



Economic Report

Venture Capital in Nanotechnology

April 2010

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1. Introduction

Start-ups and spin-offs are a vital means of commercialising research. New companies require finance to allow them to develop and grow their operations, which should be the point at which venture capital enters the fray. The best venture capitalists should also add value to investee companies beyond simply finance, providing industrial experience, contacts and – not least – momentum. This is especially so in nanotechnology, which often has longer development times and higher costs than an equivalent IT business.

The economic downturn has adversely affected new fund raising in the US and Europe, though not eliminating it all together. Other trends affecting all venture capital investment include a tightening of exit markets – particularly IPOs. There is some evidence that the value of individual early stage funding rounds is increasing, which may raise the threshold for receiving venture capital. The drop in fund raising may also be a consequence of natural funding cycles, with a number of VCs having already raised sufficient funds for the near term. Index Ventures raising of a €350 million fund in early 2009 also indicated that funding has not ceased altogether.

Investment in nanotechnology-focused venture capital in Europe has historically been a small fraction of that of the US. An annual average is of the order of €20 – 40 million, and this level appears to have been maintained in 2008 with four deals alone accounting for investments of €24 million. 2009 has already seen a substantial investment, with Oxford Nanopore (UK) receiving approximately € 16.3 million from a strategic industrial partner and an undisclosed private investor.

Increased investment will occur when the perceived likelihood of investment success increases. With that in mind, three successful exits in 2008/9; Nanoco, OptoGaN, and most notably A123 Systems provide some encouragement.

Investors themselves maintain an interest in nanotechnology not as an investment class in itself, but as one of a number of emerging technologies that affect other classes, such as clean tech or electronics. For the most part there are not nanotechnology-specific factors that concern investors; the primary issue for this, as with all areas, is that portfolio companies are able to withstand the current economic downturn.

2. Methodology

2.1. Definition

For the purposes of this report, nanotechnology is defined as “the study of phenomena and fine-tuning of materials at atomic, molecular and macromolecular scales, where properties differ significantly from those at a larger scale.”¹ The specific focus of this report is on venture capital funding of nanotechnology, and as such this report does not cover industrial investment in internal or cooperative research activities. The definition of a nanotechnology company for the purposes of this report is a company that’s technology involves work at ‘atomic, molecular and macromolecular scales’. This is typically self-defined by the companies themselves.

2.2. Methodology for Preparing the Report

The development of this report has involved desk research and discussion with investors, including an investment-focused session at Nanotech Northern Europe 2008.

2.3. Methodology for Quantitative Assessment

All listings of deals in this report should be considered as a selection of the total, and should not be considered to be an exclusive list of all investments over the period. Some deals occur in secrecy or are not widely reported; in other cases deals are disclosed but details – such as the amount of investment – are not.

Quantitative assessments of market size, growth rates, and the current market shares of nanotechnology enabled products are developed using external data sources such as market research providers, industry groups, and individual experts. Estimates and market size projections that are made by the authors of this report are clearly marked as such.

All forward looking estimates are necessarily a projection, and are therefore subject to error within the market models themselves, as well as to unforeseen external events.

3. Venture Capital Trends and Development

3.1. Global Trends in Venture Capital

The PriceWaterhouseCoopers Money Tree Report (Full Year 2009) which tracks VC investments in the United States found a 28% quarterly drop in Q408, with the amount of investment dropping from US 7.339 billion to USD 5.403 billion. Development over the period 2006-2008 is shown in figure 1. This decline was partially reversed during 2009, though with investments still 30% lower than the Q407 peak.

