Article

Crowdfunding: A New Untapped Opportunity for Biotechnology Start-ups?

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ABSTRACT
Crowdfunding is an evolving popular Internet-based process used to raise funding that has been employed by a few start-ups in the biotechnology industry. To solicit funding, companies profile their case on a specialized web platform (generally called a “crowdfunding portal”) to ask the site members (i.e., the “crowd”) who then choose which projects they would like to fund, in exchange for financial and nonfinancial inducements. In this paper we examine the evolving commercial and regulatory crowdfunding landscape and also identify case studies of biotechnology industry use. We find that a variety of crowdfunding mechanisms have been used and this alternative financing strategy may represent a viable option for biotechnology start-ups during early stage research or early stage clinical trials. A successful crowdfunding campaign may pave the way for the enterprise’s future capital formation phases by attracting angel investors or venture capital because it shows that the business or project is viable. However, crowdfunding, like all other forms of capital formation, requires careful planning and execution before, during, and after a campaign. Strategies that appropriately tap into this innovative and disruptive use of technology and social networks may prove to be a unique capital formation niche for biotechnology start-ups; one that has yet to be fully leveraged.

Keywords: crowdfunding; angel investors; biotechnology financing; start-ups; social media marketing

BACKGROUND
Crowdfunding is a fairly new phenomenon. Companies and individuals post on the Internet to ask the public to fund ideas, projects, and new ventures. It is now utilized as a worldwide funding strategy across a wide spectrum of industries and economic sectors, specifically including the biotechnology sector. Although a relatively nascent instance of technology combined with financing, its use is growing rapidly; Deloitte Touche Tohmatsu Limited estimated that over $3 billion was raised through donation or reward crowdfunding in 2013. Despite this market potential, the current exercise by, applicability to, and future impact of crowdfunding on the biotechnology industry remain relatively unknown. Taking this into account, this article examines the evolving commercial and regulatory landscape of crowdfunding and also identifies case studies of its use by biotechnology firms. Our findings can help guide the biotechnology industry to determine the potential opportunities and challenges faced by this disruptive form of financing technology.

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UNDERSTANDING CROWD-FUNDING

To understand its potential implications for biotechnology, the concept of crowdfunding must first be explained. It is one of the other forms of financing in which crowdfunding creates an ecosystem—an environment that facilitates capital formation in an organic and self-perpetuating manner by which small amounts of money are raised from a large number of people, typically through the Internet. The ecosystem integral to crowdfunding can be efficient, effective, and faster than traditional forms of financing that rely on personal resources, funding by venture capital firms (VCs), or by accessing loans.

In contrast to traditional forms of capital formation, crowdfunding relies on the Internet as a medium on which individual projects and solicit funds from the public as investors. Capital formation over the Internet leverages the ability to access a large number of people who may choose to contribute to an innovator’s project. Creating a crowdfunding portal is Internet-based business that operates specialized web platforms (generally called portals) to facilitate transactions between entities asking for funding and the investors that provide financing. These websites also act as a space to present projects and ask for funds and to provide information about the progress of projects underway. Typically, the size of individual investments is small to minimize the investors’ potential financial risks.

Crowdfunding is also the title of Title III of the Jumpstart Our Business Startups Act (JOBS Act) that was signed into law on April 5, 2012. The JOBS Act required the Securities and Exchange Commission (SEC) to develop regulations by October 2015 that will govern the offering and sale of securities through equity-based crowdfunding. The SEC finalized the crowdfunding regulations on May 25, 2015, the rules allow companies to raise up to $1 million in funds during any 12-month period (subject to capped contributions based on annual income or net worth). All transactions will be required to go through an equity crowdfunding portal that is registered as an intermediary with the SEC.

CROWDFUNDING AND BIOTECHNOLOGY COMPANIES

Crowdfunding has been used predominantly for such entrepreneurial ventures as creative projects (e.g., music productions, concerts, self-publishing), developing consumer goods (e.g., games, hardware, software, and electronic devices), and various causes (e.g., community projects), but has not been widely adopted by biotechnology firms. Nevertheless, the current crowdfunding environment may still represent a potential avenue for smaller biotechnology firms to raise capital for their early stage or start-up endeavors that continue to be squeezed out of the traditional market-based financing methods. The P2P lending model,” funders may receive small rewards as perks, or pre-purchase products in exchange for their funds. In contrast, P2P lending and equity crowdfunding models are market-based financing methods. The P2P lending and equity models are collectively referred to as “financial return crowdfunding” and are regulated by the crowdfunding rules that will be discussed below.

