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**Crowdfunding: a bibliometric analysis**

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## **Abstract**

Research into crowdfunding has increased significantly in recent years, in tandem with the growing popularity and versatility of application of the phenomenon itself. This thesis provides a bibliometric analysis of the crowdfunding literature, and specifically of articles published in English language journals and publications. Two analyses were conducted, the first a quantitative survey identifying the most prolific authors, publications and countries in this field. This is followed by a co-citation analysis highlighting the degree of inter-relatedness among academics and publications. A closer look at the main topics of interest to researchers in the current literature reveals a wide variety of research areas in both the for-profit and the nonprofit sector, reflecting the broad range of initiatives and projects that use crowdfunding to raise capital. Dominant in the for-profit sector are considerations relating to the key variables in the money-raising process, while the behavioural aspects of crowdfunding tend to be the focus of investigation and modelling in the nonprofit area. The final chapter adopts the 'founder-disseminator' paradigm to identify the authors and titles that may be regarded respectively as the 'founders' or forerunners, and as the main 'disseminators' or propagators, of research into crowdfunding.



## INTRODUCTION

*"Crowdfunding has the potential to revolutionize the financing of small business, transforming millions of users of social media such as Facebook into overnight venture capitalists, and giving life to valuable business ideas that might otherwise go unfunded."*

*The Wall Street Journal*

The conception of the economy as we know it, with its specific roles, where suppliers are just suppliers, customers are just customers and everyone has a specific task or particular part to play, simply doesn't exist any more. In the new conception of the economy, all the roles are mixed and everyone can contribute in a unique way to the economic process.

Today's connectedness of people has put entrepreneurs and consumers on a level where they seek cooperation more than ever before. They co-create both products and businesses and are dependent on each other for innovation, product development and so forth. Through globalisation, individuals take on challenges which have a global reach and local players can participate in solving issues around the globe. In order to achieve their desired outcomes, entrepreneurs form new ventures that need to be financed (Rifkin et al. 2010).

One of the main obstacles confronting the startup-environment is how to raise the necessary capital (Cosh et al. 2009). In their quest to change the world, many entrepreneurs who try to start a business end up with no external support. Banks typically require collateral from the firms it issues loans to, which means loan financing is unavailable to many startups since they rarely fulfil this requirement. In addition, the problem of asymmetric information for investors is magnified due to the lack of available historical data. Venture capital investments are available to some, although such institutions prefer to invest relatively large amounts and usually only do so if the potential upside is substantial. Moreover, more recently venture capitalist firms appear to be adjusting their investment strategies in favour of later-stage companies, as a consequence of the reduced degree of uncertainty and a more dependable assessment process.

As mentioned above, crowdfunding is a relatively new phenomenon which in recent years has attracted growing interest among the general public and also from business professionals and practitioners.

The phenomenon of crowdfunding is older than the term "crowdfunding". According to wordspy.com, the earliest recorded use of the word was in August 2006.

A rapid search on Google Trends shows that at the beginning of 2004 crowdfunding was almost non-existent, but since 2010 it has generated more and more interest in society at large. The following chart illustrates this uptrend. (Fig. 1)

Figure 1: *Crowdfunding trends*



Source: [google.com/trends](https://www.google.com/trends)



## **1. WHAT IS CROWDFUNDING?**

### **1.1 Crowdfunding in a nutshell**

Crowdfunding is a potentially ground-breaking way to finance new ventures. Put briefly, it is a combination of micro-finance and social networking.

Crowdfunding is a technique designed to raise external finance from a large audience, rather than from a small group of specialist investors (e.g. banks, business angels, venture capitalists); in this model, each individual provides a small amount of the total funding requested.

The concept of crowdfunding is related to that of “crowdsourcing”, which refers to the outsourcing to the “crowd” of specific tasks, such as the development, evaluation or sale of a product, by way of an open call over the Internet (Howe, 2008). Through online platforms, the tasks traditionally undertaken by contractors or employees can be performed by individuals for free or in exchange for some specified return, the value of which is however generally lower than that of the contribution made to the firm. Crowdsourcers may in fact have intrinsic motivations, such as the pleasure derived from undertaking the task or participating in a community, as well as extrinsic reasons related to monetary rewards, career benefits, learning, or even dissatisfaction with current products (Kleeman et al. 2008).

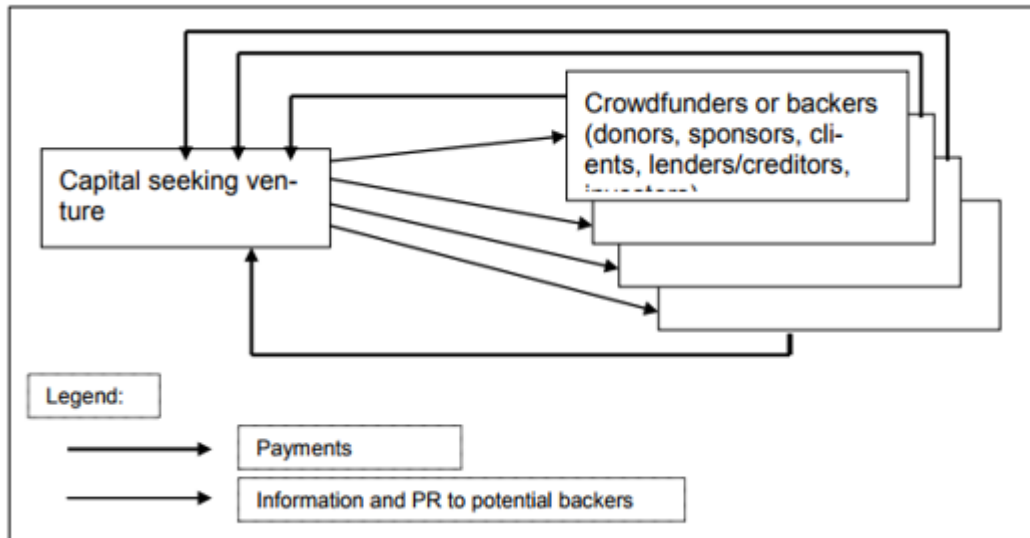
### **1.2 Financial and Non-Financial Crowdfunding**

Financial crowdfunding is underpinned by the crowdfunder's expectation of making a financial return on his investment; in other words, the motivation and incentive to invest are usually financially based. Three crowdfunding models fall under this definition: equity, loan and royalty crowdfunding. However, even though there is a possibility for the crowdfunder to make a financial return, he might also care about non-financial returns, such as the positive feeling of helping a key local business by investing in its equity, or helping a student pay for education by lending him money through a crowdfunding platform (CFP). What is more, financial crowdfunding enables crowdfunders to invest in private debt and private equity. This opportunity expands the market portfolio. Including crowdfunding as an investment alternative therefore gives the investor greater potential to diversify and find his optimal portfolio.

### 1.3 Typology of actors in the crowdfunding arena

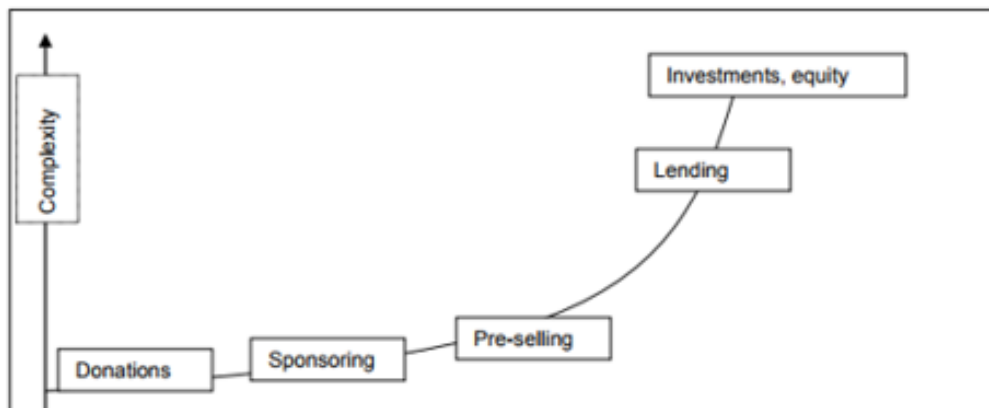
In order to explain the essential characteristics of the crowdfunding phenomenon, this is reduced to its basic elements as shown below:(Fig.1):

Figure 1: *Basic actors in the crowdfunding process*



Source: Hemer et al. (2011a)

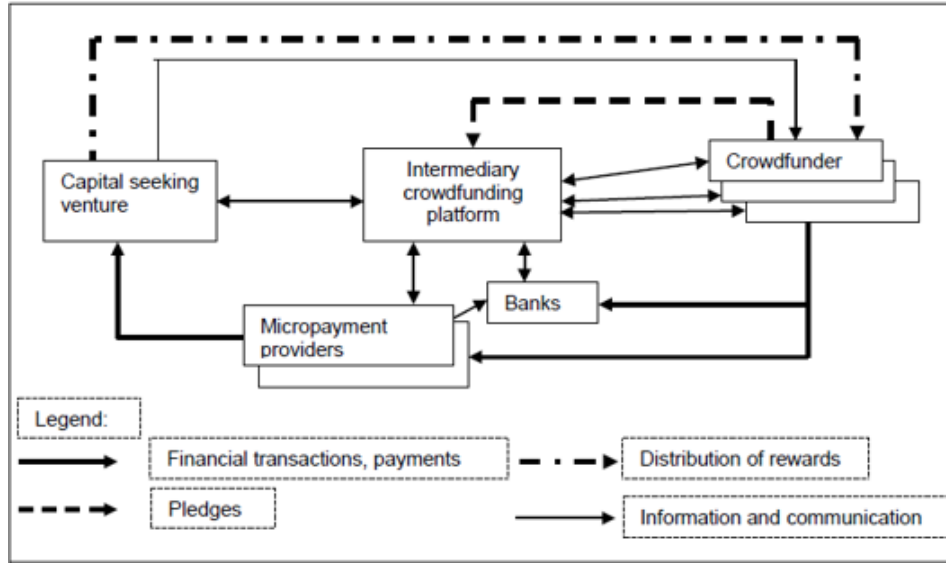
Figure 2: *The major forms of capital provision ranked by process complexity*



Source: Hemer et al. (2011a)

As the provision of capital can take the form of donations, sponsoring, pre-ordering or pre-selling, fees for membership in clubs, crediting or lending and Private Equity (PE) investments, the complexity of the processes involved varies greatly. These different forms of capital provision can be ranked in a graph, starting from very simple processes (donations) through to more complex and highly regulated forms (investments), as illustrated in Figure 2.

Figure 3: *The crowdfunding process involving intermediaries*



Source: Hemer et al. (2011)

In accordance with the origins of the crowdfunding phenomenon, the intermediary services tend to be Web- and software-based; they therefore call themselves “CF platforms”. They act as neutral facilitators both for the project initiators and the crowdfunders. They may have a wide range of activities, although most platforms do little more than offer a physical (Internet) platform, websites to present the projects, proven procedures and the software through which the financial pledges are collected and administered.

But some platforms make more effort by offering advice, organising public relations, making arrangements with micro-payment providers etc. Sometimes they offer other value-added services beyond the mere facilitation of funding (e.g. due diligence, consulting, managing a co-investment fund, searching for co-investors, etc.). As most project initiators go through a crowdfunding process only once or only a few times in their lifetime, they are most unlikely to gain the experience and professionalism that CF platforms develop through their routine work. Therefore, the rapid emergence of such platforms is not only logical but crucial too, if this new market is to function properly. Figure 3 illustrates how the platforms function as intermediaries between the capital-seeking ventures, financial service providers and the crowdfunders themselves.

## 1.4 Modalities

In crowdfunding, it is individuals who provide the firm with financial help. Crowdfunding generally takes place through social networks, with the entrepreneur detailing the business activities and objectives, which in some cases may take the form of a business plan, and requesting funding under specific terms and conditions. This is the main innovation of crowdfunding with respect to other forms of finance, since the entrepreneur does not need an intermediary, such as a bank, to seek funding and can tap directly into the savings of a large audience.

Crowdfunding is not only a means to raise funds; it can also serve as an important mechanism for sharing information with a large public, increasing awareness about projects and products, seeking feedback to improve them, and getting recognition, which may help in future commercialisation (Metzler, 2011).

The types of contribution made by the investor – and the related rewards – may vary, depending on the Internet platform, the type of firm and the project. In fact, as new platforms are created across countries, in a context of low regulation, new features and business models are continuously emerging. The types of funding may range from donations to equity, thus giving rise to processes with differing degrees of complexity and different contractual relationships between the firm and the individual investor.