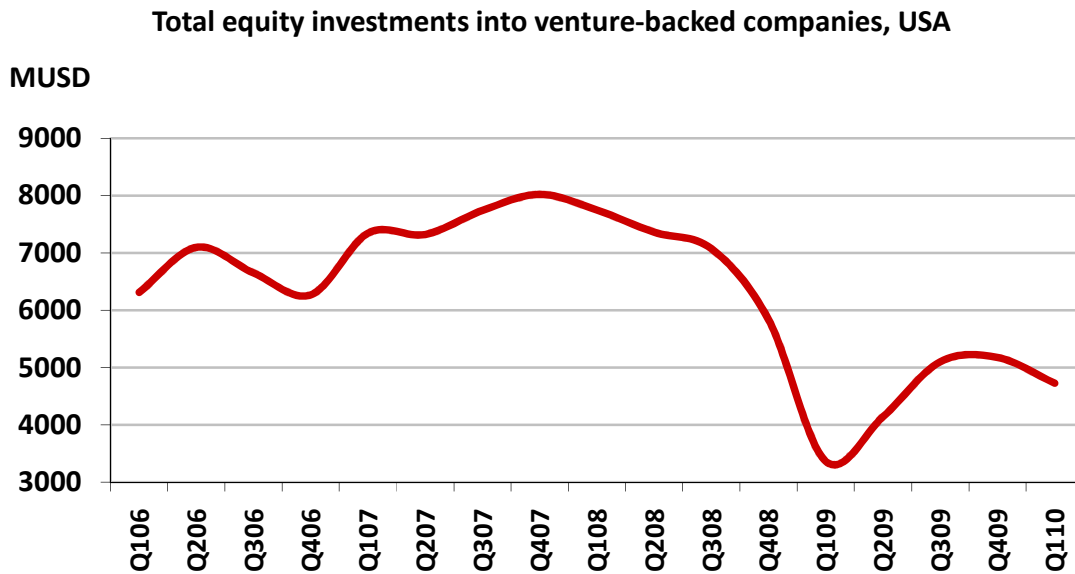
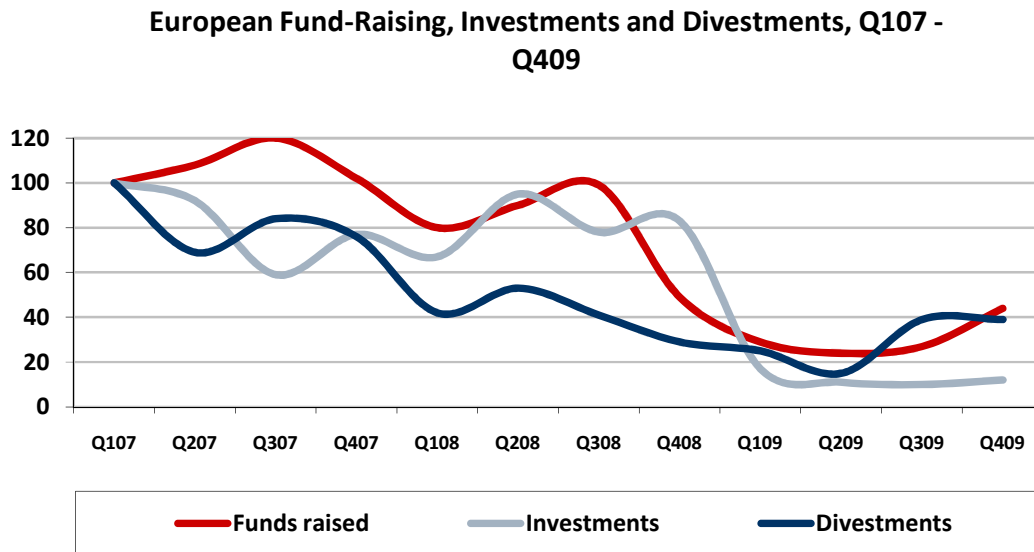


Figure 1: Equity Investments in US Venture-backed companies, PriceWaterhouseCoopers MoneyTree Report, Full Year 2009

Another notable finding from the MoneyTree report was that investments into one of the categories in which nanotechnology firms would be located, Industry/Energy, declined from 938 MUSD in Q309 to 570 MUSD in Q409. However both Semiconductors and Medical Devices showed an increase in funding from Q3 to Q409.