Financial-return crowdfunding portals that operate in a foreign country sometimes must also comply with a second country’s financial or securities laws and regulations that are applicable to their activities. For example, a United Kingdom (UK)-based financial-return crowdfunding portal intending to operate in the United States (U.S.) must also comply with all applicable U.S. laws. Here, we describe these two different models in detail in the following subsections and provide specific examples of their use in science and research.

DONATION/REWARD MODEL

In the donation/reward crowdfunding model, an entity with an idea or project goes to a crowdfunding portal (a specialized website) to request funding. Individuals or organizations describe their projects and ask the crowd to fund them. Members of the crowd who decide to fund a project then become its backers. They are kept informed about activities related to their project through the project’s web page and other identified social networking websites (LinkedIn, Twitter, Facebook, or other social media) chosen by the project owners. The backers may or may not receive a small reward (e.g., a T-shirt) in return for their donation. The backers may also pre-purchase a product to raise funds for its further development. Crowdfunding platforms that provide services related to the donation/reward model currently are subject to different regulatory requirements, so it is possible that these platforms cannot offer their backers equity securities or other types of financial return on investment due to securities laws.

The donation/reward crowdfunding model is not new and, using different media platforms, has essentially been in place for decades. Many organizations have raised millions of dollars from the public through traditional crowdsourcing methods involving a website, mailing list, or newsletter. The donation/reward crowdfunding model is described here as an example of how to apply the current crowdfunding provisions to a project.

CROWDFUNDING MODELS

There are generally three models of crowdfunding: (1) donation/reward/pre-purchase, (2) peer-to-peer (P2P) lending, and (3) equity models that can be simplified into the nonfinancial return and financial-return-based funding types. In the donation, reward, or pre-purchase models (hereinafter referred to as the “donation/reward model”), funders may receive small rewards as perks, or pre-purchase products in exchange for their funds. In contrast, P2P lending and equity crowdfunding models are market-based financing methods. The P2P lending and equity models are collectively referred to as “financial return crowdfunding” and are regulated by the crowdfunding rules that will be discussed below.

FUNDING UNDERSTANDING CROWD–FUNdING
<table>
<thead>
<tr>
<th>Crowdfunding Portal</th>
<th>Biotechnology Projects</th>
<th>Crowdfunding Model/Volume/Website</th>
<th>Fee/Ownership Claims</th>
<th>Project Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>GoFundMe (2010, Private, U.S.)</td>
<td>None</td>
<td>Donation/Charity</td>
<td>Open to global backers</td>
<td>No penalty for not reaching targeted amounts</td>
</tr>
<tr>
<td>Kickstarter (2009, Private, U.S.)</td>
<td>None</td>
<td>Donation</td>
<td>Open to global backers (certain countries)</td>
<td>All or nothing</td>
</tr>
<tr>
<td>Indiegogo (2008, Private with $40 million B-round financing in 2014, U.S.)</td>
<td>6 biotechnology projects listed</td>
<td>Donation</td>
<td>Open to global backers</td>
<td>Reach target or keep raised amount</td>
</tr>
<tr>
<td>Tilt (Formerly Crowdtilt 2008, Private, U.S.)</td>
<td>None</td>
<td>Donation (U.S., U.K. &amp; Canada)/Fundraising/Sell (using Shopify)</td>
<td>Open to global backers (requires international credit cards)</td>
<td>Volume unknown</td>
</tr>
<tr>
<td>Crowdrise (2010, Private, U.S.)</td>
<td>None</td>
<td>Donation/Charity</td>
<td>Open to global backers</td>
<td>No claim of ownership over their projects</td>
</tr>
<tr>
<td>Experiment (formerly Microryza 2012, Private, U.S.)</td>
<td>Investors include Index Ventures &amp; SV Angel are among portal’s investors</td>
<td>Donation</td>
<td>All-or-nothing funding model</td>
<td>Currently only U.S.-based projects, although piloting projects from Australia, Canada, &amp; U.K.</td>
</tr>
</tbody>
</table>

Table 1: List of popular donation/reward crowdfunding portals

Source: portal websites.
entrepreneurs around the world. Crowdsourcing for capital formation (i.e., P2P crowdfunding) provides the necessary funds for small businesses that may not have access to established sources of capital due to a variety of reasons. In P2P crowdfunding, borrowers ask the crowd for a loan on a lending portal and supply sufficient information about the purpose of the loan, their credit, and other financial information required by the portal. Members of the crowd (that is, backers) decide how to lend money—secured by existing collateral or unsecured—to a borrower, and under what terms (simple or compounded interest rates). In some cases, unlike traditional lenders, backers may go through a reversed auction to set the lowest possible interest rate for the loan amounts. A P2P lending portal facilitates loan origination, collection of funds for the loan amounts, and distribution of loans, collection of repayments for the lenders, loan servicing, necessary record keeping, and management of communication. These portals charge fees, which comprise a percentage of the loan amounts, for their services.

