaries of the projects.

Analysing the degree and nature of novelty in these small businesses, two other terms were

also examined: ‘make’ and ‘build’, marked in greyed rows in the table. Their stronger co-occurrence with ‘new’ could show that the fundraisers claim to build and make something innovative. However, they are aware of the open nature of innovation in these projects and the direct involvement of the funders with money and comments. That is why ‘open’ in italics appears 10th on the list of top 20 concept-codes, being more strongly related to ‘new’ than ‘create’. This could possibly indicate the intention of the fundraisers to use the innovative nature of their projects for sharing and open marketing, but not necessarily willing to open up their production and creation processes.

The concept-code ‘art’ appearing 12th in the top list points towards the creative rather than business nature of the small businesses rising finances in Indiegogo.com. In the website they were under a specific category on the website named ‘entrepreneurial’ and sub category named ‘Small Business’. However, the institutionalised nature of the platform used mainly for donation based art projects has a strong impact also on these business projects, their fundraisers and funders. This points toward the possible interconnectivity and convergence of the individual project networks with each other and the platform, blurring the boundaries between the micro and macro communities of online crowdfunding. More on the role of projects networks on funding is discussed in the following section.

B. The nature of funding

An analysis of the amount of funding in USD received by the 2239 small businesses in Indiegogo.com reveals the following statistical parameters:

TABLE 2: STATISTICAL PARAMETERS FOR 2239 SMALL BUSINESS PROJECTS (SOURCE: INDIEGOGO.COM - 12 MARCH 2014)

Statistical parameter	Value
Mean	4,598.24
Standard Error	308.93
Median	1,770.00
Mode	500.00
Standard Deviation	14,618.04
Skewness	26.17

Sum	10,295,460.60
Largest	557,254.00
Smallest	451.79
Confidence Level (95.0%)	605.82

Commenting on some of these parameters, it is clearly visible that there is a large difference between the mean, median and mode. This can be partially due to a few very large projects, with the highest value raised in UK on a project about a breakthrough mosquito-fighting technology designed to block their ability to track humans. This project received 743% of the funds requested. Grouping the projects according to their raised amounts into frequency bands using geometric sequences, a multiplying factor of 2 generates an almost bell-shaped distribution as shown in the chart.