The European Venture Capital Association’s (EVCA) Quarterly Trends Report has three key indicators for venture capital performance; funds raised, investments, and divestments.

Figure 2: Venture Capital Activity in Europe, EVCA Quarterly Activity Indicator Trends in Q4 2009



These figures, indexed at 100 at the start of 2007, show a sharp decline in fund raising and investment from the latter half of 2008. Fund raising was down 75% during 2009, though with a slight uptick towards the end of the year. There are no such glimmers of hope in investments, still languishing at 10-12% of the 2007 figure.

3.2. Deal Sizes Increase

The level of funding directed to Seed Stage investments in 2009 remained at the same level as 2009 (1,6 billion USD). However, an issue identified in the last version of this report, that the size of a seed round continued to increase, was again in evidence. The Seed Stage funding total was distributed amongst 312 companies rather than 2008's 493, meaning that the average seed round size increased by almost 2 million USD to 5,29 million USD.

This may be continued to indicate that the definition of what is typically thought of as seed round; funding a company to the point where it can develop proof of concept and get first customer feedback, is expanding. A challenge occurs if companies, who cannot justify that level of investment, instead receive none.

4. Venture Capital Funding of Nanotechnology

4.1. The Overall Picture

Lux Research has identified investments valued at 792 MUSD in 2009, 42% off their 2008 figure. The largest share of funding (51%) went to Healthcare and life sciences, followed by energy and environment (23%) and electronics and IT (17%). This funding was spread across 91 deals, with an average investment size of 8.6million.

This links to an earlier finding from Lux Research which noted that nanotechnology investments in healthcare had proven to be the most successful, having account for a majority of IPO value – USD 1.68 billion, with the total of nanotechnology IPO values at USD 2.57 billion.

4.2. Disproportionate shares of funding between countries

Venture capital investments in nanotechnology also demonstrate a ‘power law’ effect, with few companies dominating total funding. Three US companies; Nanosolar, A123 Systems, Neophotonics had collectively received around three quarters of a billion dollars in investment.

Nanosolar has a case for being one of the best funded companies in any sector, let alone nanotechnology. Total investment received by the company is USD 500 million, including a round of USD 300 million in August 2008. Partners for this funding round included strategic investments from energy companies AES Corporation and EDF, in addition to the Carlyle Group and a number of other investors.

4.3. Investments in Europe

Funding of European nanotechnology firms kept pace with previous years during 2008, with four large deals alone accounting for €24 million in investment. There were weak signals of a shift in focus away from material-focused companies towards electronics and biomedical companies in that year; the four deals cover MRAM (Crocus), wafer inspection (Nanda), fiber-optic transceiver modules and optical links (Nanotech Semiconductor) and DNA Analysis (Genomic Vision).

Company	Value (k€)	Round	Investors
NAMOS (DE)	15.2% equity stake for undisclosed sum		Nanostart AG
Nanda Technologies (DE)	5 000	Series B	DEWB AG, BrainsToVentures AG, Ventegis Capital AG, Bayern Kapital, Alexander Bruehl
Crocus Technologies (FR)	11 500	Series B	AGF Private Equity, CDC Innovation, NanoDimension, Sofinnova, and Ventech, raising 8.5M EUR. The company was also awarded an additional 3M EUR in funding from OSEO.

Nanotech Semiconductor (UK)	3 340 (US 5 million)		Pond Venture Partners, Atlantic Bridge
Genomic Vision (FR)	4 000	Series B	Vesalius BioCapital, Societe Generale Asset Management Alternative Investments (SGAM AI)

Despite the discouraging signs in fundraising, 2009 saw a number of nanotechnology-related investments:

