

---

# Business Angels, Social Networks, and Radical Innovation

Catherine Deffains-Crapsky and Peter G. Klein

---

## Abstract

Innovation is critical for firm and national competitiveness. However, financing innovation is increasingly difficult for early-stage, high-risk projects, as banks and venture capital firms are focusing on later-stage, less risky projects. To fill this gap, US and European entrepreneurs are turning for seed funding to Business Angels (BAs) and Business Angel Networks (BANs). We describe the role of BAs and BANs in the US and Europe from the perspectives of entrepreneurship theory and social network theory. We show how BANs can strengthen ties between entrepreneurs and individual investors under highly uncertain conditions. We also study the links between formal and informal private equity finance, raising wider questions about the funding and performance of clusters of innovation. Finally, we suggest that differences in network characteristics, rather than the availability of projects, explain the large differences in the size and performance of the BA sectors in the US and Europe.

---

## Keywords

Innovation • Social networks • Uncertainty • Venture capital • Business Angel

---

## JEL codes

G32 • M13

---

C. Deffains-Crapsky (✉)

Laboratory GRANEM UMR-MA 49, University of Angers, Angers, France

e-mail: [catherine.deffains-crapsky@univ-angers.fr](mailto:catherine.deffains-crapsky@univ-angers.fr)

P.G. Klein

Hankamer School of Business, Baylor University, Waco, TX, USA

Department of Strategy and Management, Norwegian School of Economics, Bergen, Norway

e-mail: [Peter\\_klein@baylor.edu](mailto:Peter_klein@baylor.edu)

## 1 Introduction

Entrepreneurship and innovation are vital to a globalized economy in which intangible capital plays an increasing role in value creation. Schumpeter (1911) famously linked entrepreneurial innovation to economic growth, and the burgeoning entrepreneurship literatures in economics, management, and finance testify to the growing importance of entrepreneurship among scholars and practitioners. Moreover, while Kirzner's (1973, 1985, 1997) influential work sharply separated the entrepreneur from the financier, more recent work assigns the entrepreneurial qualities of alertness, innovation, and judgment to investors as well as inventors and proprietors (Kaplan and Strömberg 2003; Foss and Klein 2010, 2012). Hence a dynamic, entrepreneurial economy needs a reliable supply of funding for highly risky, early-stage projects. In this context the role of private equity, early-stage venture capital in particular, becomes critical.

As the venture-capital sector has grown over the last few decades, as discussed later, venture capitalists have been devoting relatively less attention to the earliest-stage projects, tending to focus on activities and firms that are farther along in the development process. Increasingly, very early-stage projects are being funded by wealthy individuals, often former entrepreneurs, who take equity stakes and play active roles in the management and governance of their portfolio companies. These "angel investors" or "business angels" (BAs) are playing an increasingly important role in the establishment, growth, and evolution of new enterprises. As such, they are a key aspect of an innovative, successful market economy.

While the BA sector is attracting increasing attention (Wilson 2011; De Clercq et al. 2012), there is little systematic evidence on how it works. How do angels select projects? How do prospective founders of new ventures find funders? How do angels interact with each other? An important stylized fact about angel investing is that more and more BAs are part of a Business Angel Network (BAN). Moreover, many observers have identified an "equity gap"—also called the "valley of death"—between the early-stage seed capital provided by friends, family, and the founder's personal savings and the professional, profit-seeking venture capital needed by businesses in the priming or launching phase. This problem exists throughout OECD countries (Wilson 2011; EBAN 2010) and was exacerbated by the financial crisis (Litan and Robb 2012). Can a larger and stronger BA sector help fill the equity gap?

This paper examines the nature and role of angels and angel networks from the perspective of social network theory. Does a viable BA sector increase the likelihood that good projects can be financed and developed through the financing chain? If so, how are BA groups best organized to facilitate innovation? Do BA networks fill a "structural hole" between firm founders and private equity funders? Because we are ultimately interested in innovation, and the US economy appears to be more innovative than the European one, our analysis includes a comparison between the US and Europe, especially France. Concerning the "equity-gap" as a structural hole, we suggest that differences in network characteristics, rather than the availability of

projects, explain the large differences in the size and performance of the BA sectors in the US and Europe.

The paper is organized as follows. First, we describe different sources of uncertainty associated with angel finance across different project stages. Second, following Ferrary (2001, 2006), we examine the role of social networks in financing innovative projects through formal and informal venture capital (BAs). We show how exchanges of information within the networks can determine which projects are financed. We focus on the particular role of BAs in the financing chain. In the third part of our research we investigate both the organization of BAs through setting up BA networks and their integration into an innovation network. We conclude with some proposals for future research.

---

## 2 Radical Innovation in an Entrepreneurial Context: Financing with Shareholders' Equity

“Innovation” can describe several different business activities including the introduction of new products and services, the use of new production methods, the opening of new sources of supply, the opening of new markets, and the establishment of new business practices (Schumpeter 1911); it can be sustaining or disruptive (Christensen 1994), modular or systemic (Baldwin and Clark 2000), or, more generally, radical versus incremental. We focus here on projects involving really new products or radical changes, the nature of which can impose asymmetric information between entrepreneurs and investors that seems to be involuntary.

