Entrepreneurship and Venture Capital in the Age of Collective Intelligence

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Entrepreneurship and venture capital in the age of collective intelligence

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During the first half of the 20th century, the locus of innovation was the corporate lab, housed inside the research and development departments of large corporations like General Electric, DuPont, and AT&T (Hounshell and Smith 1988, Reich 2002). After World Ward Two, venture capital firms came into being, which allowed entrepreneurs with promising ideas to establish start-up companies in the absence of involvement by established corporations. In recent decades, start-up companies funded by venture capitalists have been responsible for most of the key innovations in emerging sectors of the economy, most notably information technology and biotechnology (Gompers and Lerner 2001).

The semiconductor shows the transition between these two modes of innovation. The device itself was developed at Bell Labs in the early 1950s. One of the inventors, Gordon Shockley, founded his own firm, Fairchild Semiconductor in 1957. Arthur Rock, a New York banker, provided the initial financing. Rock was a transitional figure between the world of early 20th century corporate finance and the venture capital-based practices that later became prevalent. Alumni of Fairchild went on to found more than forty Silicon Valley technology companies, and the success of Fairchild spurred the development of the first venture capital firms in the San Francisco Bay area (Florida and Kenney 1988).

With the rise of venture capital, the innovation function, for emerging industries at least, moved outside of the large corporation and instead came to be undertaken by the new venture sector, comprised of decentralized, external networks of entrepreneurs, university researchers, and financiers, all linked by venture capital firms. This externalization of innovation was part of a larger trend, beginning over the latter part of the 20th century, toward more distributed forms of business organization (Powell 1990, Malone 1997). For example, during the 1980s and 1990s, many large corporations reorganized into smaller and more autonomous business units (Bartlett and Ghoshal 1993); came to rely more extensively on far flung supply chains (Simchi-Levi et al. 2003) and ecosystems of partners (Brandenburg and Nabeloff 1998); and increased their usage of outsourcing and offshoring (Quinn 1999).

The past decade has seen the emergence of new, even more radically distributed ways of organizing work, enabled by the global expansion of the Internet. Prominent examples include Linux, Wikipedia, and Google. In Linux and Wikipedia, volunteers from all over the world work together to develop software and write encyclopedia articles. Google is perhaps an even more interesting example, when one considers not just Google the firm, but the entire system invoked every time a person types a query into the Google search box. This system takes advantage of the efforts of everyone who creates links on the World Wide Web. Each link is an implicit judgment that a page is worth viewing, and the sum total of all the links thus represents an aggregated global judgment about what web content is worth viewing. Google, the company, uses its crawlers to gather the content of all web links on an ongoing basis, stores this information on its servers, and parses it with clever algorithms that assess which judgments embodied in links are reliable indicators of quality. Focused portions of this ongoing collective global judgment about the quality of web content then get served up to users when they type in queries.

Systems like these, which rely on distributed groups working together, connected by the Internet, have been described by such terms as wisdom of crowds (Surweicki 2004), peer production (Benkler 2006), wikinomics (Tapscott and Williams 2008), crowdsourcing (Howe 2008), or collective intelligence (Malone 2006).

The emergence of the venture capital sector transformed the way the innovation process worked: innovation went from being an activity that took place inside corporate research labs to a more distributed process that involved interactions between university researchers, entrepreneurs, and financiers, orchestrated by venture capitalists. Could the development of collective intelligence-based mechanisms for organizing work organizations lead to another transformation of the innovation process? Specifically, could some or even all of the innovation activities that in recent decades have come to be undertaken by the new venture sector become the province of crowds linked via the Internet?

This paper will consider the prospects for such a transformation by examining the potential impact of collective intelligence on:

- start-up companies and
- venture capital firms.

To examine the potential overall impact of collective intelligence on start-ups and venture capital firms, a recently developed taxonomy that categorizes the design patterns underlying web-enabled collective intelligence systems—the Collective Intelligence Genome (Malone, Laubacher, Dellarocas 2010)—is used.