At its inception, this new financial instrument relied on unrelated people (i.e., peers) as lenders and borrowers to transact business over an internet lending portal, thereby bypassing traditional financial institutions. The business model for lending portals has changed due to regulations in various countries. Since 2008, in the United States, P2P portals have been required to register their offerings with the SEC as securities to comply with the Securities Act of 1933. In addition, P2P portals must comply with all applicable laws and regulations pertaining to financial transactions and lending. In the United States, commercially operated P2P lending portals also must comply with the Money Laundering Control Act of 1986, Money Laundering Suppression Act of 1994, and the Bank Secrecy Act of 1970 among others, including consumer protection and privacy laws and regulations. As a result, many lending portals partner with a bank that already has the necessary regulatory compliance mechanisms in place (see Table 2 for a list of well-known P2P lending portals). P2P lending portals are increasingly lending startups having short operating histories that could impact creditworthiness. In such cases, the P2P loans might be less attractive to start-up businesses because of the difficulty in demonstrating the ability to repay a loan. As a relatively new form of lending, it remains to be seen how the P2P lending market may evolve in the future. It may nevertheless still represent a pathway to access seed money for small biotechnology companies.

**Equity Model**

The U.S. equity model of crowdfunding resembles traditional investment models that include funding by VCs, angels, or accredited investors. Start-ups issuing equity to purchasers by using crowdfunding portals as intermediaries, resulting in a transfer of ownership interest in the business in return for funding. Options for offering equity-based crowdfunding under the SEC’s rules include conditional small issues exemption (Regulation A) and the limited offer and sale of securities without registration (Regulation D). Equity crowdfunding portals are registered with the SEC as intermediaries (registered broker/dealers), which allows them to facilitate this equity exchange and receive fees for their services (see Table 3 for a list of popular equity portals). The portals themselves are not currently exempt from Section 15(a) (1) of the Securities Act of 1933, which allows the SEC to allow exemptions from registration for offering equity to small companies because the SEC registration process is cost-prohibitive. Smaller companies generally qualify for an exemption under the Securities Act of 1933 to offer securities through crowdfunding portals without going through the registration process. After the SEC grants the exemption, these companies offer securities only to investors who meet the requirements for purchasing their securities (such as accredited investors).

The equity crowdfunding portals in the United States mostly allow accredited investors to purchase securities in a private transaction through the portals. Accredited investors (revised due to the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010) include traditional institutional investors such as banks, insurance companies, hedge funds (but the minimum-asset requirements are generally higher), and individuals who qualify. Individuals or married couples who qualify include those with a net worth in excess of $1 million, and those whose income exceeds $200,000 (for individuals) or $300,000 (for married couples) for the two most recent years and a reasonable expectation of the same income level in the current year. A private transaction means there can be no general advertising or publicity aimed at investors while the offering round is open. The SEC rules require investors to be accredited by the SEC as a result, a smaller crowd of potential funders is available to businesses hoping to offer equity to the crowd in exchange for financial backing. The participation...
Table 3: List of popular equity crowdfunding portals

