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Gauging Demand for Evidence and Accountability in Impact Investing by using Twitter Social Network Analysis: A Methodology

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GAUGING DEMAND FOR EVIDENCE AND ACCOUNTABILITY IN IMPACT INVESTING BY USING TWITTER SOCIAL NETWORK ANALYSIS: A METHODOLOGY

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Abbreviations

API	application programming interface
CDI	Centre for Development Impact
CSR	corporate social responsibility
GB	gigabyte
GIIN	Global Impact Investing Network
GIIRS	Global Impact Investing Rating System
IDEAS	International Development Evaluation Association
IRIS	Impact Reporting and Investment Standards
MDG	Millennium Development Goal
RAM	random access memory
SDG	Sustainable Development Goal
SNA	social network analysis
UEA	University of East Anglia
UHNWI	ultra-high-net-worth individual
UNDP	United Nations Development Programme
UNSF	United Nations Social Impact Fund

About the authors

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About this report

This report explains the methodology used to analyse the demand for evidence and accountability within the impact investment market. Social network analysis (SNA), qualitative interviews and ego network analysis¹ were used to explore actors within this market (or system), drawing on data from Twitter to consider connections, influence and conversations about social impact. To date, all data collection for the Twitter SNA has been completed from 10 May 2016 to 18 July 2016, and a Policy Briefing has been produced from the initial findings (O’Flynn and Barnett 2016). Qualitative interviews and ego network analysis as part of the second half of the research are ongoing. A longer report regarding the main analysis and findings is also planned.

¹ Ego network analysis consists of looking at a focal ‘node’ – be it an individual, company or group – and the relationships or flows between the central actor and the nodes surrounding it. It also looks at the ‘ties’ (connections) between the surrounding nodes.

1 Background

The global Sustainable Development Goals (SDGs) represent a significant shift in emphasis from that of their predecessor, the Millennium Development Goals (MDGs), in that they apply to all countries and give greater visibility to the role played by the private sector (Mancini and Morales 2015). This shift has the potential to transform how the global community addresses the major challenges of the coming decades through a variety of fields – in particular, how to achieve long-term sustainability in the face of growing consumer demand and planetary boundaries, and how to address growing inequalities of wealth (Leach, cited in Bumpus 2015).

The private sector is already emergent in the international development field, having now moved well beyond simplistic notions of corporate social responsibility (CSR). A range of individuals, companies and asset owners are looking to invest capital in innovative ways. These include: impact investing, mission-based investments, socially responsible investments, social impact bonds, climate finance, social entrepreneurship, and diaspora bonds, among others. These measures seek to promote social and environmental returns as well as financial returns.

This field of innovative finance, and its role within international development, requires further analysis and consideration, particularly when it comes to evaluation practices (Balkus, Luque and Van Alfen 2014; Brest and Born 2013; ET Jackson and Associates 2016; G8 International Development Working Group 2014). With a public sector-dominated evaluation sector field in international development, there is little consensus about what level of robustness is appropriate with different actors (Picciotto 2015). Claims can be made for publicity purposes, or stop short of fully understanding meaningful and transformative change. Flynn, Young and Barnett (2015) note the range of initiatives that have emerged to fill this gap, the burgeoning market of metric-based and compliance-driven standards (e.g. the Impact Reporting and Investment Standards (IRIS), Global Impact Investing Rating System (GIIRS), B-Corp certification, etc.), as well as the 'plethora of documents compiling and/or presenting various tools and approaches for social impact assessment' (*ibid.*: 2).

Yet as the field continues to evolve, the demand for a more evaluative perspective remains largely undeveloped. Earlier work by the G8 Social Impact Investment Taskforce (2014) highlighted the challenge of setting measurable impact objectives and tracking their achievement.

These issues were discussed at the New Frontiers for Evaluation international conference co-hosted by Wilton Park and the Centre for Development Impact (CDI) in 2015 (Clarke, Barnett and van den Berg 2015). They were also covered in subsequent panel discussions at the Global Assembly for the International Development Evaluation Association (IDEAS) in Bangkok (IDEAS and United Nations Development Programme (UNDP) 2015). These discussions outlined the need for research to advance the field of 'social impact evaluation'. In particular, research needs to contribute to a greater understanding of impact measurement and the impact investing field by answering the following questions:

- **Demand:** Who is driving the demand for evidence within the current system? What types of evidence, in whose interest, and how might this be re-shaped?
- **Evidence:** What innovative and appropriate ways are there to measure the 'social impact' of innovative finance? To what extent are (and can) the views of the poorest and most marginalised be captured and deliberated?
- **Accountability:** Given the primary accountability to shareholders rather than the public, how can citizens have a voice in the investment process? What role is there for participatory processes of evaluation, including the public deliberation of evidence?

2 Addressing demand for evidence and accountability

Given limited research to date exploring the nature and extent of the demand for impact evidence, there is a need to map the emerging landscape of impact investment: the different stakeholders; supply and demand in the marketplace; and, most importantly, drivers for accountability for results and evidence within the system. Knowledge of the current state of the system, and the role played by different stakeholders, is important in determining what demand there is for evidence, as well as accountability to a broader set of stakeholders, including citizens and those affected by investments. This research aims to contribute to a deeper understanding of the interests that drive demand for different types of evidence, and the different accountability relationships.

2.1 Research objectives and questions

There is evidence that the impact investing market is fast developing, with many new players and emerging norms around metrics, certification, etc. (Flynn *et al.* 2015). To date, there is some consensus that there has been insufficient focus on social (and environmental) value to support claims of impact – particularly on poor and marginalised people (Reeder *et al.* 2015; Brest and Born 2013; PricewaterhouseCoopers (PwC) 2014). Some anecdotal evidence cites cost considerations, and the lack of professional capacity to robustly evidence impact, as major factors behind this.

When evidence is used – in the form of emerging norms around metrics, certification, etc. – it is primarily being used as an on-boarding mechanism by asset managers in the industry – i.e. an attempt to bring asset owners to their specific funds (Bridges Ventures 2016; Principles for Responsible Investment 2013; Tickle 2016). In this context, we hypothesise that there is a democratic deficit emerging, whereby there is insufficient evidence and accountability to citizens affected by the investments – whether directly or indirectly – and particularly for the poorest and most marginalised groups.

The following research questions further set out the scope of the impact investing sector, focusing on the demand and supply of evidence and how it is used.