Collective Intelligence Genome

The Collective Intelligence Genome (or CI Genome) is based on analysis of more than two hundred examples of collective intelligence. It maps the structure of collective intelligence systems by asking four key questions:

- What task is being done?
- Who is doing the task?
- Why are they doing the task?
- How are they doing the task?

The answers to these four questions constitute the building blocks—or genes—of the systems.

For the question, *What task is being done?* there are two genes: Create and Decide. In the Create gene, the task is the development of a new artifact or part of one—lines of code in Linux, encyclopedia articles or edits to encyclopedia article in Wikipedia, videos in YouTube. In the Decide gene, the task is making a decision, and in many instances, the decision involves evaluating quality. The items being evaluated can exist in the physical world, such as restaurants or shops, which are the focus of sites like Yelp, or in the online world, like the ratings of buyers and sellers on eBay.

For the second question, *Who is doing the task?* there are also two genes: Crowd and Hierarchy. In the Crowd gene, anyone who is a member of a particular group can choose to participate in the task. In some instances, the group includes only a select category of people. For example, in IBM's Innovation Jams, only IBM's employees and the company's customers and suppliers can participate. In other instances, anyone in the entire world who wishes to can participate. For example, any person with access to a computer with a web browser can edit Wikipedia articles if they wish. In the Hierarchy gene, the task is undertaken by a person

assigned to do it by someone in a position of authority. The Hierarchy gene describes the way work typically gets assigned in most traditional business organizations.

For the third question, *Why are they doing the task?* there are three genes: Money, Glory, and Love. Money is the mechanism primarily used in business organizations today. Glory is at work when people participate to receive recognition from peers or from other users of the system. Love covers a range of motivational factors: when people participate because they like an activity for its own sake, because they enjoy interacting with other members of an online community, or because they feel they are contributing to a cause larger than themselves. Many web-enabled collective intelligence systems rely heavily on Glory and Love as motivational factors.

For the final question, *How are they doing the task?* there are two key variables to take into account when the crowd is doing the work. The first is the task the crowd is undertaking: create or decide. The second is whether the individual contributions by members of the crowd are independent of or dependent upon one another. When contributions are independent, each member of the crowd contributes an item that is an end product of the system. For example, in YouTube, members of the crowd submit complete videos, and these are made available, as is, to visitors of the site. When contributions are interdependent, each participant submits a portion of the whole, and these contributions are combined in the finished product. For example, in Wikipedia, text and edits submitted by many contributors get combined in the encyclopedia articles that appear on the Wikipedia site. When these two variables are mapped against each other, they result in four basic How genes, plus one important sub-variant (see Table 1).

	Independent	Dependent
Create	Collection Contest (when a subset of a Collection is selected)	Collaboration
Decide	Individual Decisions	Group Decision

Table 1: Variations of the How gene for Crowds

When the crowd submits independent creations, the result is the Collection gene. YouTube is a well-known collection. Another prominent example is iStockPhoto, a site where photographers submit images that are then made available to advertising agencies and graphic designers for use in magazines, brochures, web sites, and other kinds of visual materials.

An interesting variant of the Collection is the Contest, where a subset of the submitted items is chosen and made available to customers. Threadless uses a contest model to develop designs for the tee shirts it sells. Each week, the company invites artists to submit new designs in an online contest. Customers rate the entrants, and the management team at Threadless selects a handful of them and awards each designer who submitted a winning entry a prize of several thousand dollars. Threadless then has the tee shirts produced and sells them on its web site and in its retail stores.

The other group creation gene is Collaboration, where each member of the crowd contributes only a part of the eventual end product. When the Collaboration gene is used, the mechanism for assembling individual contributions becomes a key element of the system. In some instances, as with Linux, this assembly challenge is at least partially met through the use of a modular design framework, with well-defined interfaces governing interactions between key parts of the system. In other cases, managing the interdependencies between individual

contributions is an important part of the work done by the contributors themselves. Wikipedia manages the reassembly challenge through the general principle that an article at any given time reflects a rough consensus of the interested editors. The Wikipedia community has also developed a set of sophisticated rules for handling situations where interested editors find it difficult to reach consensus.