The main characteristic of such a project is a very uncertain, not simply risky, return on investments (Knight 1921).<sup>1</sup> The problem of the asymmetric information between the potential financial backers and the project carriers is further heightened by the need for confidentiality (innovation is a strategic asset which should be protected) and the importance of the non-material component, which rarely figures into the value of the business in case of liquidation.<sup>2</sup> Indeed, by their nature these are assets about which there is typically no historical information, either in terms of quality or quantity. Moreover, the initial stages of a business project often generate negative returns and the greatest part of the project's value is embodied in intangible assets and human capital.

During the launching phase, financial needs are particularly great.<sup>3</sup> But the funder is looking at a highly uncertain, illiquid investment that might generate a high return. Early-stage funding from family and friends is often critical, but

---

<sup>1</sup> This uncertainty comes from the difficulty at this time ( $t = 0$ ) in establishing all the development alternatives possible and determining the probability of each.

<sup>2</sup> Startup funding must deal with the same problems facing business finance more generally, namely agency costs and other problems associated with asymmetric information (Denis 2004). These problems are exacerbated during the creation phase.

<sup>3</sup> Grants and subsidies include explicit transfers such as US Small Business Innovation Research grants and the various local and regional grants and subsidies provided in Europe, as well as

limited in amount, even though they can help the innovator with brainstorming and partnership research fees. Highly illiquid, firm-specific assets are also difficult to finance with debt (Williamson 1988; Mondelli and Klein 2012). Innovative startup firms are thus dependent on self-finance (e.g., “bootstrap” funding) or, for larger projects, external equity.

External equity finance comes into play after grants and subsidies have been exhausted and involves different participants. In terms of a project life cycle, the first capital investors are inner-circle shareholders, that is family and friends (“love money”).<sup>4</sup> They finance the pre-launch phase, which involves feasibility studies (R&D and economic and financial studies). As we claim above, their help rapidly runs dry. Next, while cash flow is typically still negative, BAs make their appearance and finance the first phase of development. This is what we call the first round of financing. If the project is viable, greater growth should be financed quickly (12–24 months). It is generally only at this point that venture capital funds begin to participate in the financing of the business. In the next phase the project has become a business approaching its maturity and now needs to make finance decisions just like any other business to ensure its own development and durability.

In order to stand the test of time and move through each of these stages, a project must first be identified as capable of creating value at the beginning of its launching phase. Although financial evaluation is part of the financing process, it does not seem to be a part of the identification process. The information given by the innovator is subjective and may not be reliable. Indeed, evaluation using traditional methods such as discounted cash flow (DCF) analysis, designed for analyzing mature companies with stable cash flows, has proven difficult due to the uncertainty surrounding new projects. The discount rate is the cost of capital, which is difficult to estimate and would in fact be a minimum required rate of return. This minimum rate would be high compared to a traditional cost of capital of a mature firm and the actual value would be diminished. Thus applying the DCF method to innovative projects evolving in an uncertain environment may give a distorted view. Although evaluation via real options seems more promising, it remains insufficient particularly when applied in a purely financial approach. This also requires models which can quickly become very complex and require a great number of parameters to be estimated. Lastly, although the evaluation of simple options is supposed to use a single rate without risk, evaluating the whole project involves determining a discount rate including a risk premium (Deffains-Crapsky 2002, 2010).

Although finance theory helps us gain a clear definition of the characteristics of innovative projects and justify their mode of financing, a purely financial approach obscures how a project is identified by a financier and what can allow a continuous financing chain without equity gaps. For this, we need a better understanding of the

---

indirect assistance provided by publicly funded or university provided incubators and research parks.

<sup>4</sup> A popular aphorism describes these as the “three Fs” (friends, family and fools).

behavior and expectations of the entrepreneur, and the formal and informal venture capital markets.

---

### **3 Participants' Behavior and Expectations of Formal and Informal Venture Capitalists**

The quality of the business model is extremely important when seeking finance and studying this is part of the identification process. The specific nature of an innovative project is such that the social network appears a necessary yet insufficient prerequisite.

#### **3.1 The Role of Social Networks in Entrepreneurial Finance**

Social network theory is widely cited in the literature on entrepreneurship and innovation (Hoang and Antonic 2003). Certain researchers are interested in the traits of the entrepreneur and their ability to mobilize social networks. Others analyze the impact of certain structures auxiliary to such projects and their influence on mobilizing social networks. In this second group, however, very few studies have looked at the role played by financial investors during the launching phase.

In the field of entrepreneurial behavior, the works of Granovetter (1995), Coleman (1988) and Burt (1992) are central. Networks of entrepreneurs, funders, and other stakeholders are critical for information sharing. The creation of the enterprise is thus explained through the behavior of the entrepreneur. This strand of literature also explores the role of environmental factors, such as government assistance in building the social network.

