Do venture capitalists act as gatekeepers of new technology?

This article discusses the important role that venture capitalists and others play in helping to create companies around new technologies. We asked a number of venture capitalists, when considering funding a new company, what was most important to them – people or science. We also asked whether they knew of technology that, without their sponsorship wouldn't have been exploited.

By Dr June Grindley and Samantha Smart

There have been radical changes in the way drug discovery is undertaken now compared with 20 years ago. These changes have come from the input of new technologies such as genetic engineering, DNA sequencing, combinatorial chemistry, bioinformatics and robotics. In the main, the technological breakthroughs were made in academia but were adopted and refined in young companies before becoming mainstream. Generally the technology made its way out of academia into a company because a company was formed to exploit the technology. How does this process happen? What technology merits the creation of a company around it and how do the venture capitalists who put up the money to enable such companies to start up, choose the company or technology in which to invest?

In the financial world, it is a well-known mantra that Venture Capitalists (VCs) invest in people, people, people – and complain about management, management, management. But is this fact or fiction?

If it is people that are so important, why do VCs spend so much time and money in thorough due diligence to ensure that the intellectual property and the technology is owned by the company? If it is the technology that is important, why the mantra? Are VCs really gatekeepers, governing which technology is exploited? Are they trendsetters actively seeking out the next wave of technology? Or are they really investors in people? What else influences the uptake of new technology?

Rather than prejudice the response to these questions by drawing solely on our own experience, we asked a number of venture capitalists what was most important to them and whether they knew of technology that without their sponsorship would not have seen the light of day.

Traditional gatekeepers: established companies

Twenty years ago, when Amgen and Genentech were just fledglings, most new technology coming from academia would have been exploited by established pharmaceutical or diagnostic and device companies who would have licensed the

technology directly from academia. Otherwise, the technology would not have moved from the laboratory; would not have been tested in a commercial environment; nor would it have acquired the commercial imprimatur to be recognised by the established industry. Rarely would the University have had a professional technology transfer office to advise on the licensing transaction, and even more rarely would the idea of starting a company have been uppermost in the academic's mind. Nowadays, a seachange has taken place. Indeed, one senior licensing executive at a multi-national pharmaceutical company complained to us that now all new technology already seems to be in a company when he sees it.

The venture capitalist's response

Do venture capitalists regard themselves as technology gatekeepers?

Helmut Schühsler (TVM, TechnoVenture Management, Germany) explains: "Nowadays academia is aware of the potential of its scientific innovations and seeks active technology transfer. VCs are a major 'client' here. TVM also actively picks the leading scientists and invites them in to discuss commercial opportunities." He added: "Our job as a VC is to identify patented/protected quantum leap technologies such as Sequenom's, so when we invest, while the scientific team will have excellent credentials, mostly there is not good experienced management. Where we add value is by completing the founders' team with the right management."

Patrick van Beneden (GIMV, Belgium), in response to our asking if he knew technology that would not have made it out of academia if GIMV had not funded a company, said: "Although it's difficult to prove… PGS International is a good example. Fundamental research was at Ghent and Brussels Universities but the founding of the company provided the financial and organisational structure to develop the hybrid seed technology."

Alan Walton (Oxford Bioscience Partners, USA) gave a number of illustrations that support the thesis that without VCs, innovative technology could languish. As an example, Oxford picked up the muscular dystrophy gene licence from Harvard, which provided the central technology for Genica Pharma, now Athena Diagnostics, part of Elan. Walton also helped 'conceive and commercialise' differential gene expression based on technology from Sherman Weissman's laboratory at Yale, and was the first CEO of Gene Logic, the company set up to adopt the technology. Walton was also the first VC to invest in Physiome which is based on Denis Noble's organ modelling work at Oxford.

Lucy Block (Cambridge Research Investments Limited, UK) has also invested in and created a company, Immunoporation Limited, around technology. On the 'management versus technology' discussion, she added: "CRIL invests in the seed and start-up phase. It is unreasonable to expect a company that has not yet formed itself to have already got together an experienced management team. If the technology is good, it is usually possible to attract good management to it."