The Individual Decision gene is when each member of the crowd submits independent decisions, and each is made available to users of the system. Links in the blogosphere are one example of the Individual Decision gene—each blogger chooses to embed links to other web sites they believe might be of interest to their readers. The reserve and offering prices in eBay are another example of the Individual Decision gene—the seller's reserve price and the bidders' offering prices is are all individual assessments of the value of the item, and each of these assessments is made visible to any user of the site interested in the item in question.

In the Group Decision gene, members of the crowd submit decisions that are then aggregated into a decision that stands for the group as a whole. An example of the Group Decision is when open source software developers use voting to make decisions about the overall direction of the project—for example, about which of several possible features to make the top priority for future development. Each community member expresses their preference, but these preferences are then aggregated—sometimes by simple counting, sometimes by complex preferential voting algorithms—into a decision that will stand for the group as a whole.

A variety of interesting mechanisms have emerged in web-based collective intelligence systems for making Group Decisions, and in the CI Genome framework, these are each classified as separate genes in their own right. These mechanisms include Voting, Averaging, Consensus, and Prediction Markets.

In practice, systems that use the Individual Decision gene often rely on quantitative metrics, such as the five star rating system used for books by Amazon, movies by Netflix, and restaurants by Yelp. The individual ratings can then easily be aggregated, usually by averaging, into an overall group rating. In cases where it is easy to aggregate individual input to derive a group assessment, systems frequently display both the individual ratings as well as the overall group rating. Such systems thus combine both the Individual and Group Decision genes.

Most collective intelligence systems are comprised of multiple activities combined in particular ways. The combination of all the building blocks, or genes, that constitute a collective intelligence system constitute its overall design pattern—or, as it is called in the framework, its genome. The genome of a system can be mapped out in a diagram that shows all of the system's activities and the genes associated with them (see Table 2). For example, the genome of Threadless includes three core activities:

- Create tee shirt designs, by the Crowd, for Money and Love, through a Contest;
- Decide which designs are best, by the Crowd, for Love, by Averaging;
- Decide which designs to print, by Management, for Money, by Hierarchy.

	What		**Who**	**Why**	**How**
Threadless	Create	T-shirt designs	Crowd	Money Love	Contest
	Decide	Which designs are best	Crowd	Love	Averaging
	Decide	Which designs to use	Management	Money	Hierarchy

Table 2: Genome map for Threadless

In theory, any combination of genes is possible. But certain combinations have shown themselves to be especially adaptive in certain situations. In particular, some configurations have been used extensively by start-up companies in the past decade. Others have begun to be used in ways that encroach on the traditional functions of venture capital firms.

Potential impact of collective intelligence on startup companies

In many start-up companies today, the crowd, accessed via the Internet, is enlisted to do a key part of the work of the new venture, work that would previously have been undertaken by the startup's employees. Start-ups rely on crowds both to create and to decide. Threadless incorporates both in its model—a crowd of designers contributes new designs and a crowd of customers helps to decide when of those designs to produce (though Threadless management makes the final decision). Threadless thus effectively enlists an online crowd to undertake its product development and market research functions.

Use of crowd creation in start-ups

For crowd creation, both the Collection and Contest gene have proven usable by start-ups. The success of YouTube (which was acquired by Google) and iStockPhoto (which was acquired by Getty Images, a long established provider of stock photographs) is testament to the viability of the Collection gene.

The Contest gene has proven even more compelling, serving as the basis for a large number of new companies in a variety of domains. Among the more prominent examples are Innocentive, which uses a contest model to solve complex scientific problems; TopCoder, which develops software using contests; Netflix, which paid a $1 million prize for an algorithm that

achieved a 10 percent improvement in the effectiveness of a recommendation engine that matches customers with movies; and Local Motors, a recently launched auto maker that holds contests for new car designs (Jana 2009).