- **Describing the system: What is the market / ecosystem for impact investing?**
 - Who are the key actors/players?
 - Who has influence? Or, in terms of SNA, who are the influential nodes for dissemination of information and who are the brokers connecting people/organisations? What forms of communication do actors use? Is communication between actors for the sharing of best practice or the development of a service user/service provider framework?
 - How much focus is there on the developing world (and international development) with regards to impact investing?
 - What demand is there for data/metrics/evidence within the ecosystem?
 - Who supplies data/metrics/evidence to the ecosystem?
 - How is data/metrics/evidence used by actors in the ecosystem? Is knowledge shared internally, or are lessons of best practice shared among the community?

- **The role of evidence: To what extent is evidence of social value important within the market/ecosystem?**
 - How important is evidence of impact across different actors (asset managers, asset owners) and the rest of the industry?
 - What role does evidence play within the impact investing market/ecosystem?
- **Accountability to citizens: To what extent is there a democratic deficit?**
 - What factors promote or hinder a democratic deficit within the impact investing market/ecosystem?

2.2 Research approach

These research questions/hypotheses are to be addressed via the following methods:

1. Conducting a Twitter social network analysis (SNA) of the impact investing field using network and data visualisation software (NodeXL) to obtain a rapid analysis of the key players in the market/ecosystem.
2. Qualitative interviews and ego network analysis, which will consist of:
 - a. an identification and selection phase, taken from both the key actors within the SNA and from internet research of further key actors and companies, compiled for review;
 - b. qualitative interviews and ego network analysis that deep dive into drivers for accountability for results and evidence within the system;
 - c. analysis of ego-networks, focusing on some of the key players/actors, further demonstrating their drivers for accountability, results and evidence.

2.3 Definitions

Throughout this two-tiered approach, it is important to keep a consistency of language, so we have adopted the criteria used in the Global Impact Investing Network (GIIN) membership base, with some additions to make it more relevant for the Twitter social network.² This is to be used not only as a filtering device for the list of actors, but also to ensure that within the Twitter SNA and qualitative interviews/ego network analysis, attention is paid to all groups of actors within the impact investing ecosystem. These actors are identified as follows.

- Asset managers – interested in impact investing or incorporating elements of impact investing practice (e.g. impact measurement) into their activities.
- Asset owners – who have the capacity to directly deploy their capital into impact investments.
- Service providers – including research centres, investment advisors, policy advocacy groups and policymakers, technical assistance providers, industry networks, consultants, law firms.
- Media – who aid the impact investing discourse through mass communication, but have no direct relation to capital deployment.
- Investees – individuals or companies in direct receivership of capital.
- Advocates – individuals who are not engaged in any capital deployment or service capacity, but are engaged in the impact investing movement.

² There are further definitions in the Annexe with regards to metrics that analyse the social network.

3 Methodology

3.1 Social network analysis

A key motivation for undergoing SNA is the ability to look at a network of connections that is visible within a community, identifying the key actors and interactions that formulate impressions symptomatic of the impact investing sector. SNA looks at how relationships (strong or weak) can influence actor behaviour and outcomes. It assesses the structure of a social network, and identifies where opportunities may lie in connecting individuals and/or organisations. In reference to our research hypotheses, SNA allows a foray to look at the connections between actors within the impact investing sector, which can capture supply and demand in the marketplace and drivers for accountability for results.

One of the main principles of SNA is that networks are dynamic and emergent, with a range of overlapping groups, and SNA allows us to see how these groups are related to one another. The field of impact investing is still an emergent space, with new actors coming in, so by watching the process of emerging relationships through Twitter, this information could be utilised to indicate emergent trends acting as proxy of the growth and maturity of the market. With SNA, one finds that actors are connected to one another in numerous ways. These patterns of connection combine to form a social space. SNA mapping allows analysis of this social space to see how relationships are developing (Falci n.d.). Additionally, the network defines who key actors are within the space, through their connectivity or their ability to 'broker' between different sub-groups. This removes some heuristics as to perception of the main actors as an analytical approach.

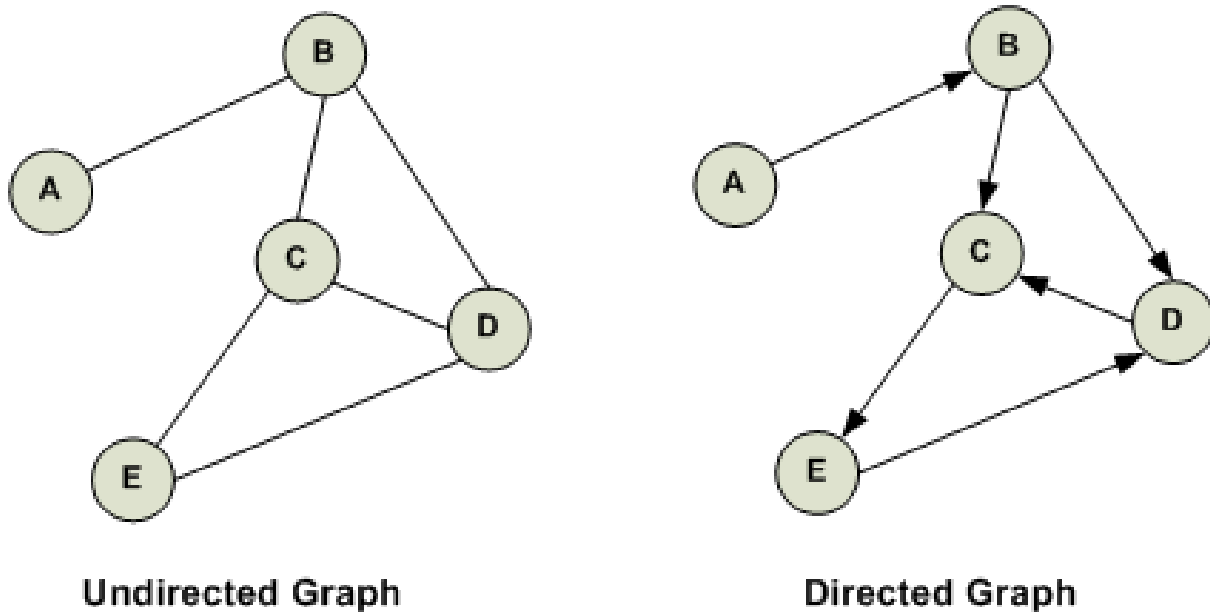
The methodology will be presented as follows: first, we explain why we decided to use Twitter as our platform for SNA, and why other approaches of assessing the network may not be as suitable at this stage. Then, we look at the limitations of SNA and, more specifically, Twitter SNA in terms of how accurate a proxy it may be for real life. Following from this, we define the parameters for SNA (including choice of hashtag and choice of software), then explain how the data will be analysed in relation to key research questions and, subsequently, the period of assessment/analysis.