In broad terms, crowdfunding can take the following forms:

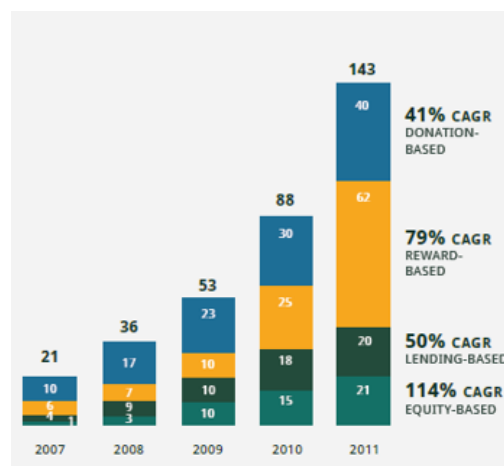
1. Donations, whereby contributors donate funds, mostly for charities and non-profit organisations, although for-profit organisations can also receive donations through this channel. Although a donation is – in essence – an altruistic act without any obligation for the recipient to give the donor anything in return, one feature of crowdfunding is for donors to be given some “reward” for their support. These rewards are often just immaterial acknowledgements, ranging from a mere thank-you mail, an artist’s autograph or a mention;
2. Reward or Sponsorship, whereby contributors receive a pre-defined reward, such as a small token of appreciation or some type of service, as a public acknowledgment for their contribution and marketing;
3. Pre-selling or pre-ordering, whereby investors provide funding to help produce some product or service and in return receive an early version of the product, or the product at a reduced price. The donation is meant to help produce something (a book, a film, a music album, a theatre performance, software, some new technical product, an agricultural product, a service concept etc.) and the promised return is the delivery of

an early version of the product or service. In such a case, crowdfunding is basically an advance order of a product and represents a purchasing act which is subject to turnover tax.

4. Lending, whereby investors receive the interest and the principal at the end of the lending period. There also exist forms of crowd-lending based on the revenue-sharing principle, whereby creditors are not paid interest at the end of the defined lending period, but rather an amount which includes an agreed share of the earnings, in the case of good performance by the debtor.
5. Equity, whereby a privately-held company offers securities to the public, through the medium of an online platform. Investors receive a share in the business and may acquire voting rights.

The reward-based modality is the largest crowdfunding category, while equity-based crowdfunding is the fastest growing form.(Fig. 4)

Figure 4: *Growth in number of CFPs by category (based on a sample of 143 CFPs)*



Source: Massolution 2012

Closely connected with the issue of rewards is, naturally, the question of the crowdfunders' motivation to give away smaller or larger amounts of their income, often without detailed screening, evaluation or examination of the project to be funded. There is some relevant literature on this (e.g. Sommeregger, 2010; Harms, 2007) and an independent interview study has confirmed these authors' findings. It should be emphasised that the backers are not primarily motivated by material rewards, but predominantly by immaterial rewards, as mentioned above, and a range of intrinsic factors such as:

- personal identification with the project itself and its goals;
- contribution to a socially important mission;

- satisfaction from being part of an established community with similar priorities;
- satisfaction from observing the implementation and success of the project funded;
- enjoyment in being engaged in and interacting with the project team;
- enjoyment from contributing to an innovation or being among the pioneers of a new technology or business;
- the chance to expand one's own personal network;
- the expectation of attracting funders in return for one's own crowdfunding project.

### 1.5 Motivation and “Community experience”

When it comes to investigating investor motivation for participating in a crowdfunding campaign, it seems logical to take a look at the research literature on psychology and consumer behaviour. After all, since individual motivation and decision-making lies at the very heart of the crowdfunding phenomenon, it is vital to understand what factors may prompt the individual to contribute to a campaign.

Belleflamme et al. (2011) explain that crowdfunding can be seen as a form of pre-ordering model of consumer behaviour and a way of using price discrimination.

By means of the crowdfunding process a creator can identify the users who are willing to pay a higher price than other users for the product, thereby allowing the creator to obtain more of the consumer surplus. The decision to participate in crowdfunding can thus be seen as the investors placing a higher value upon the reward offered than other users would.

However, Belleflamme et al. (2011) also found that in order to attract and identify these investors/users who are more willing to pay, they must be presented with a sort of “Community experience” that creates value for them. Building on the notion of crowdfunding as a model for pre-ordering and the need for an online community, other aspects of the crowdfunding phenomenon must be investigated: first, what motivates people to participate in an online community and, second, what motivates people to buy the product offered?

In order to create an online community it is necessary to motivate people to participate. Wang et Fesenmaier, (2003), divide motivation into five main categories: instrumental, efficacy, quality assurance, status and expectancy. Instrumental motivation describes the need to use the community for something; it must have a function, like finding friends on Facebook. An example of the efficacy motivation is to satisfy the needs of others, like providing help on an Internet forum. The notion of quality assurance is the motivation to control products or service quality. The status motivational factor is that of gaining prestige and status in the community.

Lastly, expectancy is the motivational factor that stems from seeking future exchanges with others. In a crowdfunding relationship it is not only necessary to get people to participate in the online community, they must also be motivated to invest in the crowdfunding campaign.

## 2. METHODOLOGY

### 2.1 General remarks on bibliometrics

The analysis of collections of documents is known as bibliometrics; it is the application of statistical methods to written publications, and is used in various disciplines, including library and information science, thesaurus compilation and lexicography, and evaluations of reader usage.

Bibliometric analysis is extremely useful in gauging the impact and quality of the academic literature in a given subject area or field of research. Bibliometric methods include quantitative analysis and citation analysis, both of which are used in the present study.

The quantitative analysis in the present study is purely descriptive, identifying the most prolific authors and publications in the field of crowdfunding, as well as the most productive nations and research areas and the trend in the crowdfunding literature over time.

Citation analysis, a widely employed bibliometric method, is based on citations between documents, illustrating relationships among authors and publications in the form of networks or chart-based representations, from which the popularity and impact of specific papers, authors and titles can be determined.

In general terms, citation analysis provides a relational perspective of the works published on a particular topic. Citation analysis is based on the premise that authors cite works they consider to be important to the development of their research. The importance of citation analysis derives from the fact that the success of a concept depends mainly on the way authors develop the lines of research, notions and theories pursued by other academics.

Citation analysis may in turn be subdivided into two methods or association measures: bibliographic coupling and co-citation analysis.

In bibliographic coupling, which was developed before the co-citation methodology, two documents are said to be bibliographically coupled if they both cite one document in common. However, the obvious shortcoming of this measure is that two papers may cite totally unrelated subject matter in the third document. In addition, bibliographic coupling is a retrospective measure of similarity in that a previously published document is cited.

Co-citation, on the other hand, considers a document's incoming citations to evaluate similarity or the degree of relatedness. It is a refinement of simple citation analysis, enhancing quality in terms of the relatedness or similarity of the items analysed since it reflects the viewpoints of

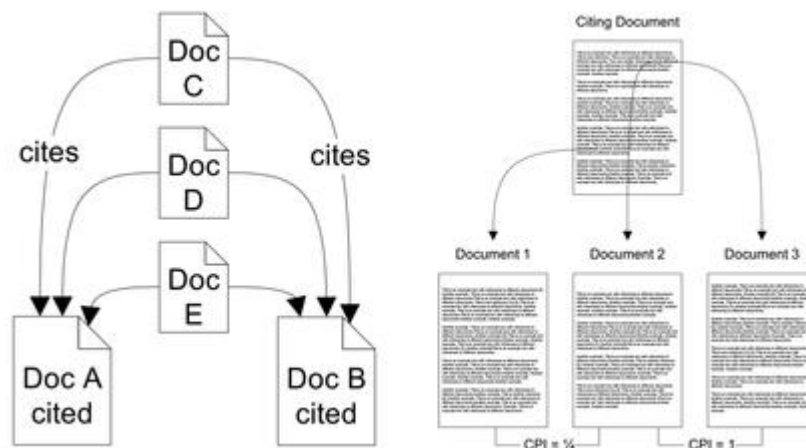


several authors, making it a more accurate indicator. The co-citation measure is liable to change in the future, and is therefore forward-looking.

As detailed below(Fig.1), in our bibliometric analysis of crowdfunding the co-citation method was chosen in order to identify more precisely the inter-relationships among authors and sources and their relative strength in terms of impact in this field of research, as well as to give some idea of potential future directions in crowdfunding research.

The following diagram illustrates the co-citation principle.

Figure 1: *Co-citation*



Source: Wikipedia

### 2.1.2 The two analyses in detail

The first step in our bibliometric analysis of crowdfunding literature involved collecting all the available literature on the subject. To do this, use was made of the Institute for Scientific Information (ISI) Web of Science, the multidisciplinary citation indexing service that accesses multiple databases.

Specifically, the word “crowdfunding” was keyed into the ISI Web of Science search engine on 28/11/2017, filtered by document type (article) and language (English), in order to locate every document in which this term occurs. The search produced 277 results, sorted from highest to lowest.

These 277 published articles in English were then examined in the two analyses: the first quantitative, the second the co-citation type.

Specifically, the quantitative or descriptive analysis considered the following elements:

- how prolific the authors are on the subject of crowdfunding;

- how much prominence the source titles give to the subject of crowdfunding in terms of articles published;
- which countries are the most prolific in terms of published articles on crowdfunding;
- the trend in published articles on crowdfunding over time; and
- the research areas in which these articles are published.

The second analysis, namely co-citation, considered the same 277 results on the basis of the co-citation criterion.

In the co-citation analysis, these articles were first sorted from highest to lowest, then downloaded as plain text; next, they were merged and reformatted in order to be read by the program “VOSviewer”, a map creation program (as detailed below).

Within this program, the type of data analysis selected was the co-citation type. In this program, co-citation analysis is defined as “the relatedness of items as determined on the number of items that are cited together”.

The units of analysis selected as criteria were:

- cited sources -> This is a specific academic journal or other publication cited in the body of the paper.
- cited authors -> A specific source mentioned in the body of the paper. The basic elements of the citation that need to be included are: name of the author(s), year of publication, page number or page range.
- cited references - > This is a list of the sources cited in a document. The references come at the end of the paper. Every source that is listed under references also needs to be cited in the body of the paper.

With regard to the counting method, the program offers two options: full or fractional. In the full counting method every co-citation link has the same weight, even if the document is co-authored. In the fractional method, on the other hand, the weight of the link is fractionalised if the document is co-authored.

The full counting option was chosen because it was found to generate clearer graphical representations or maps than the fractional method.

The final step involved setting a threshold for the citations. It was decided to limit the cited sources and cited authors to 10 in order to highlight the most important journals and authors.

By contrast, the threshold selected for the cited references criterion produced 475 cited references.

## 2.2 What is VOSviewer?

VOSviewer is a computer program for creating maps based on network data and for visualising and exploring these maps. The main features of VOSviewer can be summarised as follows:

- Creating maps based on network data. Maps can be created based directly on a network, but it is also possible to create maps of scientific publications, scientific journals, researchers, research organisations, countries, or keywords based on co-authorship, co-occurrence, citation, bibliographic coupling, or co-citation networks extracted from Web of Science, Scopus, PubMed, or RIS files. Term maps can be created directly based on a text corpus. Maps are created using the VOS layout technique and the VOS clustering technique.
- Visualising and exploring maps. Three visualisations are provided: network visualisation, overlay visualisation and density visualisation. In our case, the network and density visualisations were deemed sufficient, given the relative dimensions of the sample.

### 2.2.1 Network visualisation

When the network visualisation option is selected, items are indicated by their label and, by default, also by a circle. For each item, the size of the item's label and the size of the item's circle depend on the weight of the item. The colour of an item is determined by the cluster to which the item belongs. In the case of some items the label may not be visible: this is done in order to avoid overlapping labels. Also, by default, no lines between items are displayed. However, this can be changed by increasing the number of lines in the **Lines** text box in the options panel. The distance between two journals in the visualisation approximately indicates the relatedness of the journals in the co-citation network. In general, the closer two journals are located to each other, the stronger their relatedness in terms of co-citation links. Lines indicate the strongest co-citation links between journals.

### 2.2.3 Density visualisation

There are two density visualisation variants: item density visualisation and cluster density visualisation. The Item density and Cluster density radio buttons in the options panel can be used to switch between the two density visualisation variants. Reference may be made to Van Eck et Waltman, 2010 for a detailed discussion of the technical implementation of the density visualisation.

In the item density visualisation variant, items are indicated by their label in a similar way as in the network visualisation. Each point in a map has a colour that depends on the density of items at that point. By default, this colour is somewhere between red and blue. The larger the number of items in the neighbourhood of a point and the higher the weights of the neighbouring items, the closer the colour of the point is to red. Conversely, the smaller the number of items in the neighbourhood of a point and the lower the weights of the neighbouring items, the closer the colour of the point is to blue.

### 2.3 Creating a map based on bibliographic data

This option requires bibliographic data. As was said above, the data can be read from Web of Science, Scopus, PubMed, or RIS files. Using this option, it is possible to create maps of scientific publications, scientific journals, researchers, research organisations, countries or keywords based on co-authorship links (i.e. multiple items co-authoring the same publication), co-occurrence links (i.e. multiple items co-occurring in the same publication), citation links (i.e. one item citing another item), bibliographic coupling links (i.e. multiple items citing the same publication), or co-citation links (i.e. multiple items being cited by the same publication).

### 3. THE ANALYSIS

#### 3.1 Descriptive analysis

As stated in Chapter 2, the crowdfunding search was conducted in ISI Web of Science on 28/11/2017 and produced 277 results, specifically articles written in English.