Contests are by no means the exclusive province of web-enabled collective intelligence systems. Business plan competitions have long been used in universities and by venture capitalists to identify promising ideas for start-up companies. The launch of the X Prize for space travel in the 1990s, and subsequent X Prize contests in other domains—as well as the prominence on television of entertainment contests like American Idol—have greatly increased public awareness of the Contest gene. Prizes have a long heritage and provided the impetus for creation of some of the masterpieces of Renaissance Italy (Haines 1989), as well as scientific and engineering breakthroughs such as the development of instruments for ocean navigation in the 18th century and Charles Lindbergh's solo flight across the Atlantic Ocean in 1927 (X Prize Foundation 2011).

The collection and contest are attractive models for start-up companies because they have the potential to accomplish work formerly done in house more cheaply and/or more effectively. Both the collection and the contest models effectively lower barriers to participation and can thus unleash the talents of enthusiastic amateurs who might otherwise not have had an outlet for their work.

Collections can certainly provide opportunities for a broader group of contributors than traditional structures, where typically only dedicated, credentialed professionals could previously break in. iStockPhoto accepts contributions from hobbyist photographers who do not depend on the site as a source of professional income. And exposure on YouTube has provided an outlet for many performers to get their work in front of an audience, in some cases opening up

opportunities for them in the mainstream entertainment industry. A notable recent example is the pop singer Justin Bieber, who was discovered by a record producer after Bieber's mother posted videos of his performances on YouTube.

Contests can elicit significant effort from many members of the crowd, with only the best contributions being used, and thus they can potentially be quite cost effective—though this is dependent on the bounty being large enough to attract a sufficient number of contributors. And the true value of contests is often not in the number of participants but in the diversity of ideas they can product, and in contests' ability to identify uncommon talents that are very widely distributed. The latter is a key advantage of Innocentive, which taps a far-flung global network of to can solve challenging scientific and engineering problems.

To date, the Collaboration gene has been used primarily by mission-driven non-profits entities, as exemplified by Linux and Wikipedia, and has not been relied upon directly by for-profit start-up companies. The Collaboration gene has been used indirectly by companies like Red Hat, which provide services linked to open source software development projects. One of the difficulties involved in direct use of the Collaboration gene in a for-profit setting is the need to measure and reward incremental effort by crowd members who chose to contribute to the effort. In most current web-based collective intelligence systems that rely on Collaboration, the many individuals contribute to the effort, with the size of their contributions varying greatly in size and number. Developing a system that could measure and incentivize contributions at a sufficiently fine level of granularity could be a sizeable challenge.

A software development contest sponsored by Matlab has evolved a structure that combines the competitive elements of a contest with some collaboration. The contest asks software developers to write code that is judged on how well it solves the problem at hand and

quickly it runs. Entries get judged at intervals and scores are made available to all contestants. Contestants are able to borrow code from other contributors whose work appears promising (Gulley 2004). This structure is effectively combines the Contest and a Collaboration genes, but it is enabled by the nature of the work, in particular, by the fact that all contest entries can be judged quickly, using another computer program, on an ongoing basis. Creating hybrid structures that combine the Contest and Collaboration genes in less structured setting can create complexity that may be difficult to manage (Boudreau and Lakhani 2009). But this is also a promising area for potential future experimentation.

Use of crowd-generated decisions for start-ups

Managing systems that rely on collective intelligence-based crowd decisions is relatively straightforward when the crowd's input can be obtained without active consent from contributors, for example, through crawlers that mine information on the web or through the collection and storage of electronic traces left by people in the course of engaging in everyday activities on the web. Google is a good example of a firm that takes advantage of this approach. Because the Internet is accessible to anyone, Google's crawlers can readily identify and gather web links without need for any active contribution by or consent from the people who create those links. The challenge for Google is to keep up with the constantly expanding amount of content on the web, which means its crawlers must always be checking for new links and its servers must be continually updated.

Systems that rely on active decisions from the crowd, as opposed to capturing crowd decisions automatically, face a larger challenge (see Cook 2008 on the distinction between active and passive contributions). Sometimes the collection of decisions from the crowd can be done as

part of a related activity where contributors will receive a benefit from their participation. An example is the buyer/seller ratings on eBay. If a buyer in an eBay transaction rates the seller, there is greater likelihood that the seller will, in turn, rate the buyer that submitted the initial rating. This, in turn, can help both parties to establish a reputation for reliability that can enable them to participate in future transactions.