3.2 Why Twitter?

Problems in identifying the scope and scale of the impact investing space have led to there being an indeterminate number of asset owners, asset managers and service providers in the industry (GIIN 2016b). Not only has this created an issue within the literature to try and estimate the size of the impact investing market (Martin 2013; World Economic Forum 2013), it also creates an issue for SNA where the intention is to look at and map the players in the market, both established and emerging.

Using SNA methodology to look at the interconnectedness of actors relies on clearly defined boundary conditions. These boundary conditions set the social space from which analysis can be done. The social space can be at the level of the organisation, country, or some other predetermined unit. In this case, units can be referred to as asset owners, asset managers and service providers. Demand and supply for evidence and accountability can be addressed through the informational flow between these units or, in the language of SNA, a directed tie (see Figure 3.1). This is more important in the scope of our analysis as we do not just want to look at associations between different organisations, rather direct relational ties and contacts between actors. However, this is challenging because it is difficult to assess where information is received 'from' and 'sent to' when there is an indeterminate number of actors.

Figure 3.1 Example of an undirected vs directed tie between actors



Source: www.codediesel.com/algorithms/building-a-graph-data-structure-in-php/. Reproduced with kind permission.

Twitter is able to provide solutions for both of these issues. First, its boundary is linked to a hashtag, which categorises tweets of a certain theme (in this case, impact investing). Thereby it is capturing individuals and organisations that are involved (or wish to be involved) in the space. Second, it is able to assess directional flows of information – notably mentions (i.e. ‘I just had lunch with the team @impactalpha’) and replies to tweets (‘@pete_oflynn Thanks for a lovely afternoon’). The dialogue that is captured is current, within the public domain, and directed, ensuring that meaningful flows of information are being captured. This dialogue may contain everything from the promotion of events, to the collaboration and sharing of resources. Additionally, it is standard organisational best practice for service providers and actors on Twitter to follow and communicate with their investees/clients as part of a social media strategy (Twitter 2016), so it may be reasonable to assume that communication on the platform provides some small reflection of real-life communications.

Within Twitter SNA, there is benefit in capturing discussion beyond the organisations that make up the impact investing ecosystem, but also the key individuals that are part of the impact investing discussion (for instance, Abigail Noble, CEO at The ImPact and previously Head of Impact Investing at the World Economic Forum @ab_nobel). Through tracking live discussion, it allows inferences about the state of the community at a given point in time; continuous analysis of this community will further capture discussion of the expectation of where the market wants to be, and where it is. Additionally, because there are a multitude of interactions occurring on Twitter, SNA gives the ability to look at the dominant conversations and sub-conversations that will be occurring among various sub-groups. This will allow for analysis at the micro, meso and macro levels, where focus can be applied to the conversations of interest and the scope of the network as a whole – all the while identifying the key players who are forming/shaping the impact investing dialogue. This will not only capture many of the relevant stakeholders in impact investing but also those who are engaged in the process but who may not have capital to invest/manage and hence may be under-represented on a list approach. This latter group includes the media and the wider public willing to be engaged in delivering social impact.

3.3 Why not use another form of social network analysis, such as a survey-based approach?

As already explained, SNA is contingent on having clearly defined boundary scopes. Because there is no clearly identified set of actors, a survey approach such as a secondary sourced list would require participants to answer a survey about who they knew in a network (which may be up to thousands of actors) and then be questioned about where their drivers for evidence and accountability come from. Low response rates to questionnaires – and limited responses due to survey fatigue and having to clarify each point of connection between each and every actor – could hamper the analytical power of SNA as not all connections would be captured. This means that tools and metrics to assess the importance of key players to the network (such as betweenness centrality)³ could be weakened as the network would have less power.

A potential workaround to this survey fatigue/low response rate is to ask participants to list their ‘top ten’ or key boundary partners for certain issues relating to the network. This can be prone to bias though, and would be contingent on the participant’s role in the impact investing field, as well as gamification (as individuals may wish to promote certain people higher up the network). Most importantly, while it captures importance to the network, it does not capture sentiment regarding evidence and accountability. It may be more suitable to use Twitter, where a network is already defined and a conversation already occurring. Additionally, the SNA of impact investors is easy to replicate and creates the opportunity for continuous analysis (through a series of snapshots) where one can see how the conversation/debate is changing and the emergence of new actors.

3.4 Limitations of using Twitter social network analysis

Twitter captures one type of social media activity, which will be only partially representative of real life or, indeed, of the social media engagement of an organisation or individual. It will underplay those actors that are less active in using Twitter, but who might still be influential within the ecosystem. Twitter may be a platform for impact investing within the global North, but is it necessarily being used by actors in the global South? Preliminary analysis of the market indicates that the market is very US/European centric on the asset manager/asset owner and service provider side.

Similarly, there may be a self-selection bias as to which organisations use Twitter, particularly as those who are service providers to asset owners/asset managers seek to promote their services and have more active social media strategies. Some parties that prefer to engage in impact investing discreetly, such as ultra-high-net-worth individuals (UHNWIs) and their family offices, are unlikely to be engaging through an online social networking platform discussing the impact of their investments. However, being a discreet community and not necessarily seeking publicity, it would be difficult to identify these actors regardless, particularly if they were involved in private equity investments for impact.

Furthermore, there are data download issues (to be touched on later on), which mean that batches of tweets regarding a certain hashtag (see below) capture a one-week period of Twitter conversations. To address this, this exercise is repeated over a two-month span, not capturing all the conversation by these actors, but limited to the social impact investing field (i.e. #impinv and #impactinvesting, discussed below).

Regardless of the concerns, this form of analysis will produce a preliminary foray into scoping the nature of this market, while identifying the emerging conversations in such a way that direct flows of information between actors can be seen. Being able to access lots of data

³ For full descriptions of metrics used in SNA, please refer to the Annexe.

quickly, establish a boundary around a somewhat unbounded market, and have actors already engaging in conversations – which allows identification of key actors – is advantageous at this early stage. When combined with the second half of this methodology, engaging in qualitative interviews and ego network analysis, it will have a lot more power in mapping the emergent sphere, and assessing where the drivers, demand and supply for evidence and accountability come from.

3.5 Defining the parameters for social network analysis

3.5.1 Which choice of hashtag?

After an extensive search through Twitter and a number of social impact investing blogs (Maretich n.d.; Horoszowski 2011), SNA was conducted on the two main hashtags, #impinv and #impactinvesting, which proved the most common metatags for impact tweets. These two hashtags more appropriately capture the field of impact investing, as opposed to #socfin, #SRI, #3bl (corresponding to triple bottom line investing). Additionally, these hashtag choices limited any other potential ‘noise’ coming from Twitter that was not relevant to the impact investing conversation and would capture only the relevant organisations/individuals in the field. One assumes, for the purpose of this analysis, that improper use of the hashtag – for instance, those engaging in some other venture – would not be mentioned, retweeted or replied to as it is not relevant to the conversation; therefore, it would not feature strongly in the SNA because it would not create a relevant conversation.