The second stream of analysis considers social networks, as a form of organization (Powell 1990), which influences the coordination of economic players and the circulation of assets. In the context of BAs funding early-stage ventures, we must consider the dynamic of the information exchanges which condition the decision to finance using external shareholders' equity, and the connection between financial investors and the innovative project entrepreneur.

Financing the pre-launch phase and especially the launching phase appears to be fundamental in a reticular analysis of financing innovation. Potential providers of funds rely on different networks, professionals, and acquaintances to collect enough information to evaluate uncertainty levels subjectively. In the face of tacit knowledge (Hayek 1945) about the project and the entrepreneur, funders rely on judgment (Foss and Klein 2012) to evaluate the different sources of uncertainty and thus form their opinion on the project in question's potential to create value. These relationships outside the investor-entrepreneur relationship are fundamental. Indeed, Ferrary (2001), based on a study of exchange within networks, states that venture capitalists will only consider a project if it is strongly recommended to them by someone within their network. In recommending a project, the members of their

network reduce the uncertainty since their action effectively evaluates the risk of the project and the entrepreneur's abilities.<sup>5</sup>

Once a potential investor is interested in the project, links will be activated between the investor and the entrepreneur. These links vary depending on the level of uncertainty. The first round of investment is interpreted as a "contractual system allowing an investor to create a strong connection with the business creator in order to obtain the information necessary to reduce any uncertainties" (Ferrary 2006).

When this first external finance is obtained and if the collaboration between the financier and the entrepreneur permits a relationship of trust to become established, the project can be considered less uncertain. The venture capitalist choosing to finance a given project sends a signal to the rest of the members of their network that this project is viable. A second round of financing can begin if the project is evolving positively since the first influx of finance. The links between these investors and the entrepreneur are not as strong. We note that this sequential analysis is present in the study by Larson and Starr (1993) when they explain the evolution of relationships activated in the entrepreneurial process according to the project's stage of development. This line of thought refers back to Granovetter's work (1995) on the influence of strong ties and weak ties as well as their connections via a dynamic of embedding and un-embedding with the aim of ensuring the viability of the business created.

In the follow-up to these studies, Ferrary and Granovetter (2009) propose an in-depth analysis of the different roles played by venture capital in the complex innovation network of Silicon Valley. Unfortunately, although their analysis works well with this particular American example, this is less true in Europe (particularly in France) since, for both economic and structural reasons, operators in venture capital rarely participate in the first round of financing.<sup>6</sup> Nevertheless, a lack of investors at a stage of development can create a break in the financing chain and then reduce the forecasts return of the project. How can such equity gaps be avoided?

### **3.2 The Equity Gap as a Structural Hole and the BA as the "Network Entrepreneur"**

The notion of a structural hole was introduced by Burt (1992). Structural holes exist in a system where there are gaps between various subsystems (Ahuja 2000). Actors who manage to build links with each of these subunits will have informational advantages and can play a bridging role. Such actors have been described as

<sup>5</sup> "Reputation becomes an economic asset which individuals preserve by refusing to co-opt economic players they don't deem reliable into their networks," in Ferrary (2001). At the same time, reliance on within-network information can potentially lead to herd behavior (Parker 2008).

<sup>6</sup> "Closing gaps and moving up a gear: The next stage of venture capital's evolution in Europe", EVCA Venture Capital White Paper, Brussels, 2 march 2010.

“network entrepreneurs” who can benefit greatly from their privileged informational position (Burt et al. 2000). In the context of early-stage project finance, this network entrepreneur can reduce the uncertainty around new projects by coproducing relevant information which will then be transmitted to the other actors, so improving the coordination on the financing chain.

The financial gap can be considered as a structural hole because venture capital funds and entrepreneurs are essential partners in the development of innovation, though they sometimes cannot connect due to information asymmetries. Today venture capital funds are forced to focus on investments where uncertainties are replaced by quantifiable and diversifiable risks. Besides capital, the entrepreneur may need guidance and monitoring from a sponsor who knows the product and industry, who has valuable social capital, and whose embeddedness can reduce upstream and downstream uncertainties. Venture capitalists are no longer playing this role, as their own investors care only about financial returns, rather than the intangible benefits of helping new ventures (Sullivan and Miller 1996). Moreover, venture capitalists maintain several links at the same time (to diversify their risk), which hinders the creation of the strong ties needed for exchanges of private information between venture capitalists and entrepreneurs (Uzzi 1999; Ferrary 1999).

To complete the chain of financing for new ventures, this structural hole must be filled. Silicon Valley, with its dense network of complementary players, has fewer such holes. More generally, venture capitalists are at the center of innovation networks (Ferrary and Granovetter 2009). The venture capitalist is closest to all other actors and facilitates the interaction between them. In Europe, particularly in France, no one seems to be filling this central role. However, recognizing the existence of a structural hole does not tell us much about the characteristics of the agent who fills it. McFadyen et al. (2009) suggest integrating social capital and structural holes theory with Coleman’s (1988) analysis of the broker’s specific ties. Ferrary and Dibiaggio (2003) analyze the nature of the social embedding of the intermediary and the other disconnected actors in the same social network.