Some firms that elicit decisions or evaluations from the crowd, however, do this as a separate, stand-alone activity. Yelp, which publishes online rankings of restaurants, shops, and other locally-based businesses, is one example. Once more than a few dozen ratings have been submitted for any establishment, each individual contributor's ranking will do little, on its own, to change the overall ranking. This could reduce incentives to contribute—a phenomenon similar to the one identified by political scientists when they note that knowing in advance that large numbers of people are likely to cast ballots in an election can be a disincentive to vote (Downs 1957). One way Yelp encourages participation in the face of an individual's minuscule impact on an establishment's overall rating is by publishing the text of every review submitted by every user on its site, accompanied by each user's star rating, and with the user's name attached. Yelp also relies on other features that provide contributors with a sense of voice, such as allowing users to create home pages that feature a profile and all their reviews and by naming members who write many reviews to the site's "Elite Squad."

Collective intelligence and risk for start-ups

Given the advantages that reliance on crowds could confer, one of the biggest risks for start-up ventures would be *not* to consider seriously the use of the crowd where possible. Reliance on the crowd is certainly not appropriate in all settings, but given the new possibilities

opened up by web-enabled collective intelligence, entrepreneurs will at the very least want to think quite carefully about potential ways to incorporate the crowd in their new ventures.

At the same time, while the crowd may seem to offer significant benefits—including the prospect of tapping into a highly diverse pool of contributors at potentially low costs—reliance on the crowd also carries risks. One considerable risk is that developing a community to the point that it reaches critical mass its talents can be tapped is a sizeable challenge, one that involves far more than simply building a web site and expecting that people will find it and begin to congregate there. Developing the kind of community base needed for effective crowd-based creation or decision-making requires significant effort. Many attempts to create such communities have never reach critical mass and instead founder. Any entrepreneur who seeks to leverage the talents of the crowd should recognize the magnitude of the community building challenge.

The work of developing and managing a community charged with doing work that represents an important part of a firm's value chain may not appear to be a stretch for entrepreneurs accustomed to juggling the demands of many stakeholders, including customers, partners, employees, and investors. But the skills required to manage an industrial supply chain or even a complex ecosystem of partners (Dhanaraj and Parkhe 2006) are still different from those required to manage a crowd of individual contributors. Community management on the web remains more art than science, though scholars have begun to mine a decade plus of history (Preece and Schneiderman 2009) and also apply principles from the social sciences (Kraut and Resnick in press) in developing toolkits that can be used by entrepreneurs.

The past few years have seen the growing maturation of collective intelligence-based platforms that client firms, including start-ups, can use to tap the talents of already established

online communities. Examples include TopCoder and Innocentive, for complex tasks like software development and scientific problems solving; Amazon's Mechanical Turk and CrowdFlower for simpler tasks; and a range of other platforms, including such firms as LiveOps, Elance, and oDesk, that operate somewhere in between. These platforms can allow start-ups access to crowd-based creation and decision-making at lower cost and less risk than if the new venture tried to build a community of its own from scratch. Platforms like TopCoder and Mechanical Turk could become an important part of the entrepreneur's toolbox in the future.

Another risk of crowd-enabled start-ups is competitive. In many domains, network effects dominate, and there is room for only a few—or even one—competitor. For example, Flickr has emerged as the dominant site for online photo collections. Its competitor, Picasa, remains a distant second, despite being acquired by, and receiving major support from, Google. Given this, in new domains, there may eventually only be room for a few or even one major player, which means there are sizeable risks associated with being an also ran. These risks may not be so apparent when one looks out and sees collective intelligence systems that are prominent on today's web. But there is a considerable amount of survivor bias in our perceptions of web-enabled collective intelligence systems. We tend to be aware of the efforts that were successful enough to establish a strong position and gain mindshare. We simply do not recognize the many efforts that did not become dominant and faltered along the way—these effectively remain invisible to us. For example, at the time of Wikipedia's launch in 2000, there were as many as a dozen other groups launching competing online encyclopedias. Within a few years, Wikipedia became the clear leader and has gone on since them to become dominant its niche. The other efforts are forgotten, except by a handful of researchers.