Although limiting the SNA to two hashtags had certain advantages, it also had some drawbacks. When focusing on the sentiment of evidence and accountability within impact investing, one may not expect actors engaging in a conversation on Twitter to use the hashtags in each and every tweet in the conversation; thereby, when identification occurs, further research may be required. Conducting qualitative interviews and using ego network analysis to identify evidence and accountability trends will capture more information on these themes.

3.5.2 Choice of software

One can collect, analyse and visualise social media network data from Twitter using NodeXL, which is an add-in for Microsoft Excel. The tool automates a data flow with the ability to import from a Twitter search network, in which we asked NodeXL to add an ‘edge’ (a connection between two Twitter users) that is formed when Twitter accounts follow, reply or mention one another. When requesting a search string (such as the hashtag #impinv), you can return up to 18,000 tweets. However, due to processing requirements and the popularity of the term #impinv, a search of 5,000 tweets was more appropriate. A limitation of Twitter SNA is that there is an age limit to the tweets that will be returned by your search, of roughly a week or eight days.

The benefit is that you see the current state of the market; however, the limitation is that you cannot produce the historical data of tweets, which could demonstrate the market as it was evolving. Because the conversation evolves over a period of time, with the introduction of new research and new investments, a study of a longer time period would require repeated data collections (batch collections) of the network (to capture tweets referencing #impinv and #impactinvesting in the previous week). Another issue is that this process of download can be timely, as there are only so many times per 15 minutes that NodeXL is allowed to query Twitter’s API (application programming interface). It is recommended to run analysis on each week’s worth of tweets rather than combine the conversations that occur over the period of analysis, as workbooks with more than about 15,000 edges require at least 8 gigabytes (GB) of random access memory (RAM); 16GB or even 32GB of RAM may be required for even larger networks, making visualisations of the network cluttered, but also less intuitive to understand.

A number of factors can present risks here: first, Twitter's API can be subject to a lot of demand at any one time, which may reduce the size of the sample you are looking for, and may lead to only obtaining one day's worth of tweets. To resolve this issue, the authors of this paper recommend downloads for times when requests on the API are not significant – for instance, outside of US business hours. Second, the API can change at any time, without any notification from Twitter, so consistency of long-term analysis can be limited.

Downloading these data will show all the connections (or edges) between two people who tweeted within the sample period, corresponding through the hashtag. These edges capture replies, mentions and retweets that use the same hashtag. This means that one captures the conversations that are happening on Twitter, and the level of engagement through this platform. This will not reflect all the engagements, but will rather act as a proxy for the individuals involved.⁴

3.5.3 Analysing the social network

Once the data have been downloaded, a number of metrics and a range of processing steps can be calculated and performed, in order to get a greater understanding of the social network.⁵ These range from temporal analysis (capturing traffic and key events over the research period) to the overall structure of the network (where density and network shape will be of interest), but also to the key individuals, which will be mapped from a series of metrics of centrality.^{6,7} Conducting salience analysis, using a list of words relevant to evidence and accountability, and then deep diving into how this terminology is being used, will give a greater understanding of demand and supply for evidence and accountability within the impact investing system. From these sets of information, one can obtain a range of data visualisation approaches through which it is possible to view the network (see Figures 3.2 and 3.3).⁸

The purpose of these metrics (in relation to the key research questions) is:

1. To identify the scope of the network in the macro sense – looking at network shape and where clusters are forming – and using this to work out what the eco system of impact investing actors looks like using a Twitter platform;
2. To use metrics of in-degree, out-degree, and centrality to identify who the major players are over time. This will help determine who has influence (important nodes and connectors) so that they can be contacted for qualitative interviews and ego network analysis. Furthermore, it enables the research to go into more detail. For example, it allows researchers to look at what characteristics key actors have and share. Where are they tweeting from (for instance, the global North or South)? What topics do they include in their tweets? What attributes characterise subgroups in the network?;
3. To identify peaks in traffic in use of the hashtag, and pay particular attention to what content delivers these peaks in usage. This is to include associated hashtag analysis, key word pairings and most cited URLs. This will give a rough proxy of what events the market deems important, or resonates with the greatest number of actors;

⁴ Currently, it is not possible to see through NodeXL advertised tweets and their relative impact on the network, but it is believed that this will become a source of analysis in future updates to the programme.

⁵ For a full list of potential metrics used, please refer to the Annexe.

⁶ For further detail, please see this blog: <http://cdimpact.org/blog/identifying-worlds-most-important-impact-investors>.

⁷ Conway (2009) notes that the relationship between eigenvector and betweenness centrality can help identify key actors within the network; alternative models (such as Willis, Fisher and Lvov. 2015) track through Twitter using PageRank.

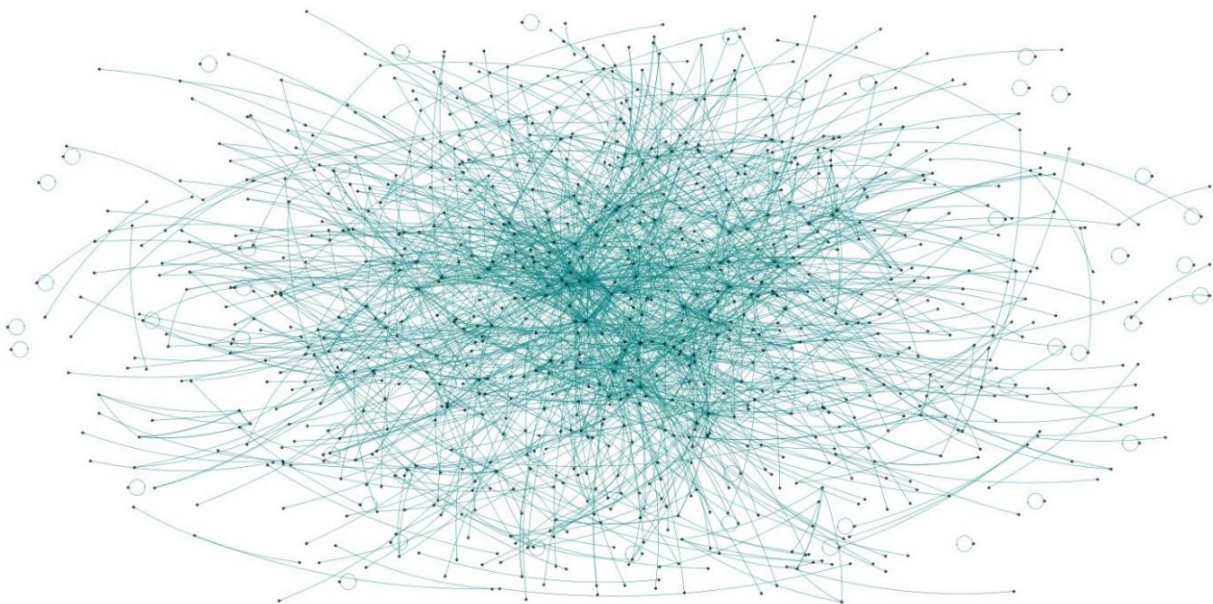
⁸ Difficulties in aggregating the data on a week-by-week basis due to the computational power of calculating and understanding the social network mean there are limitations in the visualisation approaches; but key actors, and some metrics of network centrality (namely in-degree and out-degree) can be combined over the period to get a stronger impression. This gives a greater understanding of when individuals have a more consistent output, or make timely tweets that resonate with the community.