Social embedding between the intermediary and the disconnected actors is thus a first condition for an effective brokering. For McFadyen et al. (2009), the optimal structure of the links around the intermediary is a dense network that is characterized by structural holes and strong ties between the actor bridging the hole and each of the components of this network. So, by creating strong and reliable ties with the entrepreneur from the beginning of the project, the intermediary will co-create tacit information about the validity of the project and the capacities of the entrepreneur. The homophily between both actors facilitates even more the collaboration (Ferrary 2006). The embedding here is cognitive (the same interpretation of the reality of the innovative companies) and structural (transitivity and phenomenon of recommendation between the peers) (Uzzi 1996). Thanks to the intermediary, the entrepreneur sees in the person of the venture capitalist an actor sharing his concerns. More generally, the entrepreneurs, formal venture capitalists, and these new intermediaries are part of what Baum et al. (2003) call the same “small world.” The intermediary has to be an actor who in his past had a similar activity or

developed very strong ties with each of the disconnected groups to play better the role of bridge.

Given the characteristics necessary for effective intermediation, the BA seems particularly well suited for the role. BAs are motivated by economic returns, but also influenced by hedonism and altruism (Sullivan and Miller 1996). BAs are often socially embedded among entrepreneurs because they often invest in limited geographical zones. The embedding with the entrepreneur is also cognitive because the BAs are themselves former entrepreneurs, and many are experts on venture capital funds or investment banks. They invest in few projects at the same time, which creates trust with the entrepreneur and allows reciprocity and sharing of relevant information.

Having justified our desire to qualify the financial gap as a structural hole and also the capacity which the BA takes on to be able to cover this hole and how, we will now describe in a comparative way the BAs and their organization in Europe and in the USA. The objective is to check how this representation meets the reality in each continent. Then it will be possible to discuss the remaining questions concerning BA organization and BANs, especially in France.

---

## 4 How Should Informal Venture Capital Be Organized?

To understand the growing importance attributed to BAs, we must first give some figures, define what they do and their motivations, as well as the measures put in place by governmental authorities and recommendations made by national associations of BAs. It is then possible to show how their presence can create or reinforce the social link between all the economic players involved. We may then look at the way they are organized internally.

Definitions of BAs vary (Ibrahim 2010), but a BA is commonly described as “a high net worth individual, acting alone or in a formal or informal syndicate, who invests his or her own money directly in an unquoted business in which there is no family connection and who, after making the money directly in an unquoted business in which there is no family connection and who, after making the investment, generally takes an active involvement in the business, for example, as an advisor or member of the board of directors.” Focusing on the European context, the European Trade Association for Business Angels, Seed Funds, and other Early Stage Market Players (EBAN) defines the BA as “an entity which provides capital to one or several start-ups or businesses with strong potential for growth (and therefore becomes a shareholder in it), as well as its experience in business management and its network of contacts. This is an involvement which grows over time and takes various forms.”<sup>7</sup> According to the US Angel Capital Association, “an angel is a high net-worth individual who invests his or her own money in start-up companies in exchange for an equity share of the businesses. In general, it

---

<sup>7</sup> Summary of private participants in informal capital risk, EBAN

is recommended that entrepreneurs work with investors who are “accredited” investors (who meet requirements of the Securities and Exchange Commission) or high net worth individual and who can add value to the company via high quality mentoring and advice.”

Reading these definitions, it seems obvious that in Europe and in US the BA’s central role is to create strong ties within his network to benefit entrepreneurs and that the relationship between the angel and the venture must be characterized by trust. In both Europe and the US, the informal venture capital sector is particularly important.

In all countries, there exist national angel associations who provide service to angels within their region and who represent them to policymakers, The French association France Angels, created in 2001, has given itself the objectives to promote investment by Business Angels, to represent the latter and to federate BA networks. At the end of 2012 France Angels federated 82 BA networks representing 4100 BAs having financed 352 projects totaling an amount of 40 million euros invested. In 2005, it was only 34 networks, 1600 BAs and 16 million euros invested. Although a definite progression can be noted, the total invested amount remains quite modest.<sup>8</sup> The largest US angels are represented by the Angel Capital Association (ACA). The U.S. market is more mature than its European counterpart and the amount invested per deal is a little larger. In 2010 there were around 75,000 BAs and 391 BANs in Europe, compared to 259,480 BAs and 340 angels groups in the U.S. (EBAN 2010). Total BA investments were 62.5 million euros in France, 426 million euros in Europe, and 20.1 billion euros in the U.S. These comparisons are in exact, however, as the definitions of BAs vary between Europe and the U.S., and the data are private and not publicly reported.