There are also risks associated with reliance on specific CI genes. Some firms have experienced a backlash against their use of the Contest gene, based on the argument that contests require people to work on spec—shorthand widely used by workers in freelance professions for work done on a speculative basis—with no guarantee of payment. The backlash against some contest sites in graphic design became so great that a group of designers founded a site of their own, No!Spec, to get their story out on the web (No!Spec 2011). In relying on contests, firms must craft a value proposition that keeps individual participants from feeling they are being taken advantage of as a source of cheap labor or being exploited in other ways.

Systems that rely on the crowd to contribute decisions and evaluations, especially those based on location, have particular challenges of their own. By inviting people to contribute to a crowd based assessment of the quality of establishments in a particular geographic region, like a city or metro area, such systems are effectively asking contributors to develop a type of civic resource that will be available to people who live in the region as well as visitors. A resource of this kind that is likely to be viewed by contributors as a type of public good. But an entrepreneur who creates a for profit business involving crowd creation of this kind of resource will need to generate revenues, and the profit making-imperative of the firm may conflict with the contributors' sense that they are creating a community resource. In part out of recognition of this dynamic, Yelp did not include advertising initially. Some time after the site's launch, when it did introduce advertising, the management team experienced some backlash.

The Yelp example illustrates a more general risk for entrepreneurs using crowd-based models—getting the right combination of incentives can be challenging. In particular, including Money in systems that also rely on Glory and Love gene may not in fact increase motivation, but rather, in a seeming paradox, decrease it. This is an example of what economists call the

crowding out problem, first identified when British blood banks added a paid donation option to what had previously been a wholly voluntary system—only to find that donations declined (Titmuss 1972). Experimental economists and neuroscientists are beginning to unravel the reasons behind this seemingly paradoxical result (Bowles 2008 provides a summary and Gneezy et al. 2010 describes an intriguing application). For now, entrepreneurs will want to tread carefully when designing systems that combine multiple Why genes.

Another challenge of crowd decision sites is overall lack of control over the content. A group of hotel owners was recently considering a lawsuit against TripAdvisor, a crowd-based hotel rating site, over negative reviews (Stellin 2010). Another difficulty for companies that rely on crowd-based assessments is when contributors submit negative reviews of establishments that buy advertising on the site (DeLorenzo 2010).

Impact of collective intelligence on venture capital firms

Web enabled collective intelligence could have an impact on venture capital firms by making it possible for the crowd to play a role in two of the key activities where venture capitalists currently assume responsibility:

- screening and selecting ideas for new ventures,
- financing new ventures.

Potential impact of collective intelligence on screening and selecting ideas for new ventures

Two recent developments have begun to inject the crowd into the innovation process at large corporations. IBM's Innovation Jam is a structured annual process in which the company invites all of its key stakeholders to contribute ideas for new products or process improvements.

IBM's Jams initially involved employees only, but they were subsequently expanded to include customers and suppliers. Ideas get proposed and then go through a multi-stage screening process. Proposals that make it through the process are funded, with the expectation that some of them will become new products that will be offered to IBM's customers or process improvements that get implemented internally.

The process of idea generation and screening embodied in IBM's Jams has been embedded in software applications like Spigit and Imaginatik. These applications, often called ideation tools, are frequently combined with consulting services and are typically deployed as part of focused or ongoing efforts to develop innovative ideas inside large firms. The combination of software tools and associated processes allow employees, and sometimes other corporate stakeholders, to propose ideas, develop them, and select the most promising ones to launch as new products or to implement internally.