The analysis of these 277 articles was confined to the top 10 items in each of the following five categories:

- .1. Authors
- .2. Source titles
- .3. Countries
- .4. Years
- .5. Research areas

##### 3.1.1 Authors

As stated above, this descriptive analysis looks at the authors from the perspective of the number of articles on crowdfunding they have written and published.

Given that several of the top ten authors listed in the table below have collaborated on the articles in question, these authors – and their published articles - are profiled together, and not in the order of the classification shown in the table. We refer in particular to Ghose, Burtch and Wattal in one co-authoring group, and to Gleasure and Feller in the other. Apart from these authors, the others are profiled individually as per their ranking.

The author profiles are followed directly by a critical commentary on their relevant publications. The purpose of this commentary is to analyse the topic or topics of interest to the author, the author's approach to this topic and the statistical methods and models employed, the research area or field of study involved, and any findings that corroborate or deepen our understanding of the crowdfunding phenomenon or open up new avenues for research.

We can identify two separate stages in crowdfunding research: the money raising stage and the project implementation stage. In broad terms, a distinction may be made between authors and articles that focus on one or the other of these two stages. Articles confined to the fundraising stage look at issues like donor behaviour, the provision of information, privacy, and communication between the contributors and the entrepreneur or charitable organisation.

Authors focusing more on implementation, in other words on for-profit projects and entrepreneurial ventures, consider sponsor satisfaction, timeliness of project delivery, and meeting specifications.

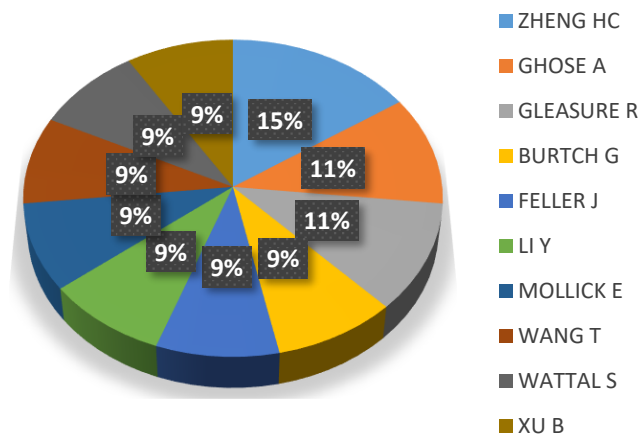
Naturally, all the authors are primarily interested in the whole question of success in crowdfunding campaigns, the factors determining the success or failure of projects, and the variables which may predict and lead to successful outcomes for crowdfunding projects.

Here too a distinction should be made. Success in crowdfunding campaigns for nonprofit bodies means that the fundraising target has been reached, while success in entrepreneurial crowdfunding ventures means not just raising the funds required to launch the start-up, but also sponsor satisfaction with project implementation.

### 3.1.2 A note on crowdsourcing

Crowdsourcing, like crowdfunding, to which it is closely related, is the outsourcing of a task to an undefined number of participants (the 'crowd') via an open call over the Internet. Crowdsourcing can be seen as a modern form of contest or competition in which members of the public are invited to solve a particular problem or discover a solution; the winner receives a prize, usually a sum of money. Crowdfunding may be regarded as a subset of crowdsourcing because it shares the same structural dynamics: an individual, institution or organisation appeals to the general public over the Internet to make a contribution, usually in return for some tangible or intangible reward. Accordingly, the question of motivation and participation in crowdsourcing is central and shows many similarities with the crowdfunding context. That is why the crowdsourcing article by H. Zheng is included below(Fig.1)

Figure 1: *Top 10 Authors*



*Source: Author's elaboration from Web of Science*

### Haichao Zheng

As the above chart shows, Haichao Zheng is by some distance the most prolific author on crowdfunding in our analysis. Zheng is an Associate Professor at the School of Economic Information Engineering, Southwestern University of Finance and Economics, China. His research interests include open innovation, crowdsourcing and crowdfunding. He has published papers in *Information & Management*, *International Journal of Electronic Commerce*, *Journal of Electronic Commerce Research*, among others.

As the following articles show, Zheng's approach to crowdfunding is empirical and practical, exploring the phenomenon from various angles through the development and testing of models. He is interested in both the fundraising stage and the implementation stage of crowdfunding.

In his paper, Zheng (2011), looks specifically at the question of extrinsic and intrinsic motivation in crowdsourcing contests, which clearly has a direct bearing on crowdfunding. Interestingly, the paper found that intrinsic motivation (where the incentive to participate comes from within the participant) was more important than extrinsic motivation (which is driven by external rewards) in inducing participation. This is of particular relevance to crowdfunding, which is essentially a request for money, since it suggests that the personal satisfaction to be derived from giving may in some cases be more important than any material reward or recompense. This is obviously true of contributions to nonprofit organisations such as charities, where there is no question of an external reward.

Turning to crowdfunding, Zheng considers various aspects of the relationship between entrepreneur and sponsors or funders. using social capital theory to develop a research model and conduct a comparative study using objective data collected from China and the USA. The

authors find that an entrepreneur's social network ties (the structural dimension of social capital), his obligations to fund other entrepreneurs (the relational dimension), and the shared meaning of the crowdfunding project between the entrepreneur and the sponsors (the cognitive dimension) had significant effects on crowdfunding performance in both China and the U.S. The predictive power of the three dimensions of social capital was stronger in China than it was in the USA. Obligation also had a greater impact in China.

Zheng (2014) looks at the implementation of crowdfunding projects, developing and testing a research model to measure project success in terms of: the on-time delivery of the product; the extent to which the end-product meets the specifications; and overall sponsor satisfaction. The findings suggest that compared with on-time delivery, meeting specifications is of more importance to increase overall satisfaction.

Rob Gleasure and Joseph Feller

Dr Rob Gleasure is a Lecturer in the Department of Accounting, Finance and Information Systems at University College Cork, Ireland. His research interests encompass online crowd behaviour (particularly crowdfunding), the philosophy of design and design science, and the psychophysiology of human-computer interaction. In particular, the author is interested in the role of less conscious processes in online interaction, such as perception, awareness, memory, affectivity and social biases.

Dr. Feller is a Professor at the Cork University Business School, University College Cork, Ireland. His research focuses on how individuals, organisations and societies can use IT to leverage collective intelligence, action and resources.

Gleasure and Feller have collaborated together on various crowdfunding projects and studies. Gleasure's interest in online crowd behaviour complements Feller's work on the collective leveraging of Information Technology. More specifically, their focus is on the fundraising stage of crowdfunding, as opposed to implementation, since they are more concerned with the behavioural side of giving, particularly to charities and nonprofit organisations, where the founder's purpose is to raise funds for a worthy cause.

Donor behaviour in charitable giving is the subject of a paper in which the authors explore donation behaviour in charitable crowdfunding based on the distinction between “pure altruism” and the desire for the personal gratification that comes from generous actions. The paper proposes a discriminatory model of donation behaviour towards individuals and organisations, which is then tested in a large-scale field study. The findings suggest that donations to organisations are more influenced by outcome-related factors, such as fundraising



targets and the likelihood of meeting that target, while donations to individuals are more influenced by interaction-related factors, such as the level of dialogue generated by a campaign. Also focusing on charitable giving, they investigated and modelled non-linear information consumption based on a field study of *Pledge.com*, an established charitable crowdfunding platform. The findings of the study reveal several curvilinear relationships between the information provided and the level of funding received. The authors discuss the implications of these findings, which may be useful for nonprofit organisations in particular.

Gleasure and Feller (2016) investigate what, if any, new forms of behaviour have emerged in the crowdfunding market. They analyse research in the four dominant categories of crowdfunding, namely crowd lending, crowd equity, crowd patronage and crowd charity. This analysis identifies the main topics of interest, the prevalent theoretical perspectives, the methods employed, and the typical focus of analysis. The authors identify two new developments: users are willing to pay to participate in interesting projects; and the financial boundaries of organisations are being eroded.

It could be argued that neither of these two developments is particularly new. Crowdfunding would not exist unless private individuals were ready to pay to participate in projects or causes which they were interested in or believed in, while the erosion of the financial boundaries of organisations is the natural and inevitable consequence of this new way of raising finance.

Gordon Burtch, Anindya Ghose, Sunil Wattal

Gordon Burtch is an Assistant Professor of Information & Decision Sciences and Lawrence Fellow at the Carlson School, University of Minnesota, USA, where he teaches graduate courses on data analytics and IT management. He is also a consulting researcher with Microsoft Research, NYC. His research, which focuses on the economic evaluation of information systems, has been published in *Management Science*, *Information Systems Research* and *MIS Quarterly*.

Anindya Ghose is a Professor of Information, Operations and Management Sciences and a Professor of Marketing at New York University's Leonard N. Stern School of Business in the USA. His research interests include crowdfunding, social media, digital advertising and marketing, and electronic commerce.

Sunil Wattal is an Associate Professor of Management Information Systems at the Fox School of Business, Temple University, Philadelphia, USA. Dr. Wattal focuses on social computing and innovation in technology industries, as well as applying advanced econometric models and

integrating multiple data sources to quantify the value of social media and crowdfunded marketplaces.

These three scholars have authored articles examining the relationship between privacy settings and contribution amounts on online crowdfunding platforms, and how the degree of user privacy offered by the site may affect the amounts pledged.

Moreover, this relationship neatly combines the three major components of the crowdfunding process itself: computing (the privacy settings on platforms), behaviour (disclosure and non-disclosure of personal information) and finance (the sums of money pledged). Although the articles described below focus only on one specific aspect of crowdfunding, namely privacy, the empirical approach employed and the pragmatic recommendations given by the authors may well account for their ranking among the top ten authors of crowdfunding articles in English.

Back in 2011, before privacy settings were introduced and the timing and amount of previous contributions made by other donors were visible for all to see, Burtch et al. published an article in, in which they suspected that this observable information about prior contributions would probably influence later contribution decisions by other participants. This notion was empirically examined in a crowdfunded market for online journalism.

Two further articles on online privacy were published by the same authors in 2013. In other study in which he examines the economic consequences of users hiding information, the authors make use of data from one of the world's largest global crowdfunding platforms, on which contributors have the option not to disclose their identity or the contribution amount. The study identified an “anchoring” effect from prior contributions, which is eliminated when previous contributors hide their amounts. The authors propose a nuanced approach to the design of information control mechanisms, such as varying default settings based on contribution amounts, in order to promote larger contributions.

They studied the impact of user information control mechanisms on crowdfunder behaviour. and finds that reducing access to information controls causes a net increase in fundraising. Interestingly, however, this finding is the result of two opposed influences: privacy settings increase the probability of contribution, but at the same time they result in a smaller average contribution. Here too, the authors not only identify the causes of user behaviour but also discuss the implications in terms of online platform design.

Y. Li

Yan Li is currently a postgraduate doing a doctorate at the Dept. of Computer Science, Wayne State University, Detroit, USA.

In Li's case, we find a variety of statistical and econometric models and methods being applied to resolve the critical issue of success in crowdfunding ventures. This approach is based on theories and models which have been developed in different fields and are then tested in the crowdfunding environment.

Signalling theory is derived from evolutionary biology and in recent years has been applied in a number of other areas, including economics, finance and marketing. The basic idea is that in some economic transactions there is a lack of balance in access to information, and this asymmetry can be corrected by one party sending a signal to encourage or reassure the other party. Yan Li (2015) applies signalling theory to crowdfunding in the article and finds that signals like the frequency of announcements and the amount of the highest bid or pledge have an impact on the success of crowdfunding projects.

In another paper, Li (2016), Li investigates the crucial issue of predicting project success, which in this study is regarded as a survival analysis problem. Applying the censored regression method, the study finds that the modelling of time-related data in the early stages of a project can significantly improve the model's performance.

Ethan Mollick

Prof. Ethan Mollick studies innovation and entrepreneurship and has published papers in leading academic journals on topics ranging from crowdfunding to entrepreneurial strategy. He is a Schultze Distinguished Professor and Kauffman Foundation Junior Faculty Fellow in the USA.

Mollick's work explores various aspects of crowdfunding as a way to raise capital for entrepreneurial ventures and performing arts projects. Although the scope of his articles is wide-ranging, they deal broadly with the dynamics and outcomes of crowdfunding, identifying a number of key factors that may determine the success or failure of a crowdfunding project. In other words, he considers not only the behavioural side of the first stage which involves raising the funds, but also investigates the second, implementation phase and the longer-term success of ventures.

Mollick (2014) describes the dynamics underlying the success and failure of crowdfunding ventures. He highlights the importance of personal networks, project quality and timely delivery

of the project in ensuring a successful outcome, while geography is another factor affecting fundraising activity.

In another article published in 2014, Mollick found that over 90% of successful projects were still in operation 1-4 years after the crowdfunding campaign ended. Another useful finding to emerge from the survey is that crowdfunding provides successful entrepreneurs with many potential benefits in addition to the money itself, particularly in terms of access to customers, the media and outside funders. The paper also analyses the factors that lead to longer-term crowdfunding success.