Merlin Biosciences' Peter Keen noted that they had created companies (Microscience and ReNeuron) around technology with Merlin providing interim management. Merlin made an unusually large investment at a very early stage in order to enable the company to attract good management. Merlin has also created a company, Cyclacel, around an individual, Professor David Lane.

Steve Bunting (Abingworth, UK) is also credited with creating companies. He commented that "the Abingworth team are incubating quite a few UK deals now." But he added that they invest only if "the project is good and the people are good." Joy Duffen of Avlar, UK, notes that as Avlar also invests in early ventures, people are important: "there is always a leading light somewhere – usually the scientist. But because we invest early, we know we are likely to work with the people concerned for a long time. We have to feel we are able to talk openly and easily with them and that we can work as a team," she added. Steve Bunting noted that, in the UK, "it is more difficult to find good management at the very beginning of a project, but it is our role to incubate the project into a company that will attract a quality management team capable of turning the science into a world class company." Peter Keen added: "If all the VC brings is money, they are not going to influence the uptake of new technologies. What is needed is a genuine partnership between the inventors and the VCs who bring their skills and expertise in addition to money, to establish a real business with adequate resources, achievable milestones and a management team. It is rare for VCs to have the time or resource to do this and if they do so, they expect to be rewarded for it."

In addition to facilitating the recognition and exploitation of technology, do VCs act as technology trendsetters? Alan Walton admitted to helping form the first genomics company which failed, but was also the first VC to work with Craig Venter to take gene sequencing out from the US National Institute of Health and into Human Genome Sciences. Obviously, Oxford Bioscience Partners, like many VCs, are trendsetters but this has its risks. Joy Duffen commented that she believed VCs both follow the fashion but also perceive the needs of the industry. She added that "the high risks associated with backing very new technology require higher returns to those brave enough to take the risks – early stage ventures can go wrong however well founded and managed they may be." Peter Keen agreed that VCs do not themselves set trends. "The industry dictates trends," he said. "Good VCs will anticipate trends and be in at the start." However, he added that, if getting in late to an existing technology that is fashionable enables you to make money for your investors before it goes out of fashion, you should seriously consider it. He also added that they declined some technology plays, particularly in the genomics area, where they felt the valuations were based more on "what you could float it for, than a rational evaluation of the technology."

Helmut Schühsler believes that the 'ivy league' of VCs that make very early strategic investments do set trends in premature or non-developed areas, and create critical mass in the area eg stem cell technology or nanobiotechnology. However, he also believes that there is a huge opportunity for 'contrarian investors' who avoid overpriced hype, invest in scientific fundamentals for longer periods and pull everything together to create the next big thing that "nobody wanted a couple of years ago, for example Ingenium." But he, like Steve Bunting, who missed out on CAT's antibody technology, said they sometimes miss out on outstanding technology because they don't see the deal. This obviously suggests a role for other gatekeepers, such as PricewaterhouseCoopers, who

Figure 1
Environmental factors conducive to start-ups

Experienced local investors (angels and VCs)
Experienced* patent and law firms
Experienced* financial advisory and accountancy firms
Appropriate real estate
Good infrastructure

** Firms prepared to work with loss-making companies with a long lead-time to profitability, and prepared to be flexible in their fee structures*

are 'grooming' companies for the VC community and deliberately matching science and people to the more appropriate VCs. Helmut added that they could also miss out because the technology does not appear outstanding at the time or the rest of the deal is poor. He also confessed to missing out because, more rarely, they just didn't believe in the technology (eg antisense.)