<table>
<thead>
<tr>
<th>Crowdfunding Portal (Launch Year, Ownership, Country)</th>
<th>Biotechnology Projects</th>
<th>Crowdfunding Model/ Other Information/ Website</th>
<th>Fees/Ownership Claims</th>
<th>Investment Categories and Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundable (2012, Private, U.S.)</td>
<td>• More than 7 health-related biotechnology companies (click to see list) • Selected companies: Genome Profiling LLC (GenPro), Levoltia Pharmaceuticals, Endure, NH Systems, Inc. works in association with UC San Diego’s Skaggs Institute of Oceanography (ISIO), UUDoc (fee-based interactive health information portal providing diagnosis, testing, and treatment)</td>
<td>• Software as a service crowdfunding platform • The portal offers both rewards-based and equity-based options for small businesses • All or nothing model • Private companies offer securities to investors under Rule 506 of Regulation D on CircleUp and through Fundme Securities LLC • Supports both Regulation D 506(b) and 506(c) offerings • $179 M in funding • <a href="http://www.fundable.com">www.fundable.com</a></td>
<td>• Monthly subscription fee, platform fees, and consulting fee • Project owners agree to pay all royalties and other amounts owed to any person or entity due to their submission or any user submissions service • Claim of ownership rights of the project content based on legal agreements; IP might be impacted unless user has secured its IP</td>
<td>• Allows both reward- and equity-based • Equity-based offered to institutional or accredited investors only • Minimum investment amount is $1,000 and there is no maximum • All securities-related activity is conducted through Fundme Securities</td>
</tr>
<tr>
<td>AngelList (2010, Private, U.S.) (The portal was originally founded in UK, also operates in U.S.)</td>
<td>• 25+ Biotechnology startups • 10+ Pharmaceuticals • 25+ Medical devices • 15+ Health technology</td>
<td>• Equity investment for accredited investors and institutions • Supports both Regulation D 506(b) and 506(c) offerings • Syndicate investors do not invest directly in a company. They invest in a special purpose fund that is created specifically for the investment. This fund then invests in the company. The corporate form of the fund is an LLC</td>
<td>• Investors pay 0–25% deal carry to lead, 5% to platform • Investors receive a profit, if any, when the company is acquired or has an IPO</td>
<td>• Startups offering rounds A, B, C, ... • Syndicated investment funds led by an angel or VC investor • 16,990 of 53,081 companies claimed funds</td>
</tr>
<tr>
<td>CircleUp (2011, Private, U.S.)</td>
<td>• None</td>
<td>• Private companies offer securities to investors under Rule 506 of Regulation D on CircleUp and through Fundme Securities LLC. • Supports both Regulation D 506(b) and 506(c) offerings • Accredited investors only • All securities related activity is conducted through Fundme Securities LLC, a wholly owned subsidiary of CircleUp Network, Inc. • Fundme Securities LLC is a registered Broker/Dealer and member FINRA/SIPC circleup.com</td>
<td>• Commission case by case—% of the total amount • Investors include USV, Canaan Partners, Google Ventures, Maveron, Rose Park Advisors • Partners: General Mills, P&amp;G, and SPINs • The issuers set the valuation of their companies. Valuations on CircleUp are intended to be in line with industry comparable on a revenue and net profit basis • Ownership claims: not clear</td>
<td>• Currently 144 companies are on the portal, focus on mostly consumer products companies, no biotech companies • Entrepreneurs screen interested investors and select which investors to participate in their round, also, structure the terms of their raises through an Investors Rights Agreement • Average funding time is 2–3 months</td>
</tr>
<tr>
<td>Seedrs (2012, Commercial, UK) (Note: Plans to expand into the U.S. market)</td>
<td>• Medical device start-up (IRIS Medical)</td>
<td>• Equity, Fund, Convertible Campaigns; investment in multiple early and growth-stage finance for businesses • All or nothing • Angel investors &amp; VCs • Open to retail investor (not U.S. residents) from throughout Europe • Investors have to provide investor questionnaire or self-certify as a &quot;high net worth individual&quot; or a &quot;sophisticated investor.&quot; Institutions provide &quot;high net worth company, unincorporated association, etc.&quot;&quot;) forms. • <a href="http://www.seedrs.com">www.seedrs.com</a></td>
<td>• One-off fee of up to 7.5% from successfully funded businesses • Investor fee of 7.5% carry (of the profits investors) • All-or-nothing basis but successful campaigns have the option to overfund • Referral fees paid for successful cases</td>
<td>• Investment in early- and growth-stage finance for businesses • Funds businesses in 48 countries • Business categorizing: N/A</td>
</tr>
</tbody>
</table>

Source: portal websites.
Few biotechnology firms have used crowdfunding to actively raise capital. Despite there being only a few case studies available for review, some firms have been successful in raising capital for their projects by way of different types of crowdfunding platforms. Successful biotechnology firms generally used crowdfunding during early stages of their R&D, and some used a multi-pronged strategy to market and raise funds for their innovations. The case studies also reveal that crowdfunding for biotechnology start-ups appears to attract a diverse group of angel, venture capital, and ordinary people who are interested in funding a project for a variety of reasons beyond investment purposes. A start-up biotechnology firm must tell a good story for the crowd to attract support. Not only must the story be made available on a crowdfunding platform, but a communications campaign must also be mounted to inform members of the public who have the potential to become members of the crowd. In this sense, crowdfunding for biotechnology projects is functionally similar to communication campaigns for political office; better campaigns have higher chances for success and garner greater funding opportunities.