Mollick shows a particular interest in the crowd's ability to assess a project's quality and chances of success compared with the experts. In one co-authored article published in 2013, Mollick compares the judgement of amateurs with the assessments of Venture Capitalists (VCs) regarding which entrepreneurial projects are worth funding. The paper examines 2,101 crowdfunded projects that match the characteristics of more traditional VC-backed seed ventures. The study finds that, despite the completely different selection environments, entrepreneurial quality is assessed in similar ways by both VCs and crowdfunders, whereas one would expect the experts to employ more sophisticated criteria.

A similar finding is the outcome of another study, this time in the performing arts field, where Mollick et al.(2015), compare the judgement of the crowd with the evaluations of the experts in deciding which theatre projects to fund. Surprisingly, not only does the paper find significant agreement between the funding decisions of crowds and experts, but the crowd is much more likely to fund a project that the experts would not support. It is important to note that in this case the crowds are also the end users, and so they may have a relatively clear idea of which projects are viable and which are not, based on personal preferences and past experience.

#### Tao Wang

Tao Wang is an Associate Professor of Management Information Systems at the Southwestern University of Finance and Economics, China. He received his Ph.D. in MIS from Chungnam National University, Korea. His main research interests include information system acceptance and user behaviour, electronic payment security and models, web 2.0 and enterprise 2.0 applications.

Wang(2013) discussed the utility of crowdfunding from the perspective of individual scientists or laboratory groups looking to fund research, and also addresses some of the main factors determining the success of crowdfunding campaigns.

Wang has also co-authored several articles on crowdfunding with Zheng, the most prolific author in our classification, together with B. Xu, who is profiled next.

#### Bo Xu

Bo Xu is an Associate Professor at School of Management, Fudan University, China. He received his Ph.D. degree in Management Information Systems from Texas Tech University, USA. His research interests include electronic commerce, online communities, and open innovation.

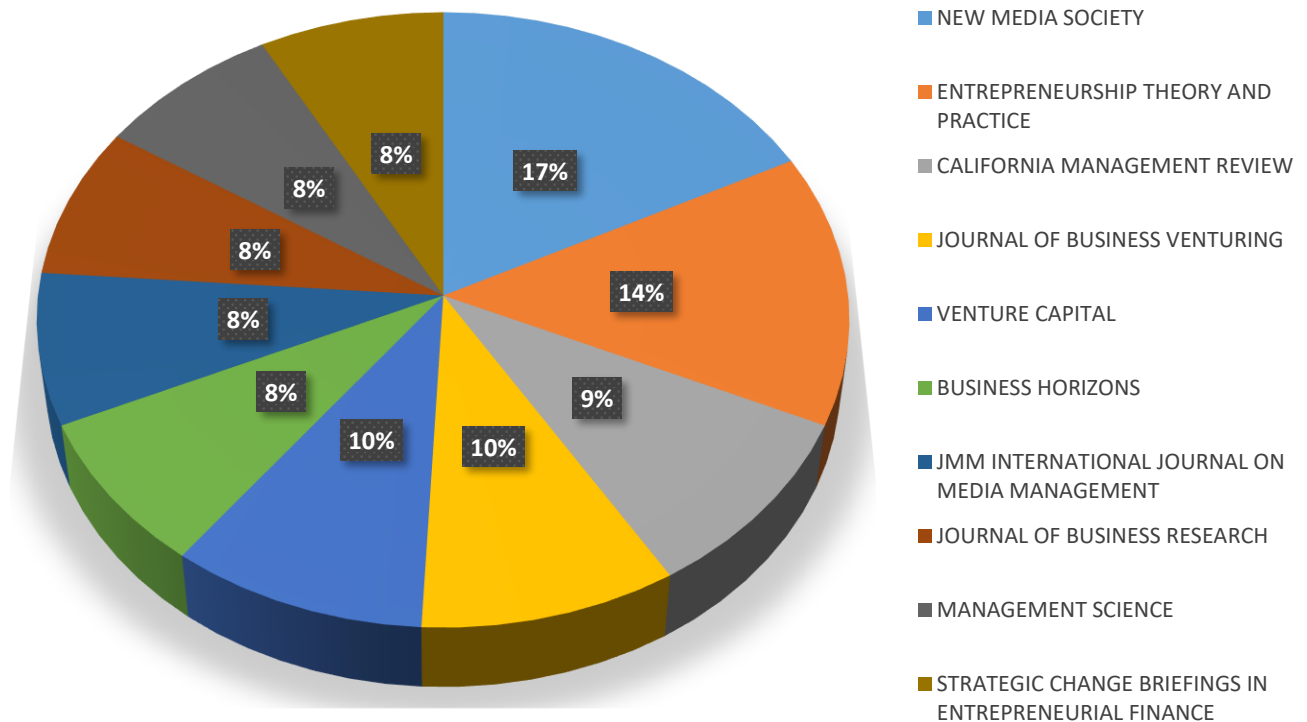
In the co-authored article Xu (2014) examines the findings of previous research indicating that the dynamics of investment during a crowdfunding campaign play an important role in determining its success. To further investigate investment dynamics, Xu uses time series data of contribution pledges to campaigns together with decision tree models in order to evaluate the how far this modelling can predict the eventual success of campaigns. The study confirms that there are discrete stages in money pledges that accurately predict the success of crowdfunding campaigns.

The question of funder satisfaction is investigated in another paper, Xu (2016), used asymmetric analytics. The focus here is on the project implementation stage rather than the fund-raising stage which has attracted the most research. The key variables of funder satisfaction include on-time delivery, product quality, project novelty, sponsor participation and entrepreneur activeness, and sponsor demographics. The results show that configurational models with high predictive capacity are sufficient for predicting sponsor satisfaction or dissatisfaction with crowdfunding projects. Xu also emphasises the practical implications of these findings for crowdfunding platforms and entrepreneurs.

### 3.1.3 Source Titles

The descriptive analysis by source title produced the following classification of the top ten publications (Fig.2):

Figure 2: *Top 10 Source Titles*



*Source: Author's elaboration from Web of Science*

As can be seen, the top source title is *New Media & Society*, even though this publication does not specifically address entrepreneurship in general or crowdfunding in particular. In fact, *New Media & Society* engages in critical discussions of key issues arising from the scale and speed of new media development, drawing on a wide range of disciplinary perspectives and on both theoretical and empirical research.

However, on closer examination we find that there is a specific reason for its first-place ranking. In fact, the February 2015 issue of this publication was a special edition entirely dedicated to the crowdfunding phenomenon (Volume 17, Issue 2, February 2015).

The guest editors of this special issue of *New Media & Society*, namely Lucy Bennett, Bertha Chin and Bethan Jones, examine the concept of crowdfunding, where grassroots creative

projects are funded by the masses through websites such as *Kickstarter* and *Indiegogo*, a practice that has been steadily gaining attention in the last few years across many different sectors of society. They introduce the nine articles comprising this special issue and identify the developments and challenges involved in such processes, concluding with suggestions for theoretical research and empirical considerations of the evolution and growth of crowdfunding in the digital society.

We find something similar in the case of *California Management Review*, which focuses on crowdfunding in Volume 58 Issue 2, published Winter 2016. This issue features six articles on the subject, which is considered from various angles and perspectives.

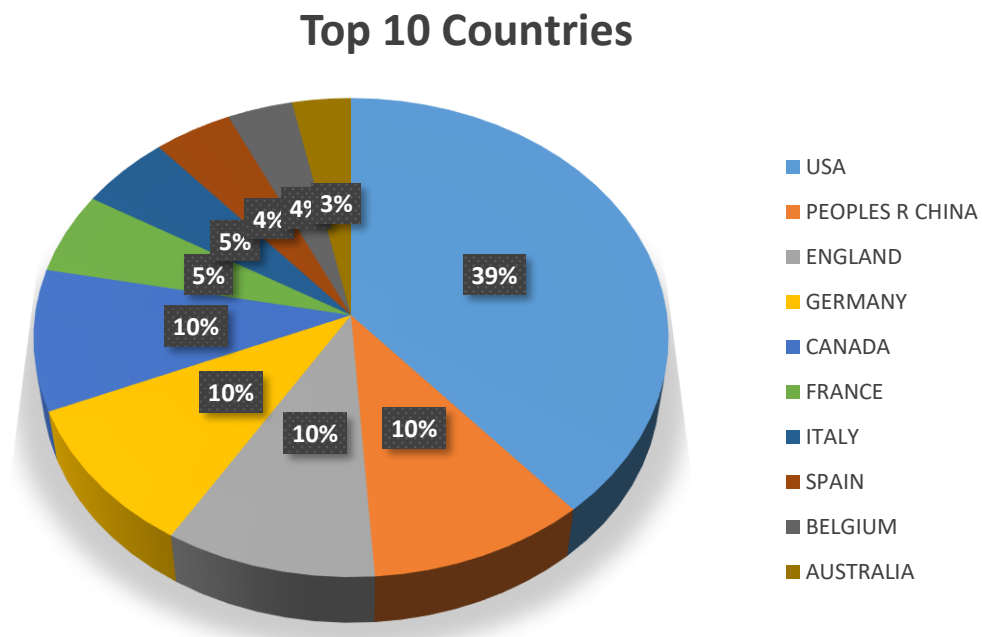
*California Management Review* (CMR) has served as a channel of communication between academia and management practice for sixty years. With a history of publishing cutting-edge research with managerial applications, CMR is uniquely positioned as both a valuable outlet for top business school faculties and an important resource for practitioners.

The descriptive analysis by source title highlights the importance attached to crowdfunding by the following publications: *Entrepreneurship Theory and Practice*, *Journal of Business Venturing*, and *Venture Capital*.

Since funding is the key factor in any new business venture or start-up, it is only natural that these three journals should devote a great deal of space to crowdfunding as a novel way of raising capital.

### 3.1.4 Countries and Territories

Figure 3: *Top 10 Countries*



*Source: Author's elaboration from Web of Science*

As we can see (Fig. 3), the USA has consistently produced the most literature on crowdfunding, reflecting the amount of research conducted in this area.

As expected, there is a close correlation between countries which invest heavily in innovation and new technologies on the one hand, and articles on crowdfunding published in those countries, on the other.

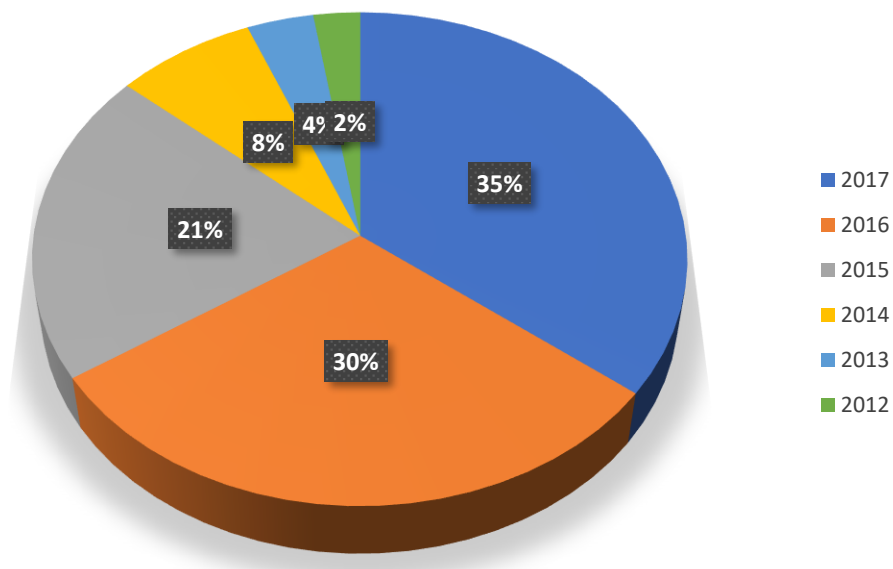
In point of fact, the countries that most actively encourage and foster private initiatives are found to have the highest number of start-ups, and these new ventures require funding to get off the ground. Crowdfunding is a new and potentially powerful and effective way to seed new enterprise in every field, which explains the number of articles published on this subject in the countries listed in the table. The more dynamic a country is in terms of championing innovation and new technologies, the more that country's universities and research centres are likely to invest in research into new developments in the fundraising sector.



### 3.1.5 Publication years

Publication Years	records	% of 277
2017	98	35.379
2016	84	30.325
2015	57	20.578
2014	21	7.581
2013	10	3.610
2012	7	2.527

Figure 4: Top 10 Publication Years



*Source: Author's elaboration from Web of Science*

This table (Fig. 4) shows quite clearly the steady growth of the crowdfunding phenomenon since 2012, and the growing interest it has evinced among both academics and practitioners.

As the chart below shows, this incremental growth reflects a similar trend in funding volumes globally.

The next chart (Fig. 5), produced in 2016, shows that the overall crowdfunding industry was on track in that same year to account for more total funding than the average annual investment made by the venture capital industry.