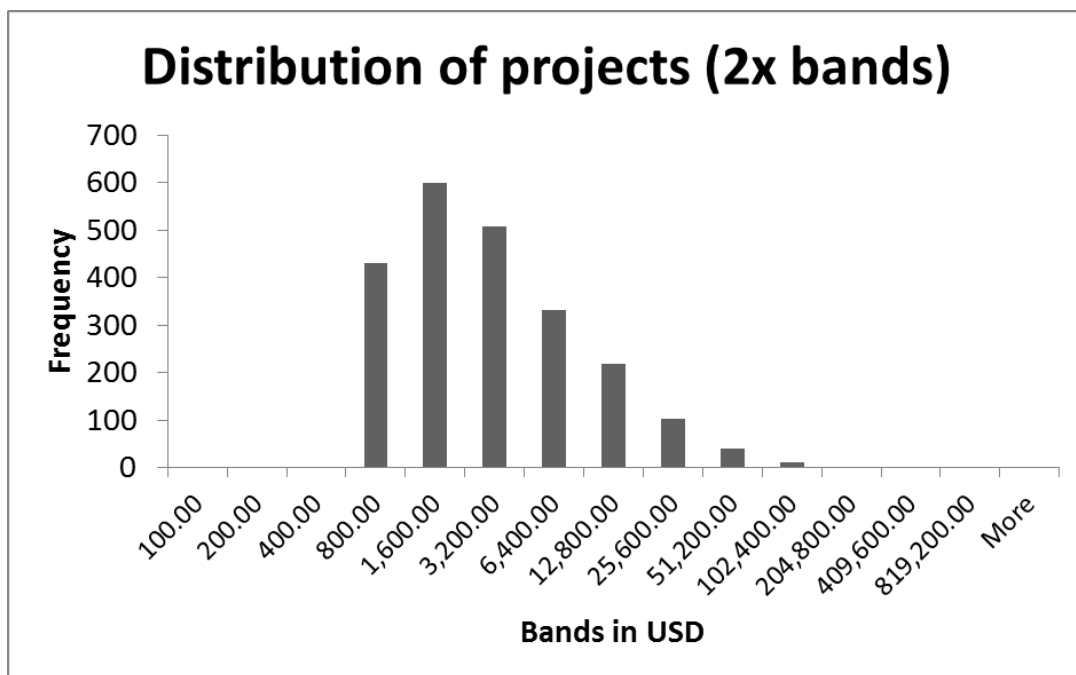


Figure 1: Distribution of business projects in geographic sequence bands of multiplying factor 2 (Source: Indiegogo.com - 12 March 2014)

However, when using a multiplying factor of 1.3 for a more detailed analysis, the results are different as shown in the other diagram.

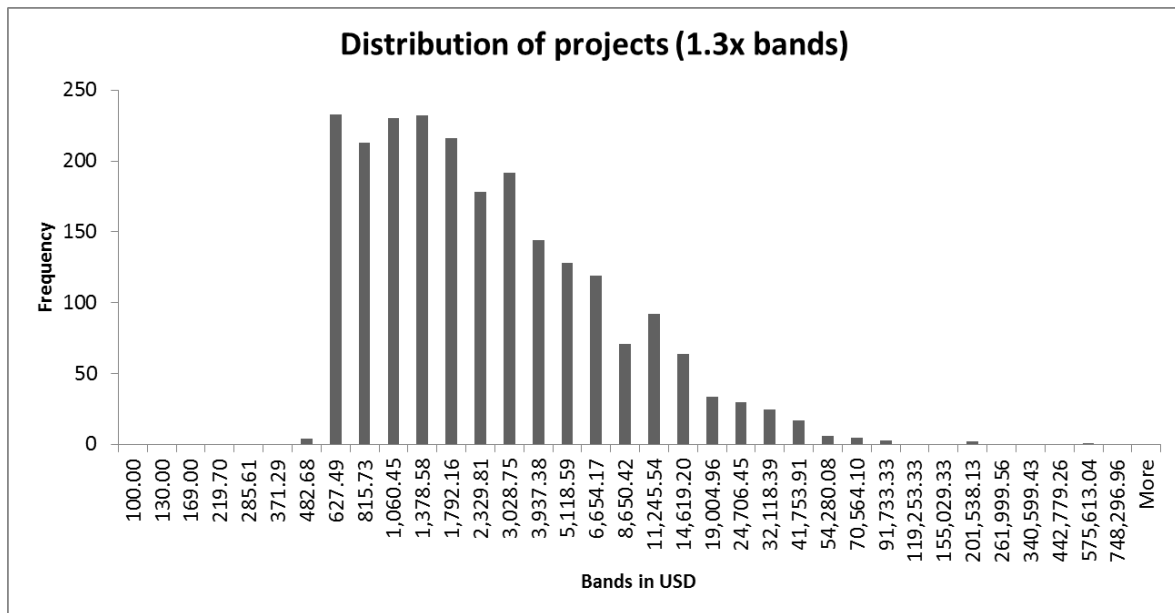


Figure 2: Distribution of business projects in geographic sequence bands of multiplying factor 1.3 (Source: Indiegogo.com - 12 March 2014)

Comparing these two charts it becomes clear that although the majority of projects fall within a central range of fundraised amounts, they are not uniformly distributed. Within the central range it is possible to identify a few relatively distinctive sub-groups of smaller or larger projects. This could point towards the importance of having a clear strategy on the size of the project and amount of money being requested. Although there are many exceptions like in the case of the top funded project mentioned earlier, positioning the project clearly in terms of size seems to matter.

C. The nature of networks

Let us look now at the success rate of securing all the required funding. A detailed analysis revealed that from the 2239 small business projects, only 488 were fully funded. This is 21.85% of the total. 11 out of the 488 projects were fully funded before their expiry date for fundraising. 139 of the total 2239 projects were still collecting money at the time of this study. So the ration of fully funded projects over the total number of finished projects is $488/2100=23.2\%$. Regardless of this slight increasing from the adjustment, the data shows that less than $\frac{1}{4}$ of the small business projects received full funding in Indiegogo.com.