Comparing figures and innovation rankings, it appears that start-up finance is more effective in the US than in Europe, France in particular. France is ranked 16th in the world, 11th in Europe.<sup>9</sup> Is the problem that good projects aren’t being financed, or that there aren’t enough good projects? To be sure, the supply of funding is much larger in the US than in Europe, and European policymakers have proposed a number of policies to increase the total amount of available capital and the amount invested per project. At the same time, French BAs say that they don’t have enough good projects to finance. The answer to this question has important implications for the usefulness of policies to increase BA funding; a

---

<sup>8</sup> In a 2008 study sponsored by the Ministry for Higher Education and Research, and in collaboration with the association France Angels, Ernst & Young documented characteristic patterns of BAs in financing innovative SMEs. “BAs are involved for the most part during the first 2 years of businesses’ existence (42 % of respondents became involved when the business was first created), very often in groups and as minority investors (82 % of participations mentioned were for less than 20 %). They invest in all business sectors but mostly in accordance with their professional background.”

<sup>9</sup> In “L’innovation: un enjeu majeur pour la France—Dynamiser la croissance des entreprises innovantes”, Report for the Ministry of Redressement Productif, Jean-Luc Beylat and Pierre Tambourin, April 2013.

policy-driven increase in capital investment in the face of a lack of quality projects runs the risk of inducing substantial misallocation of capital.

Similar problems have been reported in the US, regarding the transformation of new technologies into new marketable products, what is called the “Series A crunch.” This suggests an equity gap between the angel or seed financing and the early-stage or Series A funding that supports more ventures. In other words, despite its scale, there are problems with the financing chain even in the US.

In short, despite important differences between the US and European markets, in both settings BAs are more likely than formal venture capitalists to invest in very early stage businesses, and there are not enough BAs to fill the gap (Mason and Harrison 1995). The main advantages for BAs are that the BA network itself is organized with low transaction costs and the BA members invest their own funds, without the need to justify themselves to external investors, which allows them to make investment decisions quickly with streamlined due-diligences procedures. So, we can say that there exist in both the US and Europe structural holes in the venture-finance chain and that BAs may be described as network entrepreneurs. Indeed, BAs are also well-informed investors who are very familiar with the sectors they invest in, they invest lower amounts, they are less demanding than the venture capitalist in terms of the risk-return ratio (Freear et al. 2002), and they have the ability to build strong trust ties. Not surprisingly, BA financing has a positive impact on new-venture growth, survival, and follow-up funding (Kerr et al. 2010).

The organization of BAs plays an important role in financing innovation. It is at this point that the comparison between Europe and US is important. In 2007(a,b), in official reports concerning BAs, EBAN issued 9 recommendations concerning four fundamental aspects of developing entrepreneurial finance. The first three recommendations aimed to reduce problems related to supply. First, EBAN recommended that latent investment potential and Virgin Angels<sup>10</sup> be mobilized, to improve the market place of informal venture capital and enable greater funds to be raised. Second, to reduce problems related to demand, the official report suggests improving preparation for the meeting between entrepreneur and investor. In terms of the environment in which BAs are evolving, it recommends that the dialogue between BAs and formal venture capital be enriched, that the partnership between regional participants and entrepreneurs be reinforced, that BAs increase their visibility and not forget appropriate regulations. Finally, it recommends that taxation concerning investments made by BAs and other private investors be revised.

In part, these recommendations aim to find modes of organization which allow both supply and demand to be targeted and find a way for them to meet. It appears this would be the objective of BA networks. Without an informal venture capital market, BAs in search of investment and entrepreneurs in search of finance stand little chance of meeting each other.<sup>11</sup> This statement should be considered relative

---

<sup>10</sup> Potential BAs have never invested in unlisted projects.

<sup>11</sup> It should be noted this role is already played by start-up funds and prior to this by incubators. However, not all projects go through these stages.

to the BA's reputation. If the BA is well known, he will receive spontaneous offers of viable projects (they will be recommended by members of its network or sent directly by the project carriers). On the other hand, if the BA has little experience, he will be confronted with a lack of worthwhile projects and/or difficulty in perceiving the quality of the project (his social network will be of no help and he will face an adverse selection problem). Yet one of the recommendations is to increase the number of active BAs. Taxation measures over the last few years in France have been moving steadily in this direction. If we significantly increase the number of inexperienced BAs, can the creation of BA networks (BANs) fulfill the role of a market?

This question is complex and requires reflection in two stages and on several levels, notably before and after the launching phase. We must first examine the identification and selection stages for viable innovative projects and study the impact of BAN constitutions. How can the organization of networks reinforce social links between the different economic players present during the launching phase and increase the amount of investment? What is the impact on the BA—entrepreneur relationship? What are the risks involved in the BAN constitution? Secondly, we must question the usefulness of BA networks in the relationship between formal venture capital and informal venture capital. As we have suggested, BA can reduce the structural hole between entrepreneur and formal venture capital. What about BAN?