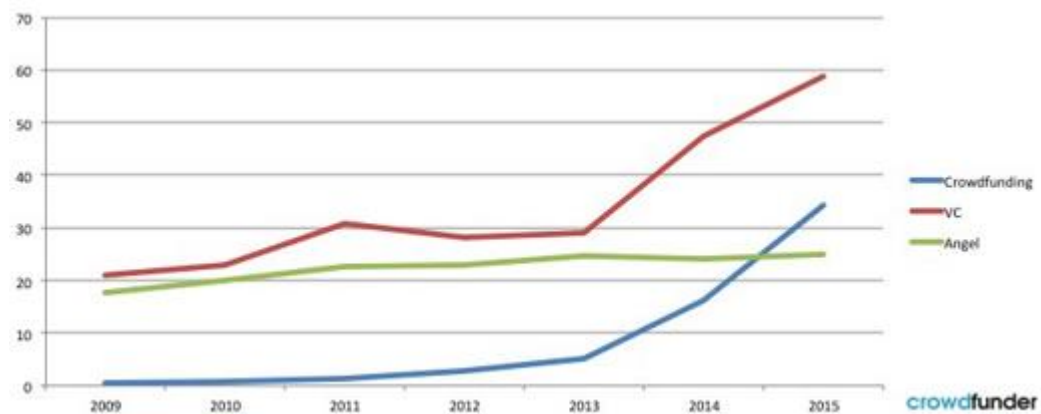
In 2010 there was a relatively small market of early adopters of online crowdfunding totalling a reported \$880 million, whereas the figure of \$16 billion was crowdfunded in 2014; this figure rose to over \$34 billion in 2015.

By comparison, the Venture Capital industry invested an average of \$30 billion each year.

The crowdfunding industry is doubling or more, every year; part of the reason for this impressive growth probably derives from the various types of funding model that the crowdfunding phenomenon encompasses, such as rewards, donation and patronage, equity, and debt/lending.

In addition, as the profile of crowdfunding is raised across society at all levels, it is deployed for an increasingly wide range of projects and purposes in an ever larger number of different sectors. Where financial resources are required for whatever purpose, crowdfunding becomes an option.

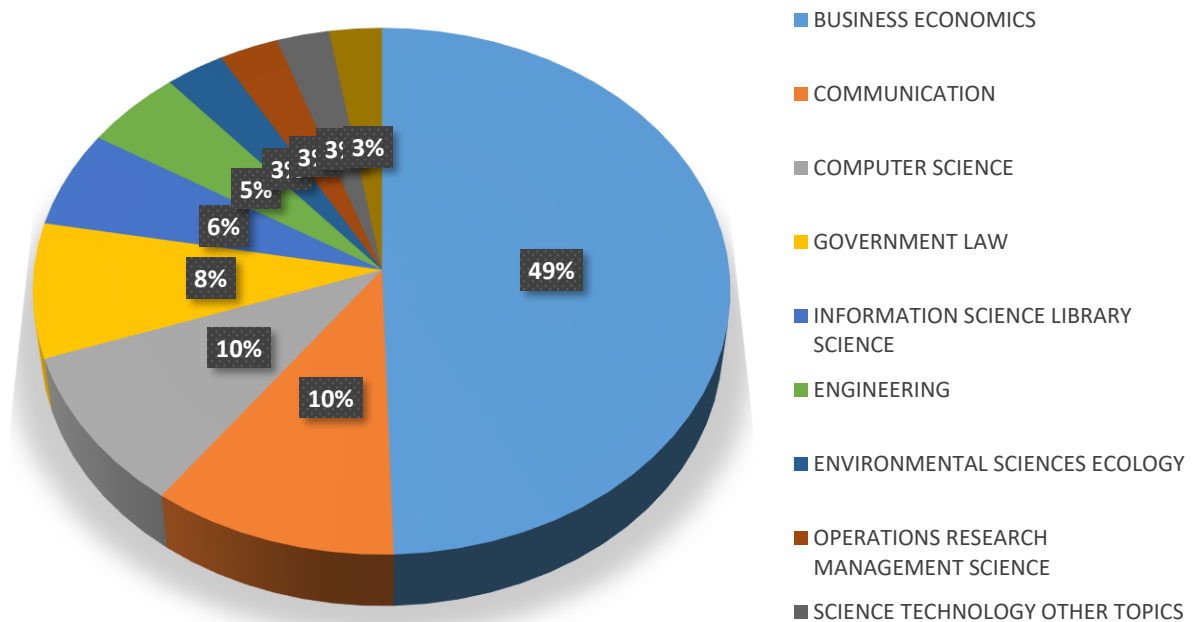
Figure 5: Annual Funding (Billions): VC vs. Crowdfunding vs. Angel



Source: [crowdsourcing.org](http://crowdsourcing.org)

### 3.1.6 Research areas

Figure 6: *Top 10 Research Areas*



*Source: Author's elaboration from Web of Science*

The analysis by research area shows (Fig. 6), unsurprisingly, that business economics is the sector which generates and attracts the highest number of articles on crowdfunding. In fact, this research area accounts for over half of the 277 articles on crowdfunding, and the reason is not hard to find. Essentially, crowdfunding is all about raising the money required to turn an idea into a reality.

Similarly, the second and third-placed research areas, namely communication and computer science respectively, probably owe their ranking to the importance these two areas occupy within the crowdfunding phenomenon. Crowdfunding depends on communication between the innovator and potential contributors, which in turn requires computer networks to make this communication global in reach and instantaneous in time. Consequently, these two areas of research are of great importance for the success of crowdfunding projects.

## 3.2 Co-citation analysis

The second analysis conducted was of the co-citation type. When two documents are cited together by another source or sources, it is reasonable to infer some degree of relatedness between them and arguably to consider them as particularly valid or important within that field. As was pointed out in the chapter on methodology (Chapter 2), the co-citation method reflects the opinion of several authors and is thus a more accurate indicator of subject similarity.

As detailed below, the literature on crowdfunding (articles in English) was analysed using three separate criteria: co-cited references, co-cited sources and co-cited authors, creating for each category a network visualisation and a density map.

The co-cited references option was the most complex to analyse since the number of co-cited references selected was 475.

The findings of the analysis are described in the following paragraphs.

### 3.2.1 Cited sources

#### 3.2.1.1 Network visualisation

In the case of the network visualisation of cited sources, we selected the top 10 items for analysis.

The program identified two clusters, one red and one green. The five journals featured in the red cluster publish empirical and theoretical research papers in the fields of entrepreneurship, management practice, and financial research. In particular, the top three sources in this cluster (ranking first, third and fourth in the table) welcome research into empirical methods for the testing and evaluation of management theory.

The four cited sources featured in the green cluster publish research papers on management practice, strategic management, general-interest economics and economic theory and practice.

Figure 7: Cited Sources-Network Visualization



Source: Author's elaboration from Vos Viewer

Source	Citation	Total link strength
Journal of Business Venturing	26	395
Management of Science	18	249
Entrepreneurship Theory and Practice (ETP)	13	220
Academy of Management Journal	12	193
Strategic Management Journal	12	178
American Economic Review	10	168
Working paper	11	167
Academy of Management Review	11	166
The Journal of Finance	11	133
Journal of Political Economy	9	119

Source: Author's elaboration from Excel

### 3.2.1.1.1 Red cluster publications

The leading publication (Fig. 7) by some distance in the cited sources ranking table is the *Journal of Business Venturing*. A look at the range and scope of this journal explains why it ranks top.

*Journal of Business Venturing* is dedicated to entrepreneurship and provides a forum for sharing useful and interesting theories, narratives and interpretations of the antecedents, mechanisms and consequences of entrepreneurship.

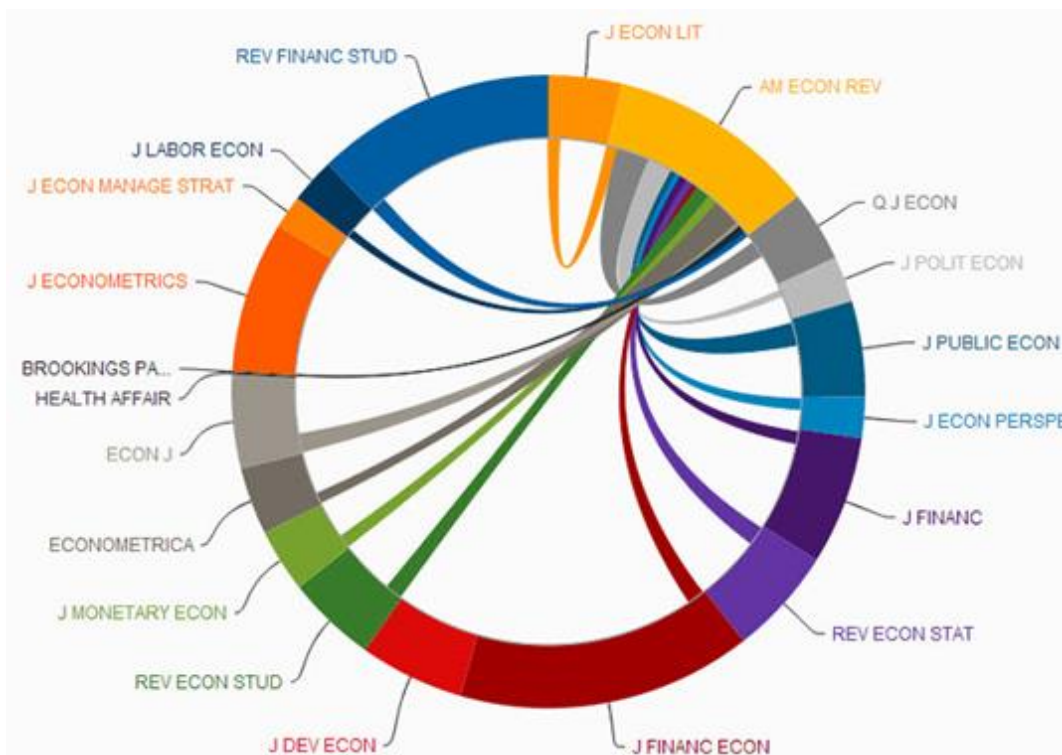
The purpose of this multi-disciplinary, multi-functional, and multi-contextual journal is to broaden understanding of the entrepreneurial phenomenon in all its various forms. The journal publishes entrepreneurship research from (1) economics, psychology and sociology, as well as papers from anthropology, geography, history and other disciplines; (2) finance/accounting, management, marketing and strategy, plus research in other areas such as operations, information technology, public policy, medicine, law and music; and (3) environmental and social sustainability.

This journal is the most frequently co-cited source on the subject of crowdfunding, which is not surprising given its multi-disciplinary reach and its mission to investigate the entrepreneurial phenomenon from every angle.

***Journal of Business Venturing: Journal Relationships***

The Journal Relationships visualisation displays the citing (Fig. 8) or cited (Fig. 9) data relationships between the parent journal and the top twenty journals in its network. In the diagram below, the top twenty cited or citing journals are displayed as arcs of the circle. The size of each arc is indicative of the relative citation relationships to that journal. The thickness of the chords connecting the arcs is indicative of the strength of citation relationship between the journals.

Figure 8: *Citing Data*

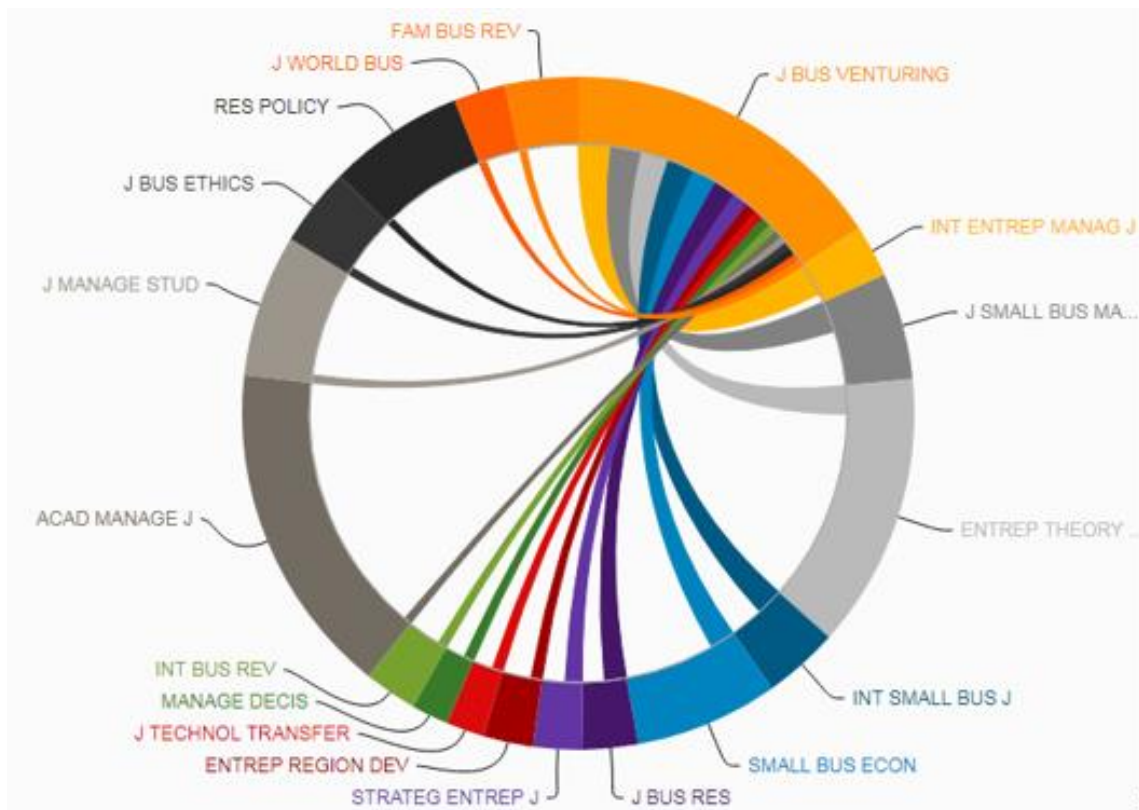


Source: *Journal Relationship*

It is interesting to note the relative weight of the two main financial and economics journals: *The Review of Financial Studies* and *Journal of Finance Economics*.