The following table allows a comparison between fully funded and all projects, looking at the average figures of funds raised, completion rate, number of funders, and days left.

TABLE 3: SELECTED AVERAGES OF FULLY FUNDED AND TOTAL BUSINESS PROJECTS

(DATA EXTRACTED FROM INDIEGOGO.COM ON 12 MARCH 2014)

	Averages	
	Fully funded	All projects
Funds raised USD	9,948.16	4,598.24
Completion rate	1.29	0.45
Funders	127.41	56.48
Days left	0.59	1.52

The sub-group of projects that on average asked for 9,948.16 USD and had a network of about 127 funders, were more likely to be fully funded than the total number of projects asking for 4,598.24 USD and had a network of about 56 funders on average. This could be partially due to the fact that some not fully-funded projects were still in the period of raising money and increasing their networks. As mentioned earlier, only 11 out of 488 fully funded projects were able to be fully funded before their expiration date in the platform.

The ratio USD/Funder was 78.08 for fully-funded projects, and 81.41 USD/Funder for all projects, indicating that better funded projects could rely on larger networks of backers where each ones contributes with a smaller share.

D. The nature of geographic distribution

The geographic spread of the 2239 projects looks very global, with 78 different countries indicated as their originating place in the website. A world distribution of these projects is given in the map figure where each dot shows one country where there is at least one project.



Figure 3: World distribution of crowd-funded business projects by country (Source: Indiegogo.com - 12 March 2014)

However, looking at the number of business projects for each country, the picture is completely different, as the pie chart shows. Almost 80% of the projects are based in USA, with other English-speaking countries such as Canada and United Kingdom following.

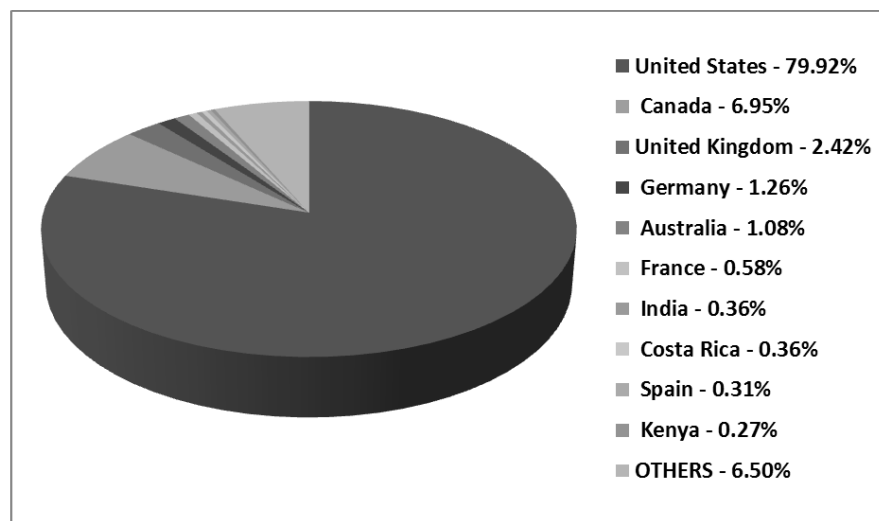


Figure 4: Geographic distribution by small business projects per country (Indiegogo.com: 12 March 2014)

Considering that Indiegogo.com as Kickstarter.com started in USA, this information reveals is that there is a relationship between the geographic proximity of the funders and

fundraisers, but also of their micro-networks with the broader network around the virtual crowdfunding platform.

Regarding the currencies used in this context, there were limited to only US Dollars being the dominant one, but also, Canadian Dollars, Australian Dollars, Euro and British Pounds. This reinforces the previous argument that regardless of the wide geographic distribution of small business projects, they rely strongly on developed countries and major currencies.

V. FINAL REFLECTIONS AND CONCLUSIONS

Taking a grounded methodological approach, the findings revealed that innovation in online crowdfunding projects is open to the influences of the networks and relies strongly on their support. Because Indiegogo.com studied in this research is better known for donation-based projects in areas related to arts, the small business that applied for funding here could have been influenced by its nature. This shows not only the influence of the crowd on the nature of online crowd-funded projects, but also the dynamic role of the platform itself.