**Exogen Biotechnology Inc.**

In January 2014, Exogen Biotechnology Inc. (Exogen) launched a reward/purchase crowdfunding campaign called “How Damaged is your DNA?” on Indiegogo (a crowdfunding platform, but a communications campaign for political office; better campaigns have higher chances for success and garner greater funding opportunities, launched a reward/purchase crowdfunding campaign called “How Damaged is your DNA?” on Indiegogo (a crowdfunding platform, but a communications campaign for political office; better campaigns have higher chances for success and garner greater funding opportunities.

**Apta Biosciences**

In April 2014, Apta Biosciences (Apta) had a crowdfunding-based equity offering round on SyndicateRoom and raised £1,850,000 by the round’s close.22 Apta is a small biotechnology company (11 to 50 employees) that was founded in 2013 when its technology spun out of Fujitsu. Its offices are in Singapore and the United Kingdom. SyndicateRoom is a UK-based equity crowdfunding platform; its business model allows its retail members to invest alongside angel investors in equity offering rounds that allow the same share class and same price per share.22 The same criteria were used in Apta’s offering round, which allowed Apta to raise capital to undertake the validation process of its adaptamers, a new group of synthetic molecules that mimic the characteristics of proteins such as antibodies, for further product development. The company holds 25 patents for its developed adaptamers. Apta’s adaptamers are called Seligos; the synthetic molecules are very stable (they do not require cold storage), easy to produce, and purportedly deliver high performance.

**ImPatience**

ImPatience is a nonprofit crowdfunding platform that is currently crowdfunding its own creation and launch by soliciting donations.22 The portal’s funders won seed money when they won the top prize during the Lehigh Valley Startup Weekend competition sponsored by the Lehigh University Baker Institute for Entrepreneurship, Creativity and Innovation.22 ImPatience is planning to launch its crowdfunding portal in fall 2015 and operate as a hybrid donations and loans crowdfunding platform, that for a fee, will raise funds for small biotechnology companies. After launching the portal, ImPatience’s scientific advisors will select “promising unfunded medical treatments” for the crowd to fund as their favorite medical research. The crowd includes portal’s members, who provide a minimum of $25 in the form of a loan to the medical project of their choice. The funded companies may pay back the loaned amounts. The payback amounts are then credited to members’ accounts and can be loaned to another project. A loan that is not repaid is considered a donation.

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**Table 4: Crowdfunding proposed rules for participating1**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
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<tbody>
<tr>
<td>Investor</td>
<td>The amounts of capital raised through crowdfunding offered by a company are capped to less than $500,000. The total amount that can be sold to any investor is $15 to $1299. By the end of the campaign, not only did Exogen raise 212 percent of its original funding goal through individual contributions, the crowd also provided valuable DNA samples for research to measure DNA damage, which has the potential to advance our understanding of cancer and immunological disorders, among other diseases.22</td>
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Biodiversity startup-steps generally need to raise $50 to $100 million to have a chance at developing a new drug or medical device. Raising capital through traditional VCs and angel investors has the advantage of allowing the start-up to receive mentoring and guidance. As these sources of capital move toward funding start-ups at earlier stages of development, technology start-ups have fewer options for raising capital during early stage development. However, various models of crowdfunding may expand options for nontraditional capital formation.

Small companies can qualify for exemptions from registration for equity offerings through existing SEC rules, such as conditional small issues exemption (Regulation A) and the limited offer and sale of securities without registration (Regulation D). However, U.S. equity-based crowdfunding platforms currently operate under Regulation D, because Regulation A was finalized on June 19, 2015. When considering crowdfunding with securities offerings, investors may consider how easily they can exit their securities, an exit strategy that depends on the method of securities offering (for example, securities offerings through Regulation A, Regulation D, or the equity crowdfunding platform). Some organizations, such as VCs, angel investors, or the start-up’s management, are often in favor of an equity crowdfunding offering since it may provide investors with a marketing engine for the start-up, should both parties have a vested interest in the success of the project.

In conclusion, biotechnology start-ups need to know that (1) crowdfunding is happening now, (2) it behooves them to understand how it works today and in context of the JOBS Act, and (3) they must strategize if they want to appropriately tap into this unique and disruptive opportunity.

REFERENCES