A plausible reason for this relative strength is that the two publications in question devote less space to issues directly concerning entrepreneurship and business ventures and therefore, when the articles featured in these two titles make reference to crowdfunding, they are likely to cite an article from *Journal of Business Venturing* for which this is a core issue.

Figure 9: Cited data



Source: *Journal Relationship*

As was to be expected, we don't find any specifically financial or economic publications among the cited sources. Instead, all the publications cited deal with management practice and entrepreneurship.

The three most cited sources are *Academy of Management Journal*, *Journal of Business Venturing*, and *Entrepreneurship Theory and Practice*, which rank respectively fourth, first and third in the cited sources table.

These three publications, plus *The Journal of Finance*, are profiled below.

***Entrepreneurship Theory and Practice (ETP)*** is a leading scholarly journal on entrepreneurship. The journal's mission is to publish original conceptual and empirical research that contributes to the advancement of entrepreneurship. ETP is consistently ranked as one of the most influential business journals in the *Journal Citation Reports* and by the *Financial Times* as one of the top journals.

The mission of the ***Academy of Management Journal (AMJ)*** is to publish empirical research that tests, extends or develops management theory and makes a contribution to management practice. All empirical methods are considered, including qualitative, quantitative, field, laboratory, meta-analytic and mixed methods. In order to be published in AMJ, the research must make strong empirical and theoretical contributions and the manuscript should underscore the relevance of these contributions to management practice. Authors should seek to produce original, insightful, interesting, important and theoretically bold research that makes a significant "value-added" contribution to the field's understanding of an issue or topic.

***Academy of Management Review*** aims to publish theoretical insights that advance understanding of management and organisations. Submissions to AMR must extend theory in ways that develop testable knowledge-based claims. To do this, researchers can develop new management and organisation theory, significantly challenge or clarify existing theory, synthesise recent advances and ideas into fresh, if not entirely new theory, or initiate a search for new theory by identifying and delineating a novel theoretical problem. The contributions of AMR articles are often grounded in traditional science disciplines such as economics, psychology, sociology and social psychology, as well as offering non-traditional perspectives, such as the humanities.

***The Journal of Finance*** publishes leading research across all the major fields of financial research. It is the most widely cited academic journal on finance and one of the most widely cited journals in economics as well. Each issue of the journal reaches over 8,000 academics, finance professionals, libraries, government and financial institutions around the world. Published six times a year, the journal is the official publication of the *American Finance Association*, the premier academic organisation devoted to the study and promotion of knowledge about financial economics.



### 3.2.1.1.2 Green cluster publications

***Management Science*** is a scholarly journal that publishes scientific research into management practice. It covers all business areas, such as accounting, finance, marketing and operations. It includes studies on organisational, managerial and individual decision making, from both the normative and descriptive perspectives.

The articles are primarily based on the core disciplines of economics, mathematics, psychology, sociology and statistics. Their interest extends to managerial issues in diverse organisational forms, such as for-profit and non-profit firms, private and public sector institutions, and formal and informal networks of individuals.

Topics covered in *Management Science* include: Accounting, Behavioural Economics, Business Strategy, Decision Analysis, Entrepreneurship and Innovation, Finance, and Information Systems.

***Strategic Management Journal*** (SMJ) publishes original material concerned with all aspects of strategic management. It is devoted to the improvement and development of the theory and practice of strategic management and it is designed to appeal to both practising managers and academics.

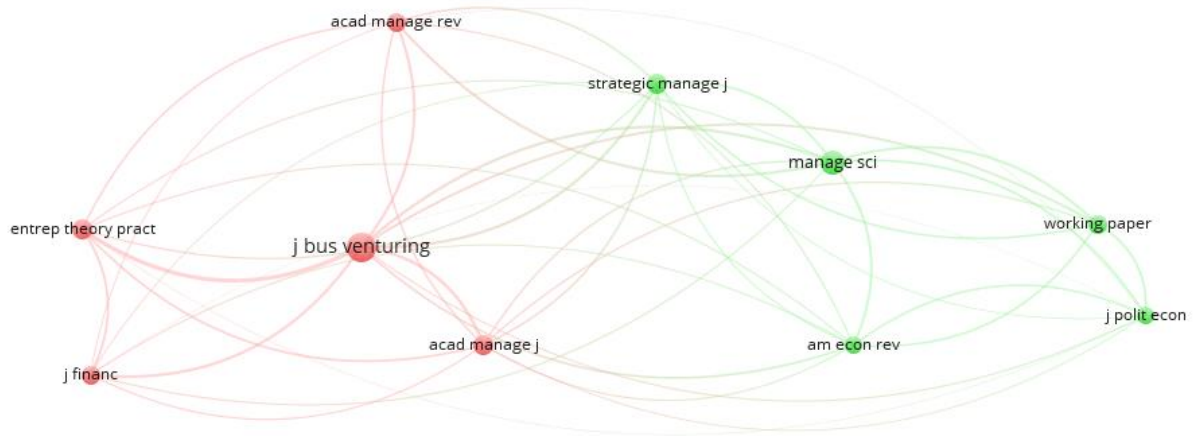
SMJ also publishes communications in the form of research notes or comments from readers on published papers or current issues. Overall, SMJ provides a communication forum for advancing strategic management theory and practice. Major topics featured in SMJ include: strategic resource allocation; organisation structure; leadership; entrepreneurship and organisational purpose; methods and techniques for evaluating and understanding competitive, technological, social, and political environments; planning processes; and strategic decision-making processes.

The ***American Economic Review*** (AER) is a general-interest economics journal. Established in 1911, AER is among the USA's oldest and most respected scholarly journals in the economics profession. The journal publishes 11 issues per year containing articles on a broad range of topics.

***Journal of Political Economy*** (JPE) is one of the oldest and most prestigious journals in economics, and has since 1892 presented significant research and scholarship in economic theory and practice. The journal aims to publish highly selective, widely cited articles of current relevance that will have a long-term impact on economics research. JPE publishes analytical,

interpretative and empirical studies in a number of areas, including monetary theory, fiscal policy, labour economics, development, micro- and macroeconomic theory, international trade and finance, industrial organisation, and social economics.

Figure 10: Cited sources – Network visualisation (with frames)



Source: Author's elaboration from Vos Viewer

The first thing to observe (Fig. 10) is that there is not a marked difference between the two clusters in terms of inter-node strength, although the red cluster shows a slightly higher degree of relatedness. One possible explanation is that while crowdfunding as a phenomenon is of interest to all sectors of the economy and society, it is particularly valuable for entrepreneurs and start-ups, since it offers a new way to secure funding. Therefore, the publications in the red cluster, which focus above all on entrepreneurship and business ventures, are more dominant than those in the green cluster, with the single exception of *Management Science* in the green cluster.

We also note that all the nodes are quite distant from the others and the links between them are relatively thin, suggesting a low degree of relatedness or similarity between individual publications. The notable exception is the linkage between *Journal of Business Venturing* and *Academy of Management Journal*, which is quite strong, indicating a higher degree of similarity between the two titles.

*The Journal of Finance* and *Academy of Management Review* show the weakest links and the most marginal positions in the red cluster. Perhaps the reason for the co-citation weakness of *Academy of Management Review* is due to its emphasis on theory as opposed to empirical research.

Turning to the green cluster, *Management Science* is relatively close to *Strategic Management Journal*. Like *Journal of Business Venturing*, *Management Science* covers a wide range of topics (including behavioural economics, entrepreneurship, innovation, finance and IT systems) and it is the highest ranking cited source in the green cluster (2<sup>nd</sup> place). Similarly, *Strategic*

*Management Journal*, in addition to the core topics, also explores issues such as leadership, entrepreneurship, organisation and the social environment.

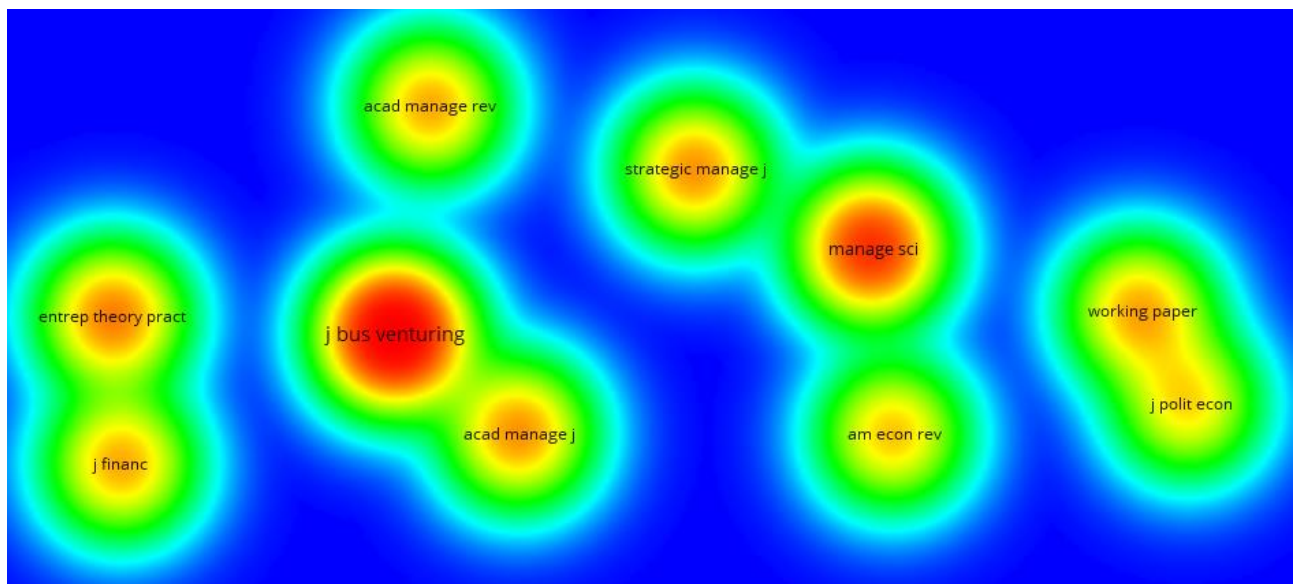
The outlier in the green cluster is the *Journal of Political Economy*. This may be due to the fact that it deals primarily with more general matters relating to macro- and micro-economic theory and questions of policy that have no inherent or direct relationship with crowdfunding.

### 3.2.1.2 Density visualisation

As mentioned above in Chapter 2, the larger the number of items in the neighbourhood of a point and the greater the weights of the neighbouring items, the closer the colour of the point is to red. Conversely, the smaller the number of items in the neighbourhood of a point and the lower the weights of the neighbouring items, the closer the colour of the point is to blue.

The density visualisation (Fig. 11) confirms what was said above regarding the classification of the cited sources. *Journal of Business Venturing* in the red cluster and *Management Science* in the green show the highest density.

Figure 11: Cited sources – Density visualisation



Source: Author's elaboration from Vos Viewer

### 3.2.2 Cited authors

As shown in the figure, VOSviewer identified two clusters of co-cited authors, one green and the other red. In order to analyse the co-cited author classification and the rationale behind the two clusters, it was necessary to investigate and identify the principal differences among these authors in terms of their approach to the subject of crowdfunding.

Accordingly, as was done with the authors in the first, quantitative analysis (Chapter 3.1.1), the author profiles are followed directly by a critical commentary on their relevant publications. Once again, the purpose of this commentary is to analyse their topic of interest, the statistical methods employed and the research area involved.

#### 3.2.2.1 Network visualisation

Figure 12: Cited authors – Network visualisation



Source: Author’s elaboration from Vos Viewer

Authors	Citations	Total link strength
Deci	9	63
Andreoni	7	53
Hart	4	48
Belleflamme	8	40
Burtch	6	34
Mollick	5	33
Lin	4	26
Shane	6	23
Schwiebacher	4	21
Agrawal	4	15

Source: Author’s elaboration from Excel

The top three cited authors are all in the green cluster (Fig. 12). One thing they have in common is the fact that they have no direct connection with crowdfunding; indeed, much of their published work dates from the 1990s and even earlier, predating the age of digital media and the crowdfunding phenomenon. The significance of this result is explored in more detail below and also in the Chapter 4 of this thesis (on 'founders' and 'disseminators').