Developing networks of BAs is no doubt the solution to avoiding the perverse effects of tax incentives alone. Indeed, if these future BAs do not become professional, the tax incentives run the risk of not producing BAs capable of filling the desired role. As we have stated, the BA is a partner that contributes his skills, knowledge and relationships. Furthermore, it should be emphasized that the risk also lies in seeing the value of projects increase simply due to the incentive driven influx of capital. Such a risk is not negligible and could have disastrous consequences for the development of innovation. Once again, we may use the theory put forward by Burt (1992) to analyze the role played by BA networks. Networks act as an intermediary between BAs and entrepreneurs seeking finance. This is particularly true for inexperienced BAs.<sup>12</sup> This statement must contain many nuances. Two researchers have shown, following a survey and five empirical studies, that BA networks do not bring BAs the value expected (Knyphausen-Aufseß and Wesphal 2008). According to the authors, BA networks are facing an adverse selection problem during the investment phase. Lastly, we must not forget the rise in transaction costs related to an increasing number of intermediaries. Thus, the constitution of BA networks carries undeniable negative aspects even though their functioning can include positive effects.

Concerning the organization of BAs in Europe and in US, accreditation appears to be more important in the U.S. than in Europe. Another difference concerns the way angel investments are done. In US, in order to make larger investments, BAs

---

<sup>12</sup> Not all BAs belong to a network and not all networks are in national associations,

invest through angel syndicates or angel groups. These groups are not typically as formalized as European BA networks. Nevertheless, as explained by the definition given by EBAN, such a network “is an organization whose aim is to facilitate the matching of entrepreneurs with business angels. . . Angels continue to make their own individual investment decision, and the BAN does not decide which investors will invest in a deal.” Of course, belonging to a network allows syndication.

EBAN also recommends increasing connections between the economic players during the launching phase and between the informal and formal branches of venture capital. BA investment during the launching phase reduces uncertainty and sends a positive signal to the venture capitalist who then becomes involved. In order to select their investments venture capitalists will more easily be able to utilize traditional evaluation methods which will also be more applicable. It even appears that the later they become involved, the more competition they will be confronted with from other venture capitalists. Indeed, the more the business’ stage of development advances, the less need there is for external shareholders’ equity. This is easily explained by the reduction in uncertainty and the increased use of debt. In this way, the supply of capital becomes greater than the demand. But before entering this phase, there is a period of exponential growth to finance. At this time, although uncertainty has been reduced, it remains strong and there may still be equity gap problems. Moreover, if we follow this line of reasoning as to the life cycle of a BA investment, a link with formal venture capital may be necessary. It must not be forgotten that the BA is an investor that wants to realize its capital gains upon concluding the investment, even if this is not a priority.

The question is therefore to know which links the BA networks must maintain with other economic players who participate professionally in the partnering with and financing of innovation in a given sector. Numerous structures have already been put in place to accompany entrepreneurs of innovative projects. We may cite the example of technopoles in Europe and high tech business incubators in North America. There are many other participants however, and their presence does not seem to have facilitated the financing of a sufficient number of innovative projects over the past several years. This can be explained by the incapacity of these participants to build the right link with the right person and to create an atmosphere of trust. The problem appears linked to uncertainty (and consequently to the nature of innovation) and the circulation of information. If being organized into a network can improve the second point, we should better understand how innovation networks should be organized in order to promote the development of these projects.

Harrison and Mason (2000), analyzing the U.K., emphasize the various complementarities that exist in venture-capital markets: “co-investing in deals, sequential investing in ventures, business angels as investors in venture capital funds and deal referring.” Ferrary (2009) demonstrates the role of venture capital funds in Silicon Valley in the financing and growth of start-ups in the CleanTech sector, concluding that in this specific cluster the VC serves as a network

entrepreneur, unlike the French “poles de compétitivité,” characterized by a lack of venture capital funds. In other words, the problems of innovation financing in France seem to derive more from a lack of connections between the various actors involved than to a lack of funding, too few investors, or too few projects. Improving innovation in France may require a radical restructuring of the system of financing, rather than new incentives to increase the number of financed projects.

The classic sequential investing scheme has recently begun to change in the US as a new type of BA, the “super angel,” has emerged (Wilson 2011). Super angels occupy an intermediate ground between BAs and VCs. Like VC funds, they invest large amounts and most of the time they invest other investors’ money. Still, the continuity of the financing chain is a problem, and the series A crunch remains. Some policy measures designed to address the continuing gap include the JOBS act of April 2012 designed to facilitate start-up financing, particularly through crowdfunding. The JOBS Act also aims to encourage IPOs for “emerging growth companies.” Accredited BAs already use more and more internet platforms to find projects, so BAs will continue to play a role in the development of this new type of financing technique.

---

## 5 Conclusion

The objective of this paper was to bring some thoughts to the financing of innovative projects. We have focused on the role played by social networks in dealing with the uncertainty associated with radical innovation. While social network theory has been widely used to analyze networks of founders, there is relatively little work on networks of funders. Work by Ferrary (2001, 2006, 2009) and Ferrary and Granovetter (2009) on venture capital in the complex innovation network of Silicon Valley are important but do not generalize to other sectors and national contexts.