These crowd-based approaches are eminently applicable to the venture capital process, and there is already at least one VC firm that has applied them. Spencer Trask has developed a web based collective intelligence platform, VenCorps, and has recruited a web-based community that uses the platform to find and nurture new ventures. VenCorps relies on a community comprised of entrepreneurs, scientists, investors, and government officials. An open variant of the platform has also been used to address social problems like traffic congestion. And the VenCorps technology served as the basis for the U.S. Department of Education's Open Innovation Initiative, which elicited new ideas for improving American schools, connected innovators who were working on complementary concepts, and funded the most promising teams (Wise 2010, Tapscott and Williams 2010).

The potential of collective intelligence has been recognized by others in the new venture sector. For example, the 2010 MIT Venture Capital Conference ended with a session using a tool called IdeaStorm, designed to harness the collective intelligence of attendees at the meeting (MIT Venture Capital Conference 2010). A related development is Springwise, a crowdsourced web site that finds and posts promising new business ideas.

Potential impact of collective intelligence in the funding of new ventures

A development that could have an event greater impact on venture capital firms is the emergence of crowdfunding, where both the selection and funding functions are externalized to crowds. Crowdfunding has already been used for social ends, through sites like Kiva, which combines the principles of microfinance and crowdfunding to link small business owners in developing countries with donors (Hartley 2010). As of early 2011, Kiva had channeled nearly $200 million to more than a half a million small business owners.

The success of Kiva has spurred the development of numerous platforms that allow donors to pool small amounts of funding for organizations that promote social causes and for arts projects. Some of these platforms are based on a charitable donation model, while others rely on debt financing or even providing equity to donors (Cahalane 2011). Kickstarter, one of the most prominent arts crowdfunding platforms, has funded more than 400 projects since its founding in 2009, with a dozen projects raising more than $50,000 and one raising nearly a million (Wortham 2010). An interesting feature of Kickstarter is that donors do not expect to get paid back or receive equity, though they do receive something tangible in return from the artists they fund—a CD, DVD, or print or an invitation to a concert, screening, or gallery opening.

The potential of crowdfunding has begun to be recognized by actors in the new venture sector. Friends and family and angel investors have long helped to fund new ventures before they were ready for venture capital investment. Crowdfunding takes this concept and combines it with the concept of web-enabled social networks. Social investors pursuing double bottom line returns—profit plus social impact—have also frequently used direct public offerings (DPOs) to fund new ventures. DPOs also involve some of the same principles as crowdfunding, though they typically involve fewer investors who are less widely dispersed (Gore 2009). Two venture capital firms based on the principles of crowdfunding have been formed: GrowVC and ProFounder. And some of the crowdfunding platforms that initially focused exclusively on social or arts-related activities are now beginning to fund for profit start-up ventures. One caveat must be kept in mind. In the United States, securities regulations make some aspects of crowdfunding challenging (Lawton and Marom 2010).

The use of collective intelligence in the selection and development of ideas for new ventures and the rise of crowdfunding could both could have major implications for venture capital firms. In each case, the crowd may increasingly come to assume a role that was formerly the province of venture capitalists. Some venture capital firms may adopt these practices, and new entrants—such as GrowVC and ProFounder—dedicated to crowd-based approaches, which currently hold a niche position, could emerge as viable competitors to mainstream venture capital.

Conclusion

Web enabled collective intelligence has the potential to reshape innovation in the early 21st century as profoundly as the emergence of the new venture sector reshaped innovation in

latter half of the 20th century. In the 1950s, when Fairchild Semiconductor was founded, start-up companies and their funders must have seemed exotic, even unserious, to observers who looked out at them from inside the corporate labs that still dominated innovation in the mid-20th century economy. In the same way, early experiments with web enabled collective intelligence may well appear exotic to observers who see them from inside the new venture sector that has come to dominate innovation in recent decades. But these experiments only scratch the surface of the potential that collective intelligence has to unleash new modes of innovation.

In the face of these developments, entrepreneurs will want to seek ways to take advantage of collective intelligence-based approaches for undertaking work formerly done by the employees of start-up companies. And venture capital firms will want to track the ongoing diffusion of collective intelligence-enabled innovation and seek ways to incorporate the crowd in the activities of their portfolio companies and to experiment with collective intelligence as a tool for running their own businesses.

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