In the red cluster on the other hand, we find the remaining seven authors, all of whom take an empirical approach to the specific subject of crowdfunding, which they address from various perspectives.

#### 3.2.2.1.1 Green cluster of co-cited authors

Edward. Deci

Edward Deci is a Professor of Psychology and Gowen Professor in the Social Sciences at the University of Rochester, USA, and director of its human motivation program. He is well known in psychology for his theories of intrinsic and extrinsic motivation and basic psychological needs. With Richard Ryan, he is the co-founder of self-determination theory (SDT), an influential contemporary motivational theory.

Self-determination theory is a macro theory of human motivation that differentiates between autonomous and controlled forms of motivation; the theory has been applied to predict behaviour and inform behaviour change in many contexts including: education, healthcare, work organisations, parenting and sport, to name only a few.

James. Andreoni

James Andreoni is a Professor of Economics at the University of California San Diego, USA. He has studied altruism, charitable giving, and the effects of social interactions on economic choices. He is a past President of the Economic Science Association and Editor of the *Journal of Public Economics*. He is currently a member of the National Bureau of Economic Research, and is a Fellow of the Econometric Society.

Robert Hart

Roderick Hart received his M. A. and Ph.D. degrees from Pennsylvania State University, USA. His area of special interest is politics and the mass media and he is the author of twelve books, the most recent of which is *Political Tone: How Leaders Talk and Why* (University Of Chicago

Press, 2013). He is also the author of DICTION 7.0, a computer program designed to analyse language patterns.

Deci and Andreoni have authored works on their specific areas of interest, namely human motivation, altruism, motivational theory and the economics of giving. Hart, on the other hand, specialises in language as used in politics and the mass media.

Together, their published articles, many of which date predate the phenomenon of crowdfunding, do not bear directly on the subject. Accordingly, the relevant publications of these three authors lie outside the scope of this study and are not listed or detailed.

However, more details are provided on these three authors in the analysis of Figure 19 (network visualisation with frames, p. 56), and also in Chapter 4.

#### 3.2.2.1.2 Red cluster of co-cited authors

Paul. Belleflamme

Paul Belleflamme is currently Professor at AMSE (Aix-Marseille School of Economics) in France and a member of GREQAM; he is also visiting professor at Kedge Business School.

His main research area is theoretical industrial organisation, with a special focus on innovation in the digital economy, publishing widely in leading economics journals.

He is a fellow of the CESifo Research Network and co-editor of *Economics* and managing editor of *Regards Economiques*.

He considers crowdfunding from a number of different perspectives, including those of industrial organisation, for-profit vs. nonprofit initiatives, entrepreneurial ventures, and individual crowdfunding practices vs. standardised platforms. In the articles discussed below, the focus is on the success of the fundraising stage rather than on later-stage implementation. We also find that in these articles Belleflamme considers the broader aspects and mechanisms of crowdfunding, rather than concentrating on one specific detail such as modelling variables or privacy settings. This approach, which encompasses the entire crowdfunding process, makes his articles more accessible to non-specialists, and may be one reason for his high ranking in the table (first place in the red cluster).

Belleflamme (2010) uses a previous empirical study to identify the main features of crowdfunding, which at that time was still a relatively new phenomenon and was just starting to take off (see Introduction, Fig. 1). Next, the authors suggest two alternative crowdfunding models. In the first model, crowdfunding is associated with pre-ordering and price discrimination, and it is also compared with traditional forms of funding. In the second model,

crowdfunding is seen as a way to publicise a product among the general public. The article also suggests why nonprofit organisations tend to be more successful in using crowdfunding.

Belleflamme et al. (2013) compare individual crowdfunding practices with standardised platforms, which offer fewer options to customise the crowdfunding initiative. In addition, projects that are structured as nonprofit organisations tend to be significantly more successful than other organisational forms in reaching their fundraising targets, even allowing for the diversity of project characteristics. This appears to confirm the theoretical argument that nonprofit organisations find it easier to raise money for initiatives that are of interest for the general community due to their reduced focus on profits.

Belleflamme (2014) compares two forms of entrepreneurial crowdfunding: pre-ordering the product or contributing a fixed sum of money in exchange for a share of future profits (equity). Using a unified model, the paper finds that entrepreneurs prefer pre-ordering if the start-up capital requirement is relatively small compared with market size; otherwise, they prefer profit sharing. The findings clearly have implications for managerial decisions when the venture is still at an early stage and the entrepreneur needs to build a community of individuals.

Belleflamme (2015) also looks at crowdfunding platforms (CFPs), both investment-based and donation-based. He describes the main features of this rapidly developing sector and investigates the economic forces involved that may explain how these platforms are designed.

Gordon Burtch and Ethan Mollick

The author profile for Burtch and Mollick, together with the relevant commentaries, are given in the first, descriptive analysis of the top-ranked authors (Chapter 3.1.1).



## Mingfeng Lin

Mingfeng Lin is an Associate Professor of Management Information Systems (MIS) at the University of Arizona, USA. He studies Internet-enabled communities, marketplaces and business models as drivers of innovation and entrepreneurship, including: crowdfunding, particularly debt-crowdfunding (peer-to-peer lending) and equity crowdfunding; online labour markets; and online communities, including user-generated contents (UGC's).

He considers a variety of issues related to crowdfunding, including geographical bias, the impact of language and style on successful campaigns, and market mechanisms. The specific sector researched in the three articles discussed below is that of financial products and services. Lin (2015) finds that geographical bias does exist in the online marketplace for financial products, as it does in the physical world. This tendency to prefer locally sourced financial products even among online communities seems surprising and empirical testing shows that rationality-based explanations cannot fully account for this behaviour. As crowdfunding becomes an alternative and increasingly attractive financing channel, a better understanding of home bias would have important managerial, practical and policy implications.

He looks at the choice of market mechanisms on crowdfunding platforms, i.e. how the supply and demand of funds are matched, and the price at which transactions will occur. Crowdfunding platforms typically use either the auction mechanism or posted prices (where the platform determines the price). Lin investigates the implications of these choices for the behaviour of market participants and transaction outcomes. The specific market sector studied is debt-based (loan) crowdfunding on a platform which has switched from auctions to posted prices. The study finds that with the posted price mechanism there is a higher probability of loans being funded, but the pre-set interest rates are higher than borrowers' starting interest rates in auctions. In addition, loans funded under the posted-price mechanism are more likely to default.

Lin (2016) also considers the impact of texts and linguistic styles in terms of information asymmetry and how investors interpret the economic value of texts. He shows that investors do consider the "loan purpose" descriptions that borrowers provide in their loan requests, even though these texts are not verified or legally binding. An analysis of the linguistic features of these descriptions shows there is a close relationship between the readability, objectivity, negativity, and deception cues of these texts and loan repayment. However, investors do not correctly interpret the economic value of all the linguistic features, most notably deception cues. Lin shows that these automatically extracted features can improve the predictive accuracy of loan defaults, suggesting that texts can be quantified and standardised into credit risk modelling. This finding should be of significant value to both lenders and borrowers.

Scott. Shane

Scott Shane, PhD, is the A. Malachi Mixon III Professor of Entrepreneurial Studies and professor of economics at Case Western Reserve University, Cleveland, Ohio, USA.

His current research examines: how entrepreneurs discover and evaluate opportunities, assemble resources, and design organisations; university spin-offs and technology transfer; business format franchising; angel investing; and genetic factors in entrepreneurship.

Shane, who ranks in 8<sup>th</sup> place in the cited author classification, does not deal directly with crowdfunding in the two articles we have been able to procure, which both date from the year 2000, before the advent of the crowdfunding phenomenon. He is co-cited as an author probably because of his work on developing a conceptual framework for entrepreneurship and investigating how and why entrepreneurs discover opportunities.

Shane (2000) creates a conceptual framework for entrepreneurship, and uses it to explain a set of empirical phenomena and predict a set of outcomes not explained or predicted by conceptual frameworks already in existence in other fields.

Shane argues that opportunity discovery is a function of the distribution of information in society. Through case studies of eight sets of entrepreneurs who exploit a single MIT invention, it is shown that entrepreneurs discover opportunities related to the information that they already possess. This finding has several implications: entrepreneurs do not always select between alternative market opportunities for new technologies; the source of entrepreneurship lies in differences in information about opportunities; and individual differences influence the opportunities that people discover and the way they organise their entrepreneurial ventures.

Armin. Schwienbacher

Armin Schwienbacher is a professor of Finance at the Université Lille Nord de France, SKEMA Business School (France), and research fellow at the University of Amsterdam Business School (the Netherlands).

His research focuses on venture capital and various other topics in corporate finance, and his work has been published in various international academic journals, including *Journal of Financial Intermediation*, *Economic Journal*, *Journal of Banking and Finance*, *Entrepreneurship Theory and Practice*, *Journal of Business Venturing* and *Financial Management*.

In the two articles described below, Schwienbacher analyses entrepreneurial ventures and reward-based crowdfunding from the financial perspective.

Schwienbacher (2010) provides a general overview of crowdfunding in the entrepreneurial sector for project-specific investments and start-ups, exploring the phenomenon from the perspective of entrepreneurial finance and describing factors affecting entrepreneurial preferences for crowdfunding as a source of finance. Different business models used to raise money from the crowd are developed, in particular with respect to the structure of the crowdfunding process. The study also gives recommendations for entrepreneurs and suggests further avenues of research.

Schwienbacher (2015) analyzed reward-based crowdfunding campaigns offered in one of two models. The first, “Keep-It-All” (KIA) model where the entrepreneurial firm sets a fundraising goal and keeps the entire amount raised, even if it fails to meet the goal, thereby allocating the risk to the crowd when an underfunded project goes ahead. In the second, “All-Or-Nothing” (AON) model, the entrepreneurial firm sets a fundraising goal and keeps nothing unless the goal is achieved, thereby shifting the risk to the entrepreneur. The paper shows that small, scalable projects are more likely to be funded through the KIA scheme, while large non-scalable projects are more likely to be funded through the AON scheme. Overall, KIA campaigns are less successful in meeting their fundraising goals and offer less risk but lower returns for the entrepreneur.

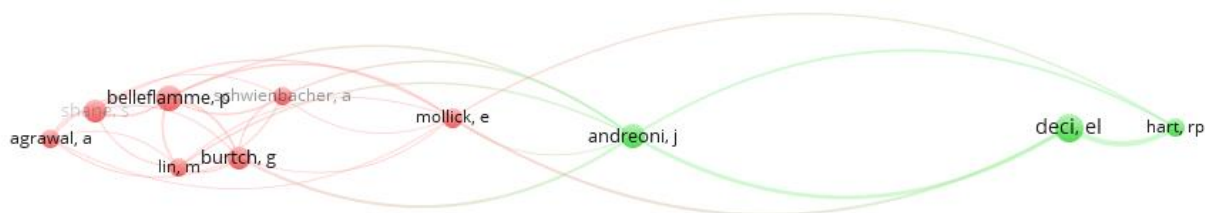
Ajay Agrawal

Ajay Agrawal is the Peter Munk Professor of Entrepreneurship at the University of Toronto's Rotman School of Management, where he conducts research on the economics of artificial intelligence, science policy, entrepreneurial finance, and geography of innovation. Professor Agrawal is a Research Associate at the National Bureau of Economic Research in Cambridge, MA, co-founder of The Next 36 and NextAI, and founder of the Creative Destruction Lab.

Agrawal (2011) examines a crowdfunding setting that connects artist-entrepreneurs with investors over the Internet for financing musical projects. The average distance between artists and investors is about 3,000 miles, suggesting that spatial proximity is not a factor. However, distance does play a part. The study finds that local investors invest at an early stage in the campaign, and seem less affected by the decisions of other investors. The study shows that this geography effect is driven by investors who probably have a personal connection with the artist-entrepreneur (family and friends). Although the online platform seems to eliminate most distance-related economic frictions such as monitoring progress, providing input and gathering information, it does not eliminate social-related frictions.

Agrawal (2013) provides a preliminary exploration of the economics underlying the launch of equity-based crowdfunding, a new market for early-stage finance in the United States. Agrawal highlights the extent to which economic theory, in particular transaction costs, reputation and market design, may account for the rise of non-equity crowdfunding and offers a framework for speculating on how equity-based crowdfunding may develop in future years. The paper also discusses the rate and direction of innovation in crowdfunding.

Figure 13: *Cited authors – Network visualisation (with frames)*



*Source: Author's elaboration from Vos Viewer*

The first thing to observe (Fig. 13) with regard to the co-cited authors is that the top three of the ten, comprising the green cluster, are academics working in the fields of behavioural science, economics, and language and communication. In other words, their relationship with the specific subject of crowdfunding appears to be marginal. However, given that crowdfunding is by definition based on the motivation and willingness of individuals to fund a particular project or campaign, that is to say on their psychological make-up and behavioural disposition, this result is perhaps not so surprising after all.