This study revealed that the size of the network and the amount of money received were directly related. The average amount of money raised for the 2239 small businesses analysed in this research was 4,598.24 USD. This is small considering the amount of money businesses could receive from angel investors, banks or venture capitalist. What this shows is that online crowdfunding seems to be complementing rather competing with these traditional means of raising finances, but this could change in the future.

Finally, analysing the geographic distribution of projects, the study shows clearly that most small businesses remain concentrated around developed hubs of innovation such as USA, Canada, United Kingdom or Germany. This could be related to many factors, including the fact that Indiegogo.com where the money was raised is based in USA. Furthermore the currencies of these countries are widely used globally, indicating thus two types of concentration: one about innovation and the other about finances.

Reflecting on the findings this study highlights the co-creative nature of funders attracted by open innovation, the interactive and collaborative approach of fundraisers, and the community-building power of online crowdfunding platform within and beyond geographic

borders. Trying to generalise from the narrow context of this study, rather than trying to develop a theoretical model from the grounded approach and data, Actor Network Theory (ANT) seems like a suitable alternative. The theory tries explain: 1) How human and non-human actors including objects, artefacts and technical practices are stabilized and 2) how they take the shape they do (Law 1987). Following this argument and drawing a parallel with online crowdfunding projects, Law and Callon (1992) propose that the success or failure trajectory of an international project is a function of (ibid.: 46) the following:

First, “the capacity of the project to build and maintain a global network that will for a time provide resources of various kinds in the expectation of an ultimate return” – In the context of online crowdfunding the global network is the market in which the small business raising finances is operating. This can be the same, overlapping or different from the funders.

Second, “The ability of the project to build a local network using the resources provided by the global network to ultimately offer a material, economic, cultural, or symbolic return to actors lodged in the global network.” – In the case of online crowdfunding the local network consists of the project team and the funders who can contribute not only financially but also with ideas to co-create project deliverables.

Thirds, “The capacity of the project to impose itself as an obligatory point of passage between the two networks.” – In the case of online crowdfunding the projects are the meeting point between the project team, project market and project funders, often resulting in overlapping between these groups.

Following these three points, global and local networks of online crowdfunded projects have a merging point in the ‘crowd’, therefore their success should be based on how they interact with it in the local and global environments. According to the idea of punctualisation suggested by ANT (Law 1992), online crowdfunding projects have a dual nature, appearing like networks of actors such as funders, fundraisers and artefacts in the local network, but also as individual actors if we look at the global networks.

What shouldn't be ignores is also the online platform where the project fundraises, such as Indiegogo in this case, that provides the virtual environment. The capability of a project to impose itself as an obligatory passage point between the global and local networks can be superimposed by the virtual reality of human and non-human interaction in the online

crowdfunding platform.

VI. SOME LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

This is only an exploratory study, touching only the surface of online crowdfunding innovation and networking opportunities for small businesses. As such, its level of detail is limited to an exploratory overview of some interesting insights on the nature of innovation, funding, networks, and geographic distribution. Nevertheless, the key points of ANT proposed here can be used as a starting point for future research.

A better analysis of open innovation and the role of the funding crowds could have been informed also by a more detailed qualitative analysis of their interactions with the funders. Many online crowd-funded projects use internet social media to disseminate their ideas and relate with their networks. How such interactions are influencing updates on the crowd-funded projects could be an interesting avenue for future research on the nature of innovation and opportunities for small businesses seeking alternative ways to raise finances.

Finally, a deeper analysis of why small businesses from 78 countries were limited to only four currencies could be investigated further. This should lead to some interesting future research on different poles of concentration in online crowdfunding entrepreneurship based on the location of platforms, innovation, sources of finances or other factors.

In summary, online crowdfunding means looking at opportunities beyond traditionally institutionalised practices of doing business and networking. Earlier studies focused on the impact this has on economies, the nature of the online platforms, or the potential for marketing. This study took an entrepreneurship perspective by investigating the nature of innovation and opportunities for small business using online crowdfunding. This exploratory research reveals how current trends of crowd networking and collaborative innovation in entrepreneurship finance are challenging what the internal finance theory of growth suggested in the past decades about small firms having limited access to external funding.

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