4. To use keyword and sentiment analysis to see, within the impact investing tweets, how much of a focus there is on evidence and accountability. Furthermore, it allows researchers to delve deeper to see what conversations are occurring around evidence and impact. It can assess where gaps are within the network, in which brokers can bring forth opportunity for evaluation;⁹
5. To produce meaningful data visualisations of the network, so that the impact investing sphere can be mapped.

The intention is that in addition to identifying the key actors and salience of evidence, a review of conversation groupings will take place. Conversation groupings are one viewpoint where clusters can occur, seeing where information sharing is prominent. An advantage of this is that one sees natural clusters form around certain individuals, which would highlight a greater need for analysis of those individuals. This exercise will demonstrate the level of connectivity, and has the potential to assess where there may be gaps in the market in sharing best practice and exchange of information.

It is important that weekly downloads of data (batch process) take place at the same time each day, to ensure that no data are lost. This means that should more than 5,000 edges be created within the week, there is scope and opportunity to make the sample size larger. The data for each week should be treated in a uniform manner. However, this is not always considered best practice for SNA, as each network will have different properties unique to the period of time being assessed. It will, though, allow for easy comparison of the network and network data over the analysis period. At this proposed moment in time, the plan is to capture the following metrics and then visualise the network on any given week, taking note of any particular events or occurrences during that week.

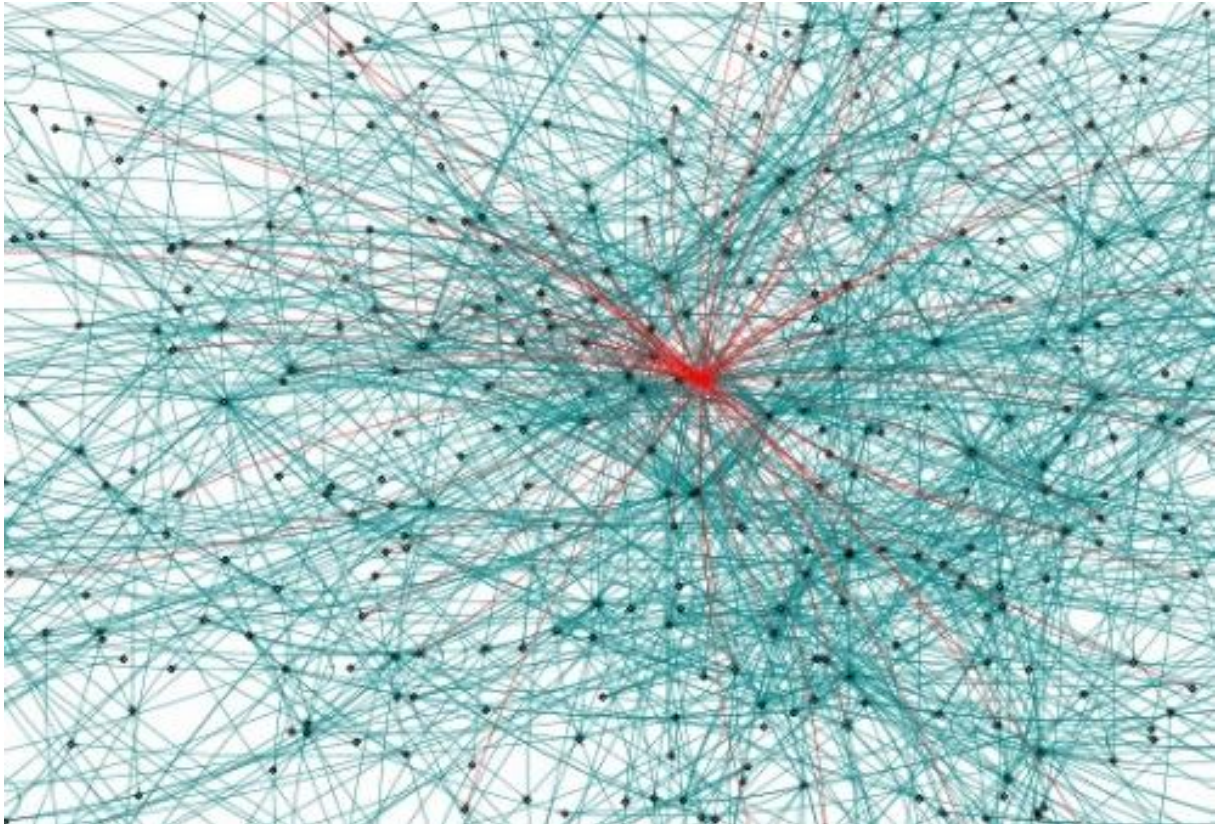
Figure 3.2 Network map of tweets using #impinv on 11 and 12 May 2016



Note: Each dot is a corresponding Twitter account.

⁹ Note that this step will require substantive cleaning of the data to provide meaningful insights. This can take a lot of time and may involve some tricky decisions. Our attempts will be through the analysis to standardise the dataset, without creating any bias to ensure minimal ambiguity in sentiment analysis.

Figure 3.3 The United Nations Social Impact Fund (UNSIF)’s network of tweets on 11 and 12 May 2016 within the whole network, capturing individual account contribution



3.5.4 Period of assessment

The proposal is to analyse two months’ worth of social network data initially (10 weekly batches).¹⁰ This allows for ten weeks of iterations, in which it is assumed that major players within the impact investing sphere will engage in Twitter – but the period could be extended or repeated in a year’s time to show how the network has changed. This is because some accounts do not necessarily engage in day-to-day communication, but rather in bursts around the release of a publication/announcement of a particular event. A limitation/concern is that released publications throughout the period may place more importance on some actors. However, over ten weeks, one would expect these factors to average out as the effects of short bursts (and their subsequent conversations) would only be around the weeks of publication. Furthermore, it reflects the very current state of the market, and what is dominating conversation. It would be possible to replicate this analysis in a separate period should there be any confounding factors hampering Twitter analysis during this period.