In particular, the most co-cited author is Deci, who has written extensively on the question of individual motivation and self-determination.

Andreoni, whose area of expertise is altruism and in particular the economics of philanthropy and fundraising, occupies the central position in the network visualisation of co-cited authors and is the closest of the green cluster to Mollick and the red cluster. It is reasonable to suggest that this prominent, central position reflects his relatedness both to the behavioural and motivational side of crowdfunding as well as to its economics.

The author ranked third in the green cluster, Hart, is an expert on language and rhetoric in politics and mass-media communications in general. Given that language and text are the means by which the entrepreneur or founder communicates with the 'crowd' in order to raise funds, and that crowdfunding relies on communication through the medium of the Internet, his inclusion in the classification is understandable. In fact, as we have seen (p.53 above), the question of text and linguistic style is analysed by Lin in connection with online debt crowdfunding.

In the red cluster, as we have seen, six of the seven authors deal specifically with crowdfunding, considering it from various points of view and in its diverse forms.

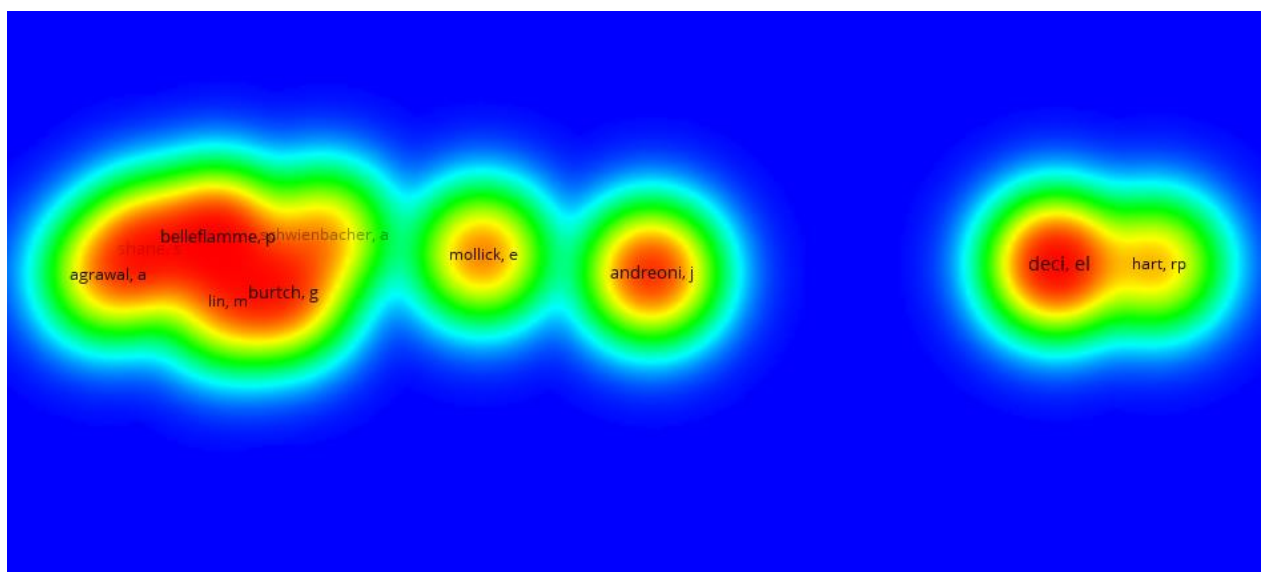
As we saw above, the most co-cited author, Belleflamme, addresses issues such as how crowdfunding works, popular crowdfunding models, the success of the nonprofit model, and crowdfunding platforms.

The visualisation shows six of the seven red cluster authors forming a relatively compact group, whereas Mollick occupies a more central position on his own, and closer to Andreoni in the green cluster.

### 3.2.2.2 Density visualisation

As we saw before, the density visualisation confirms the findings of the network map (Fig. 14). The two areas showing the highest density are Deci in the green cluster, and six of the seven authors in the red cluster.

Figure 14: *Cited authors – Density visualisation*



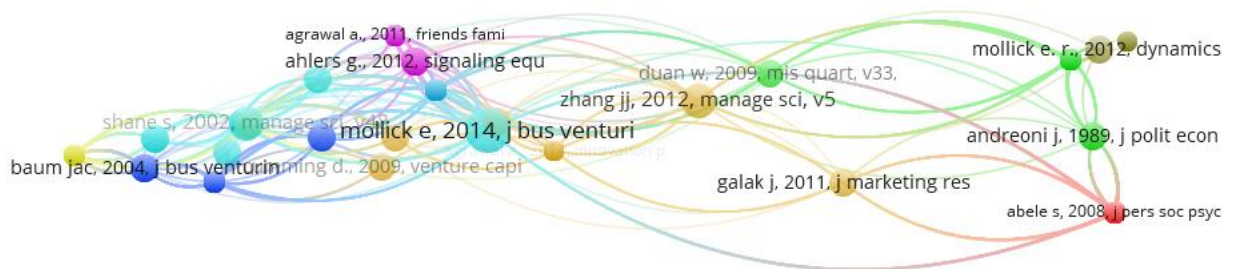
*Source: Author's elaboration from Vos Viewer*

### 3.2.3.Cited References

This is a list of the sources cited in a document. The references come at the end of the paper. Every source that is listed under references also needs to be cited in the body of the paper.

#### 3.2.3.1 Network and Density visualisation

Figure 15: *Cited references – Network visualisation (with frames)*



*Source: Author's elaboration from Vos Viewer*

The co-cited reference criterion shows (Fig. 15) that *Journal of Business Venturing* is by some distance the leading publication given that both Mollick and Belleflamme, although they belong to different clusters, are predominantly published in this journal. This confirms the findings of the previous analyses of co-cited sources and co-cited authors.

Interestingly, *Journal of Business Venturing* features in six of the seven cited reference clusters, confirming the broad scope of its exploration of every aspect, both economic and social, of crowdfunding.

The author Belleflamme appears in three clusters, while Mollick features in two of the seven clusters.

#### 4. CONCLUSION

One interesting and potentially valuable approach to studying and interpreting the data collected in this bibliometric analysis of crowdfunding articles is the 'Founders and Disseminators' paradigm, as illustrated and employed in the article **Founders and disseminators of cluster research** by L. Lazzeretti, S.R. Sedita and A. Caloffi, published in *Journal of Economic Geography* in 2014.

Founders are authors, articles and/or publications which lie at the root or source of the topic under investigation, They can be seen as the originators of subsequent research into that topic or field of study.

Disseminators are authors, articles and/or publications that are most frequently cited in other documents and publications, on the basis that they make the largest contribution to extending the reach and scope of research in a particular field or area.

This model, as we will see below, makes a good fit with the findings of our analysis, particularly with regard to the co-cited authors.

Crowdfunding is a relatively recent phenomenon, and the significant amount of research work it has attracted, especially over the last few years, reflects the increasing number of applications it has found, the variety of CF models that have been developed, and the expansion of the sectors and fields in which CF is deployed. In parallel with this trend, the literature has tended to become increasingly specialised, just as it has grown in terms of quantity and complexity. It is notable that the articles analysed dating from 2010 to 2012 generally adopt a broader approach and treat the crowdfunding process as a whole, while the most recent articles we analysed tend to focus on more detailed issues and narrower aspects within one specific area of crowdfunding. This is particularly true of the algorithmic modelling of behavioural phenomena on the contributor side, and of management practices on the entrepreneurial side.

Considering that the main elements of crowdfunding are digital media, communication and motivational behaviour, the authors specialising in these separate fields may justifiably be regarded as precursors of the crowdfunding phenomenon, and therefore as 'founders'.

It is not possible to identify either an article or publication which may be regarded as a seminal source or "founder". Like any complex phenomenon, crowdfunding is composed of several different components and dimensions and therefore research work on this subject inevitably refers back to the theories and empirical findings of experts in each of these component areas. Our two analyses, one quantitative and the other co-citational, do not allow us to form a judgement on which article or articles originated subsequent crowdfunding research, because the focus was primarily on authors and publications and not directly on individual articles.



Therefore, in the following paragraphs we have focused exclusively on the authors we regard as the figureheads and sources to which the crowdfunding authors refer in their articles.

The same thing broadly applies to the disseminators of crowdfunding literature: here too, it is the authors and not the articles that play the part of disseminators.

However, the *Journal of Business Venturing* is by far the most cited source in our analysis and has clearly played a key role in raising awareness of crowdfunding and deepening our understanding of the phenomenon. It may therefore be regarded as the leading disseminator, also considering its broad scope and multi-disciplinary approach.

Based on their ranking in the cited author classification (Ch. 3.2.2), Edward Deci and James Andreoni may be considered in the role of founders with regard to the literature on crowdfunding, in that their work, Deci on motivation and Andreoni on the economics of giving, is of such central importance to the phenomenon of crowdfunding, and this despite the fact that their published works on these subjects extend back at least to the 1990s, i.e. before the advent of the Internet. Technology advances and evolves, opening up new opportunities at every level and in every field of endeavour, but the human motivations that underpin crowdfunding have always been a constant feature of society and communities in general. Accordingly, it is only natural that the more recent scholarship on crowdfunding should reach back to the research conducted in past decades on behavioural and motivational science and the economics of giving.

As we saw in his author profile, Deci co-founded self-determination theory (SDT), which is described as a macro-theory of human motivation that distinguishes between autonomous and controlled forms of motivation. His publications date back to the 1970s, and SDT to the mid-80s, justifying his role as a founder for the literature on crowdfunding.

Andreoni broadens the behavioural and motivational side by approaching charitable giving from the perspective of economics. His earliest article on charitable giving clearly demonstrates this perspective: in fact, "An Econometric Analysis of Charitable Giving with Interdependent Preferences", co-authored with J.K. Scholz, was published in 1998 in the journal *Economic Inquiry*. Moreover, a survey of his published works shows that this scholar's principal area of research is 'the economics of philanthropy'.

Also of interest is Andreoni's editorial history: he has been on the board of editors of numerous economics publications, including *American Economic Review* (Associate Editor 1999-2004). This publication, as we saw above in the Cited Sources table (chapter 3.2.1 Cited Sources), ranks sixth in the top ten classification of cited sources, and third (out of five) in the green cluster.

Belleflamme, Burtch, Mollick and Zheng are arguably the principal disseminators of the crowdfunding phenomenon in the academic literature, considering only articles published in English. This is based on their positions (fourth, fifth and sixth place) in the cited author ranking, while Zheng dominates in terms of output. A look at the focus and range of their published articles would appear to justify this assertion.

Belleflamme researches crowdfunding from several diverse but related empirical standpoints, including those of industrial organisation, crowdfunding models and practices (e.g. donation vs. compensation), economics, and the comparative performance of different crowdfunding platforms. In other words, he investigates both the fundraising stage and the implementation phase of the crowdfunding process. Belleflamme's citation ranking also suggests that he is regarded as an authoritative, quality source by his peers.

Burtch is a specialist in IT management and data analytics. His articles, as we have seen, also adopt a predominantly empirical approach to data-related issues of crowdfunding. One good example of this is how data privacy affects crowdfunding contributions, a topic which brings together and combines the three pillars of the crowdfunding phenomenon: social behaviour, information technology and economic performance.

Like Belleflamme, Mollick considers crowdfunding from an empirical, entrepreneurial perspective. His research addresses crowdfunding as a broad-based phenomenon, focusing on its dynamics and outcomes. He suggests reasons for the findings of his surveys and analyses, leaving the door open for further, more specialised studies on specific aspects of crowdfunding. He also compares crowdfunding with traditional venture capital in two articles; the findings of this research, namely that the 'crowd' is as good as the 'experts' in judging entrepreneurial quality, are sufficient to warrant further investigation, which also justifies his status as a disseminator.

Zheng, as we have seen, tops the classification of authors in our quantitative analysis. Based in China and publishing in English, Zheng may be regarded as an important disseminator of crowdfunding research for several reasons.

Firstly, China ranks second in terms of crowdfunding article output, behind the USA, reflecting the importance attached to this phenomenon in that country and its universities.

Secondly, Zheng was publishing research on crowdsourcing before the research specifically on crowdfunding, which as we have noted is a sub-category of crowdsourcing, began to develop. As crowdfunding research gained traction, Zheng turned his attention to this subject.

Thirdly, and perhaps most importantly, Zheng's articles cover crowdfunding from both the sponsor's and the entrepreneur's perspective, and consider both the fundraising and the implementation stages of the crowdfunded project process. He has also developed research

models to analyse the key variables in determining the success of a crowdfunding project. All of these factors warrant his status as a 'disseminator'.

#### 4.1 Limitations and further research

Naturally, this analysis is to a certain extent limited by a number of factors.

These factors include the fact that only one program was used, namely “Vos Viewer” and only one search engine, namely Web of Science.

Accordingly, the use of other search engines and different visualization programs, as well as different criteria, would produce different results.

This is obviously an area that merits further research, but it lies beyond the scope of this thesis.

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