The equity gap characterizing the lack of finance for the launch of innovative projects has prompted studies, reports and recommendations in the US and in various European countries. These studies conclude that it is necessary, indeed essential, to increase the number of active BAs in order to increase their level of professionalism as well as the sums invested. But government programs to subsidize BA activity and otherwise support early-stage ventures have a poor track record (Lerner 2009, 2010; Klein 2012), as we would expect from experience with other forms of industrial planning.

Although, as clarified by the theory of structural holes (Burt 1992), BAs appear to be an indispensable intermediary between project entrepreneurs and formal venture capital, BA networks themselves serve as intermediaries between inexperienced BAs and entrepreneurs. Yet the organization of BAs into networks is not without disadvantages and new issues arise. Lastly, the connections to be maintained between BAs, organized into networks or not, and the other participants in fostering innovation lead us to the much broader question of the functioning of innovation clusters.

The ideas outlined in this paper are only a first step. The role of BAs in the development of innovation is an important, yet poorly understood issue. We propose moving forward in two stages. First we must examine and evaluate the role of government intervention, particularly measures taken to support BAs, and the next steps concerning crowdfunding and new legal regulations in different countries. Secondly, a study of the functioning of BA networks, possibly from the point of view of Communities of Practices, should permit a better understanding of the process involved in identifying and selecting projects and an in-depth comparison between US angel groups and French BA networks.

**Acknowledgment** We thank Jim Chappelow, Jingjing Wang, and Abel Malik Ola for assistance.

---

## References

- Ahuja, G. (2000). Collaboration networks, structural holes, and innovation: A longitudinal study. *Administrative Science Quarterly*, 45(3), 425–455.
- Amable, B. (2006). Innovation et compétitivité en Europe. *Reflète et Perspectives*, 45, 15–30.
- Baldwin, C., & Clark, K. B. (2000). *Design rules: The power of modularity*. Cambridge, MA: MIT Press.
- Baum, J. A. C., Shipilov, A. V., & Rowley, T. J. (2003). Where do small worlds come from? *Industrial & Corporate Change*, 12(4), 697–725.
- Burt, R. (1992). *Structural holes: The social structure of competition*. Cambridge, MA: Harvard Business Press.
- Burt, R. S., Hogarth, R. M., & Michaud, C. (2000). The social capital of French and American managers. *Organization Science*, 11(2), 123–147.
- Christensen, C. (1994). *The innovator's dilemma*. Boston, MA: Harvard Business School Press.
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, S95–S120.
- De Clercq, D., Meuleman, M., & Wright, M. (2012). A cross-country investigation of micro-angel investment activity: The roles of new business opportunities and institutions. *International Business Review*, 21(2), 117–129.
- Deffains-Crapsky, C. (2002). L'analyse par les options réelles : apports en termes de valorisation de projets innovants et gestion stratégiques des opportunités d'investissement. *Cahier de recherche du CREFIB 02-03*.
- Deffains-Crapsky, C. (2010). Les apports et les limites de l'évaluation des projets innovants par les options réelles. Journées de Microéconomie Appliquée, JMA, Angers, Juin, France.
- Denis, D. J. (2004). Entrepreneurial finance: An overview of the issues and evidence. *Journal of Corporate Finance*, 10(2), 301–326.
- EBAN. (2007a). Note synthétique sur les acteurs privés du capital risque informel.
- EBAN. (2007b). La contribution des business angels à la réalisation de la stratégie de Lisbonne, au Plan d'Action Communautaire en faveur de l'entrepreneuriat et au C.I.P. 2007–2013. Livre Blanc.
- EBAN. (2010). Statistics compendium.
- Ferrary, M. (1999). Confiance et accumulation de capital social dans la régulation des activités de crédit. *Revue française de sociologie*, 40(3), 559–586.