¹⁰ Please note that as explained in the section entitled ‘About this report’, data collection has already been conducted from 10 May 2016 to 18 July 2016 and initial findings can be found in O’Flynn and Barnett (2016).

4 Qualitative interviews and ego network analysis of the impact investing space from a generated list of key actors

Noting the limitations of Twitter SNA, it is important, when mapping the impact investment landscape, that: (1) one considers those without a social media platform; and (2) judgements from those inside the industry, particularly from those in the global South, determine whether there is insufficient focus on social (and environmental) value to support claims of impact and whether there is a democratic deficit. Because of this, it is preferable to expand the analysis to three further key elements, in order to see the granularity of the drivers for accountability, results and evidence within the impact investing ecosystem. These three processes are as follows.

1. Undertake an identification and selection phase, taken from the key actors within the SNA and from internet research of other key actors and companies, compiled for review;
2. Conduct qualitative interviews and ego network analysis to deep dive into drivers for accountability for results and evidence within the system;
3. Analyse ego networks, focusing on some of the key players/actors, further demonstrating their drivers for accountability, results and evidence.

We now look at each of these three processes in turn, highlighting any limitations.

4.1 Undertake an identification and selection phase to generate a list of actors in the impact investing space

Recognising that key actors within the Twitter SNA provide a proxy for the whole impact investing market, a complementary approach has been undertaken to ensure that we engage with a sample that allows a more in-depth understanding of the diversity of the impact investing sector. For this, generating a list of impact investing actors – while not the overall aim of this research – allows one to generate a further understanding of the impact investing market. With this resource, different asset managers, asset owners and other individuals engaged in the sector can be identified.

Individuals for the list are collected through two methods. The first is to use the analysis of the Twitter SNA to conduct qualitative interviews with influential nodes, be they organisations or individual accounts. During those interviews, further key individuals may be sought. The other method is to use secondary source analysis with snowball methodologies to identify further key actors who are not on Twitter – for instance, Sir Ronald Cohen. Identification of actors for this list has come from sources including the G8 Impact Investment taskforce delegates list (G8 Social Impact Investment Forum 2013), list of funds, impact investors/companies as listed through ImpactSpace (ImpactSpace 2016), a list from CDI partners, and the Global Impact Investing Network (GIIN 2016a). This list has also been used as an internal resource for the authors of this report to ensure that qualitative interviews are conducted with relevant interviewees who are not active on Twitter, paying particular attention to actors from the global South. The overall aim of this sample is not to generate anything representative, but rather to identify a selection of key actors and actor types to help us interpret and better understand the Twitter SNA.

The information captured in this list of actors can provide an overview of the organisations involved, while still outlining key descriptions of their role in the impact investing ecosystem, as well as what specific fund and/or programmes each is involved in. The full detail is as follows: organisation name, HQ (country), HQ (city), additional offices (countries), organisation type (asset manager, asset owner, investment advisor, other industry stakeholders), description of organisation, specific funds/programmes the organisation invests in, website details, do they work in the global South? And whether they are a member of the GIIN.

This information, particularly with reference to funds/programmes, should go beyond what can be captured in the flow of information in the Twitter analysis (primarily their dialogue), to capture the extent to which they are engaged in impact investing (actions rather than words). More importantly, this list will capture those organisations specifically working in the global South. Though it is possible that some major players may be left out of this list, using the variety of sources available (as well as the Twitter analysis), it attempts to be exhaustive to provide as much clarity as possible on the major players in the sector.

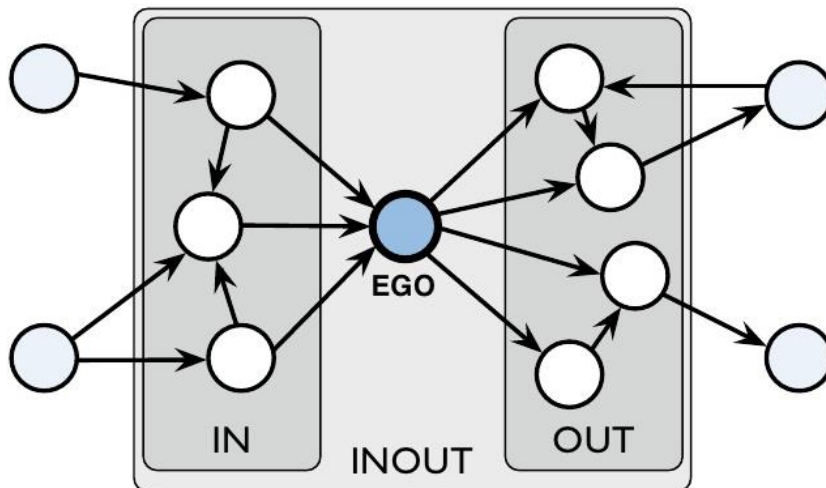
Based on this list of key actors in the impact investing ecosystem, careful thought will be given as to who to select for qualitative interview. Of particular importance will be those who are believed to be recipients of information (asset owners), but also service providers and asset managers. Additionally, given the authors' focus on international development, those who work (i.e. invest in, manage funds or provide services) in the global South will be prioritised for qualitative interviews and ego network analysis, should they not come up in the Twitter SNA.

4.2 Conduct qualitative interviews and ego network analysis

After the identification and selection of individuals, both from the Twitter SNA and secondary research, an outreach phase will begin. It is intended that as many face-to-face discussions take place as possible, but depending on resources and the number of actors in the global South, interviews are likely to take place over the phone or on Skype.

Qualitative interviews will be of a semi-structured nature, engaging on issues related to the focus of evidence and accountability with regards to measuring impact in the network. Similar focus will take place through ego network analysis, which is similar to SNA but has one major difference: ego networks focus on a focal node ('ego') (see Figure 4.1) and the nodes that ego is directly connected to ('alters'). The analysis would focus on the key players alters, and see how the strength of their ties varies with regards to evidence and accountability. The purpose of this would be to establish who the key providers of evidence are and why they prioritise certain key stakeholders. This will be done by qualifying nodes (individuals within the organisation) to characterise actors based on their expressions of access to impact evidence, unmet desire for impact evidence, or no expressed desire.

Figure 4.1 Illustration of an ego network



Source: Zimmermann and Nagappan (2008). Reproduced with kind permission.