Other factors influencing technology exploitation

i) Technology Transfer Offices

What other factors are important to ensuring that technology moves from inventors, usually academia, into the commercial world? A recent survey in Europe, reported in Nature Biotechnology concluded that "industrial exploitation does not depend only on the amount of money invested by governments; associated policies for technology transfer also seem to have a crucial impact." Technology transfer organisations like the long standing MIT office, the more recently founded UK's Medical Research Council Transfer office, and the many organisations founded as a result of Germany's BioRegio competition, have been responsible for much direct technology exploitation through licensing and for start-ups. But according to Jonathan Gee (Imperial College Innovations) European technology transfer offices have to work much harder than their US counterparts to get companies off the ground: "In the USA the first a technology transfer office knows about a company is when the academic entrepreneur walks in with a VC in tow and asks for a licence to his intellectual property (IP). In Europe the IP has to be in place before a VC will look at it," he said. In the UK, Gee felt that very few VCs were really investing seed finance: all activity is currently being funded through the government's university challenge programme and via business angels (see below.) Gee believes that VCs in Europe want to see a more robust proof of principle before they bring money to the table.

Nevertheless, few technology transfer organisations have the complete package of financial and staff resources to establish a company without help from VCs, even if the VCs are often standing on the road, rather than opening the gate in a muddy field.

ii) Other Gatekeepers: Business Angels

In the early days of European biotechnology, lack of life science venture capital meant that companies relied on other sources of finance. Innogenetics (Belgium) and Neurosearch (Denmark) both started in the 1980s with a mixture of funding from founders, private investors and a variety of institutional investors. Government and European grants or cash cow businesses helped eke out the venture capital for Innogenetics, Genset, British Biotech and Celltech.

Have things changed now? Are venture capitalists the major providers of start-up funds these days or do private investors/business angels still act as technology gatekeepers? An analysis of 15 companies founded over the last four years and highlighted in BioCentury's Technology Briefing this year shows that two out of four of European start-ups and three out of 11 of American start-ups were funded by private investors, government grants or contract research rather than venture capitalists. This indicates that VCs in the US may have a greater appetite for funding start-ups than their

counterparts in Europe. As Jonathan Gee remarked earlier, most of the Imperial College start-ups gain their initial finance from private investors or government sources.

Another example is the Oxford angel network that is developing fast. Oxford-based business people and serial entrepreneurs are well acquainted with the risk:reward ratio and vagaries of the life science scene and have backed recently founded Avidex, but are also supporting the seed financing of a number of other local start-ups, thereby acting as technology gate keepers.

iii) The General Environment

At least in some areas of the world, companies start locally more because the environment is friendly to young companies, rather than because of the local University's activities. For example, in the UK few of the Cambridge Science Park's life science companies are based on technology from Cambridge. In the USA in the early days, there were fewer life science companies in the Chicago and Washington areas then in Boston and the Bay Area despite the excellent biological science and medical schools in the Chicago and Washington areas. What made the difference in Cambridge, was the supportive local environment and the presence of advisors and investors who had cut their teeth on high risk, high growth IT companies and who transferred that experience to the wave of life-science start-ups (see **Figure 1**). Similarly, in Boston and the Bay Area the local climate plus established, experienced technology transfer offices at the major academic institutions made the difference. However today, according to Alan Walton, the Washington DC/Maryland Area is one of the fastest growing bio-regions in the States and generally considered to be the home of Genomics.

Conclusion

Our survey indicated that venture capitalists do act as gatekeepers for new technologies, but that they are not the only filters (**Figure 2**). Other factors also influence the uptake of new technology – these include environmental factors, industry needs, valuations and the people involved.

Peter Keen of Merlin noted that "five of our first eight companies were based on technology that other VCs had rejected, primarily because it was just the technology they were looking at – there being no management team or business strategy in place at the time." All the other VCs we contacted are also early stage investors, and as we have seen, all invest in the science or technology and all work with the founders to put appropriate management and a commercial framework in place. The mantra should perhaps be changed to 'outstanding, timely science'. However, all the VCs also stressed the importance of the people element: founder scientists must be easy to work with and good management must be present to grow the company, at least through its first phases of growth.

As the industry matures, venture capitalists, technology transfer organisations, individual scientists and entrepreneurs and other service providers are all playing their part in opening the gate to enable new technology to be recognised and exploited to aid the drug discovery process. DDW

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Figure 2
Gatekeepers of Technology uptake

Technology transfer officers
Established companies' licensing or business development executives
Business angels
Venture capitalists
Financial advisers/corporate financiers