- Ferrary, M. (2001). Pour une théorie de l'échange dans les réseaux sociaux. Un essai sur le don dans les réseaux industriels de la Silicon Valley. *Cahiers internationaux de Sociologie*, 111, 261–290.
- Ferrary, M. (2006). Apprentissage collaboratif et réseaux d'investisseurs en capital-risque. *Revue Française de Gestion*, 163, 171–181.
- Ferrary, M. (2009). Les capital-risqueurs comme “transiteurs” de l'innovation dans la Silicon Valley. *Revue Française de Gestion*, 190, 179–196.
- Ferrary, M., & Dibiaggio, L. (2003). Communautés de pratique et réseaux sociaux dans la dynamique de fonctionnement des clusters de hautes technologies. *Revue d'économie industrielle*, 103, 111–130.
- Ferrary, M., & Granovetter, M. (2009). The role of venture capital firms in Silicon Valley's complex innovation network. *Economy and Society*, 38(2), 326–359.
- Foss, N. J., & Klein, P. G. (2010). Alertness, action, and the antecedents of entrepreneurship. *Journal of Private Enterprise*, 25(2), 145–164.
- Foss, N. J., & Klein, P. G. (2012). *Organizing entrepreneurial judgment: A new approach to the firm*. Cambridge: Cambridge University Press.
- Freear, J., Sohl, H. E., & Wetzel, W. (2002). Angles on angels: Financing technology-based ventures—A historical perspective. *Venture Capital*, 4(4), 275–287.
- Granovetter, M. (1995). The economic sociology of firms and entrepreneurs. In A. Portes (Ed.), *The economic sociology of immigration: Essays on networks* (pp. 128–165). New York: Russell Sage Foundation.
- Harrison, R. T., & Mason, C. M. (2000). Venture capital market complementarities: The links between business angels and venture capital funds in the United Kingdom. *Venture Capital*, 2(3), 223–242.
- Hayek, F. A. (1945). The use of knowledge in society. *American Economic Review*, 35(4), 519–530.
- Hoang, H., & Antonic, B. (2003). Network-based research in entrepreneurship: A critical review. *Journal of Business Venturing*, 18(2), 165–187.
- Ibrahim, D. M. (2010). Financing the next Silicon Valley. *Washington University Law Review*, 83(4), 717–762.
- Kaplan, S. N., & Strömberg, P. (2003). Financial contracting theory meets the real world: An empirical analysis of venture capital contracts. *Review of Economic Studies*, 70(2), 281–315.
- Kerr, W. R., Lerner, J., & Schoar, A. (2010). The consequences of entrepreneurial finance: A regression discontinuity analysis, Harvard Business School, Working Paper 10-086.
- Kirzner, I. M. (1973). *Competition and Entrepreneurship*. Chicago: University of Chicago Press.
- Kirzner, I. M. (1985). *Discovery and the capitalist process*. Chicago: University of Chicago Press.
- Kirzner, I. M. (1997). Entrepreneurial discovery and the competitive market process: An Austrian Approach. *Journal of Economic Literature*, 35, 60–85.
- Klein, P. G. (2012). Entrepreneurship and creative destruction. In B. Minter (Ed.), *The 4% solution: How to unleash the economic boom America needs in the twenty-first century* (pp. 116–126). New York: Crown Business.
- Knight, F. H. (1921). *Risk, uncertainty and profit*. New York: Hart, Schaffner and Marx.
- Knyphausen-Aufseß, D. Z., & Wespahl, R. (2008). Do business angel networks deliver value to business angels? *Venture Capital*, 10(2), 149–169.
- Larson, A., & Starr, A. J. (1993). A network model for organization formation. *Entrepreneurship Theory and Practice*, 17(2), 5–15.
- Lerner, J. (2009). *Boulevard of broken dreams: Why public efforts to boost entrepreneurship and venture capital have failed—and what to do about it*. Princeton: Princeton University Press.
- Lerner, J. (2010). The future of public efforts to boost entrepreneurship and venture capital. *Small Business Economics*, 35(3), 255–264.
- Litan, R. E., & Robb, A. M. (2012). *A market-based approach for crossing the valley of death: The benefits of a capital gains exemption for investments in startups*. Available at SSRN: <http://ssrn.com/abstract=2000836>

- Mason, C. M., & Harrison, R. T. (1995). Closing the regional equity gap: The role of informal venture capital. *Small Business Economics*, 7, 153–172.
- McFadyen, M. A., Semadeni, M., & Cannella, J. (2009). Value of strong ties to disconnected others: Examining knowledge creation in biomedicine. *Organization Science*, 20(3), 552–564.
- Mondelli, M. P., & Klein, P. G. (2012). *Private equity and asset characteristics: The case of agricultural production*. Working Paper, McQuinn Center for Entrepreneurial Leadership, University of Missouri.
- Parker, S. C. (2008). The economics of formal business networks. *Journal of Business Venturing*, 23(6), 627–640.
- Powell, W. (1990). Neither market nor hierarchy: Network forms of organization. *Research in Organizational Behavior*, 12, 295–336.
- Schumpeter, J. A. (1911). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*. Cambridge, MA: Harvard University Press.
- Sullivan, M. K., & Miller, A. (1996). Segmenting the informal venture capital market: Economic, hedonistic, and altruistic investors. *Journal of Business Research*, 36(1), 26–35.
- Uzzi, B. (1996). The sources and consequences of embeddedness for the economic performance of organizations: The network effect. *American Sociological Review*, 61(4), 674–698.
- Uzzi, B. (1999). Embeddedness in the making of financial capital: How social relations and networks benefit firms seeking financing. *American Sociological Review*, 64(4), 481–505.
- Williamson, O. E. (1988). Corporate finance and corporate governance. *Journal of Finance*, 43(3), 567–591.
- Wilson, K. E. (2011). *Financing high-growth firms: The role of angel investors*. OECD Report. Available at SSRN: <http://ssrn.com/abstract=1983115>