As the research seeks to go into more depth on a case-by-case basis of the key actors and players within the impact investing space, qualitative semi-structured interviews are to be conducted. Within this, the focus will be on 'drivers for accountability for results and evidence within the system'. It is intended that interviews will be conducted with a range of asset owners, asset managers, investment advisors and other stakeholders to ensure that multiple perspectives are collected. Technological requirements (using Skype) makes ego network analysis potentially less feasible, but some of the relevant information can be captured in interview questions.

4.3 Analyse qualitative interviews and ego networks

Building on this range of information from the qualitative interviews, the next stage is to analyse the ego networks and SNA. The intention is for the findings to help drive analysis of the social network, looking for particular themes and characteristics, and to aid understanding of our research questions. This greater understanding of demand/supply and use of evidence of impact within impact investing, across different actors, will also provide broader benefits in structuring the final results, and enabling their interpretation by researchers. In particular, ego network analysis will demonstrate how different individuals in the network utilise evidence of impact, and where those major sources are. Ego network analysis can help identify gaps in communication regarding evidence and accountability, through gaps in the network. Addressing these gaps and understanding why they occur will help further understand and develop best practice in how to identify, measure and demonstrate impact.

Annexe

To enhance understanding of the metrics that SNA offers, and why it may prove such a useful tool, definitions of each metric (derived from NodeXL¹¹), with commentary, are provided, noting its relevance. These metrics are provided to note the flavour of the information within the network, but also to use and inform the ongoing analysis and visual representation of the network.

Standard graphical metrics

- Nodes: The individual actors, people, or things within the network.
- Vertices: The number of nodes in the social space (capturing all the Twitter accounts that received and sent tweets related to the hashtag within a week's period).
- Total edges: The number of edges (be that tweets, retweets or mentions) in the graph. Sum of the unique edges and edges with duplicates:
 - Unique edges: The number of edges that do not have duplicates;
 - Edges with duplicates: The number of edges that have duplicates. NodeXL skips duplicate edges when it calculates most graph metrics, because duplicates would make the results invalid.
- Self-loops: The number of edges that connect a vertex to itself. In terms of our Twitter analysis, this may be a self-referencing tweet.
- Connected components: The set of vertices that are connected to each other but not to the rest of the graph. These may contain sub-conversations that may be of interest to the analysis. The metric calculates the number of connected components.
- Single-vertex connected components: The number of connected components that only have one vertex. These connected components will not have as much relevance to the analysis, as there is no group conversation occurring.
- Maximum vertices in a connected component: The number of vertices in the connected component that has the most vertices – i.e. the number of vertices in the conversation containing the most actors.
- Maximum edges in a connected component: The number of edges in the connected component that has the most edges – i.e. the number of edges in the conversation that has the most discussion.
- Maximum geodesic distance (diameter): Where, among all vertex pairs, the maximum distance between two vertices along the shortest path between them is calculated. This captures the number of actors a conversation needs to go through before it reaches a certain individual/organisation.
- Average geodesic distance: Where, among all vertex pairs, the average distance between two vertices along the shortest path between them is calculated.
- Graph density: A ratio that compares the number of edges in the graph with the maximum number of edges the graph would have had if all the vertices were connected to each other. Duplicate edges and self-loops are ignored. Graph density captures the level of connectedness in the Twitter conversation.
- In-degree: A vertex's in-degree is the number of incoming edges incident to the vertex. A self-loop in a directed graph is counted once as an incoming edge (in-degree) and once as an outgoing edge (out-degree). This will capture the individuals/organisations that are referred to most often, which would capture key players over time.

¹¹ NodeXL (2016); NodeXL Pro.

- **Out-degree:** A vertex's out-degree is the number of outgoing edges incident to the vertex. A self-loop in a directed graph is counted once as an incoming edge (in-degree) and once as an outgoing edge (out-degree). This will capture the people who reference others the most in their tweets.
- **Betweenness centrality:** This is equal to the number of shortest paths from all vertices to all others which pass through that node. To view the formula, please see: https://en.wikipedia.org/wiki/Betweenness_centrality. Betweenness centrality is related to a network's connectivity, in so much as high betweenness vertices have the potential to disconnect graphs if removed (creating gaps in the conversation).
- **Eigenvector centrality:** Eigenvector centrality is the measure of the importance of a node in a network. It assigns relative scores to all nodes in the network based on the principle that connections to high-scoring nodes contribute more to the score of the node in question than equal connections to low-scoring nodes. To view how this is calculated, see: https://en.wikipedia.org/wiki/Centrality#Eigenvector_centrality.
- **Clustering co-efficient:** The clustering coefficient of a vertex in a graph quantifies how close the vertex and its neighbours are to being a clique (a complete graph). Self-loops, which would render the clustering coefficients invalid, are skipped. To read more, see: https://en.wikipedia.org/wiki/Clustering_coefficient.

Group metrics

The metrics above can also be used for specific groups, but one measure of group metrics can be defined.

Modularity: When a graph has groups, this is a measure of the 'quality' of the grouping. Graphs with high modularity have dense connections among the vertices within the same group, but sparse connections among vertices in different groups. When no groups exist, this is undefined.

Directed graph-specific metrics

- **Reciprocated vertex pair ratio:** In a directed graph (which will be used for our analysis), this is the number of vertex pairs that have edges in both directions, divided by the number of vertex pairs that are connected by any edge. Duplicate edges and self-loops are ignored.
- **Vertex reciprocated vertex pair ratio:** This is the number of adjacent vertices that are connected to the vertex with edges in both directions divided by the number of adjacent vertices.
- **Edge reciprocation:** An edge from vertex A to vertex B is reciprocated if the graph also has an edge from vertex B to vertex A.
- **Reciprocated edge ratio:** In a directed graph, this is the number of edges that are reciprocated, divided by the total number of edges. Duplicate edges and self-loops are ignored.

References

- Balkus, J.; Luque, M. and Van Alfen, T. (2014) *The Intersection of Impact Investing and International Development: A Primer*, Washington DC: McDonough School of Business, Georgetown University, <http://socialenterprise.georgetown.edu/sites/socialenterprise.georgetown.edu/files/The%20Intersection%20of%20Impact%20Investing.pdf> (accessed 1 November 2016)
- Brest, P. and Born, K. (2013) 'When Can Impact Investing Create Real Impact?' *Stanford Social Innovation Review*, Fall, https://ssir.org/up_for_debate/article/impact_investing (accessed 1 November 2016)
- Bridges Ventures (2016) 'A Practitioner-led Advisory Function', <http://bridgesventures.com/impact-plus/> (accessed 1 November 2016)
- Bumpus, A. (2015) 'Four Big Questions on Communicating the SDGs: A Conversation with IDS Director Melissa Leach', *Apidae*, 23 September, www.apidae.com.au/blog-1/four-big-questions-on-communicating-the-sdgs-a-conversation-with-ids-director-melissa-leach (accessed 1 November 2016)
- Clarke, C.; Barnett, C. and van den Berg, R. (2015) *New Frontiers for Evaluation in an Era of Market-oriented Development*, www.wiltonpark.org.uk/wp-content/uploads/WP1411-Report.pdf (accessed 1 November 2016)
- Conway, D. (2009) 'Social Network Analysis in R', presentation to the New York City R User Group Meetup, 6 August, http://files.meetup.com/1406240/sna_in_R.pdf (accessed 1 November 2016)
- ET Jackson and Associates (2016) *Field Building*, www.evaluatingimpactinvesting.org/topics/field-building/ (accessed 1 November 2016)
- Falci, C. (n.d.) *Social Network Analysis*, <http://advance.unl.edu/SocialNetworkAnalysis.pdf> (accessed 1 November 2016)
- Flynn, J.; Young, J. and Barnett, C. (2015) *Impact Investments: A Literature Review*, Brighton: IDS/Centre for Development Impact, www.cdimpact.org/publications/impact-investments-literature-review (accessed 1 November 2016)
- Global Impact Investing Network (GIIN) (2016a) 'Current Members', <https://thegiin.org/current-members> (accessed 1 November 2016)
- Global Impact Investing Network (GIIN) (2016b) *What You Need to Know About Impact Investing*, <https://thegiin.org/impact-investing/need-to-know/> (accessed 1 November 2016)
- G8 International Development Working Group (2014) *International Development: Subject Paper of the International Development Working Group*, www.socialimpactinvestment.org/reports/International%20Development%20WG%20paper%20FINAL.pdf (accessed 1 November 2016)
- G8 Social Impact Investment Forum (2013) *G8 Social Impact Investment Forum: Outputs and Agreed Actions*, www.gov.uk/government/uploads/system/uploads/attachment_data/file/225547/G8_Social_Impact_Investment_Forum_-_Outputs_and_Agreed_Actions.pdf (accessed 1 November 2016)

G8 Social Impact Investment Taskforce (2014) *Impact Investment: The Invisible Heart of Markets*,
[www.socialimpactinvestment.org/reports/Impact%20Investment%20Report%20FINAL\[3\].pdf](http://www.socialimpactinvestment.org/reports/Impact%20Investment%20Report%20FINAL[3].pdf)
(accessed 1 November 2016)

Horoszowski, M. (2011) 'Top 13 Twitter Hashtags for Social Entrepreneurs, Enterprises, and Investors', *MovingWorlds Blog*, 17 December, <http://blog.movingworlds.org/top-13-twitter-hashtags-for-social-entrepreneurs/> (accessed 1 November 2016)

ImpactSpace (2016) 'Impact Companies 6,244', <http://impactspace.com/companies>
(accessed 1 November 2016)

International Development Evaluation Association (IDEAS) and United Nations Development Programme (UNDP) (2015) *Bangkok Principles on National Evaluation Capacity for the Sustainable Development Goals (SDG) Era*, Bangkok, 30 October,
http://web.undp.org/evaluation/documents/NEC/2015/Bangkok_declaration.pdf (accessed 1 November 2016)

Mancini, M. and Morales, M.M.M. (2015) 'The Private Sector and the Sustainable Development Goals', *IDS Blog*, 24 September, www.ids.ac.uk/opinion/the-private-sector-and-the-sustainable-development-goals (accessed 1 November 2016)

Maretich, M. (n.d.) 'Best Twitter Hashtags for Following Trends in Impact Investing', *Maximpact Blog*, <http://maximpactblog.com/best-twitter-hashtags-for-following-trends-in-impact-investing/> (accessed 1 November 2016)

Martin, M. (2013) *Status of the Social Impact Investing Market: A Primer*, Geneva: Impact Economy,
www.gov.uk/government/uploads/system/uploads/attachment_data/file/212511/Status_of_the_Social_Impact_Investing_Market_-_A_Primer.pdf (accessed 1 November 2016)

NodeXL Pro (2016) *Social Media Research Foundation*, <https://nodexl.codeplex.com/>
(accessed 1 November 2016)

O'Flynn, P. and Barnett, C. (2016) 'Towards Greater Effectiveness and Accountability in Impact Investing', *IDS Policy Briefing* 126, Brighton: IDS, www.ids.ac.uk/publication/towards-greater-effectiveness-and-accountability-in-impact-investing (accessed 1 November 2016)

Picciotto, R. (2015) *The 5th Wave: Social Impact Evaluation*, New York: The Rockefeller Foundation Evaluation Office

PricewaterhouseCoopers (PwC) (2014) *Impact Investing: The New Paradigm for Poverty Reduction?*, www.pwc.co.uk/government-public-sector/assets/impact-investing-the-new-paradigm-for-poverty-reduction.pdf (accessed 1 November 2016)

Principles for Responsible Investment (PRI) (2013) *Sarona Asset Management: Driving Standardisation in Impact Measurement*, www.unpri.org/download_report/3928 (accessed 1 November 2016)

Reeder, N.; Colantonio, A.; Loder, J. and Rocyn Jones, G. (2015) 'Measuring Impact in Impact Investing: An Analysis of the Predominant Strength that is also its Greatest Weakness', *Journal of Sustainable Finance & Investment* 5.3: 136–54

Tickle, M. (2016) 'The Increasing Demand for ESG Scoring and the Benefits of Standardization', *TriLinc Global Blog*, www.trilincglobal.com/trilinc-blog/946/ (accessed 1 November 2016)

Twitter (2016) 'Twitter Followers', <https://business.twitter.com/en/basics/twitter-followers.html> (accessed 1 November 2016)

Willis, A.; Fisher, A. and Lvov, I. (2015) 'Mapping Networks of Influence: Tracking Twitter Conversations through Time and Space', *Journal of Audience and Reception Studies* 12.1: 494–530, www.participations.org/Volume%2012/Issue%201/30.pdf (accessed 1 November 2016)

World Economic Forum (2013) *From the Margins to the Mainstream: Assessment of the Impact Investment Sector and Opportunities to Engage Mainstream Investors*, Geneva: World Economic Forum, www3.weforum.org/docs/WEF_II_FromMarginsMainstream_Report_2013.pdf (accessed 1 November 2016)

Zimmermann, T. and Nagappan, N. (2008) 'Predicting Defects using Network Analysis on Dependency Graphs', *SlideShare*, www.slideshare.net/tom.zimmermann/predicting-defects-using-network-analysis-on-dependency-graphs (accessed 1 November 2016)



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