Company	Value (k€)	Round	Investors
Nanosight (UK)	Undisclosed (the company had recently completed a separate GBP 1 million funding round)	Mezzanine	Shackleton Ventures Ltd (expanded it's shareholding in the company by buying out a stake held by the National Endowment for Science, Technology and the Arts (NESTA))
Oxford Nanopore (UK)	14 000 (US\$ 18 million)		Illumina. Oxford Nanopore formed a strategic alliance with listed tool developer Illumina. This deal included both an equity investment and commercialisation agreement
	2 300 (GBP 2.1 million)		Undisclosed private investor.
Peratech (UK)	1 300 (GBP 1.1 million)		Partnership Investment Finance (YFM Group)
GLO AB (Sweden)	8 500 (SEK 82 million)	Series B	Teknoinvest and Nano Future Invest, Hafslund Venture AS, Agder Energi Venture AS, Provider Venture Partners, LU Innovation

Non-venture funding was also seen. MagForce Nanotechnologies was able to secure equity line financing of 20 MEUR from YA Global Master SPV Ltd. This is an agreement to subscribe to new tranches of shares to be made available by MagForce as the company requires, and will fund development and sale of the company's line of Nano-Cancer therapeutic products.

4.4. Exits and Divestments

One of the primary factors which have made VCs reluctant to invest in nanotechnology companies is the perceived lack of an exit market. VCs seek to exit investments by selling their shareholding to the public –via an initial public offering (IPO) or through acquisition by another firm. Companies had been unable to achieve sufficient size to justify an IPO, or had pursued too broad a portfolio of technologies to justify an acquisition by a larger company.

The IPO challenge is not limited to nanotechnology; the US saw only six venture-backed companies IPO in 2008 raising USD 470 million. This was a small fraction of the 2007 figure; 86 flotations had then raised over USD 10 billion.

In 2009, the situation has improved somewhat. A123 Systems recorded the largest IPO of 2008, raising \$370 million and seeing a 50% increase in its share price during the first day of trading. The company develops lithium-ion batteries that use nanophosphate materials, which have the effect of improving energy density. A123 Systems had previously been one of the largest recipients of venture capital in nanotechnology.

2009 also brought news of the first nanotechnology IPO in Europe for some time. UK-based Nanoco Technologies plans to list on the Alternative Investment Market via a reverse takeover of Evlutec Group. Evlutec Group was originally a bioscience firm which had planned to develop novel therapeutic products. However, following results from clinical trial, the company decided to suspend its activities. The largest shareholder in Evlutec then established the following strategy; it would maintain its listing, with the intention of purchasing a company and reversing it into the Evlutec.

This strategy was carried out with the February 2009 initiation of the acquisition of Nanoco Technologies. Nanoco is a bulk manufacturer of a range of functionalised quantum dots, with applications in lighting, displays, solar power, and biological imaging. Post merger, the company will be known as Nanoco Group plc. The company is expected to have a market capitalisation of around GBP 38.6 million.

4.5. Investor Views of Nanotechnology

Discussion with investors has generated a somewhat mixed picture of nanotechnology, which continues in 2010. The first important item to note is that the term does not have a great deal of relevance for investors; “It makes no sense to talk about nanotechnology as a separate investment class – we look at companies, industries and markets [not technologies] ” commented one German investor. This is basically a labelling issue, which makes it difficult to measure nanotechnology venture capital, but which doesn’t affect its amount.

Investors have also noted a shift in the strategies employed by companies seeking investment. In the early-to-mid part of the decade, these were predominantly materials vendors, but over the last couple of years they have become application specialists, focusing on specific uses of their technology.

An investment class is more often defined by the market – or in the case of clean tech – the ultimate need. In this sense the perception is of nanotechnology as one of a spectrum of enabling technologies, affecting different markets in different ways. This may also be the reason why since 2008 no new nanotechnology-specific venture funds, along the lines of Nanostart and Nanodimension, have come into being.

The positive converse to this is that there are not nanotechnology specific issues which dissuade investors from involvement in this sector. The complexity of achieving reliable production of nanotechnology-based materials or equipment is often thought to be a factor which hampers development, yet investors reported that this did not tend to be a critical issue for their portfolio companies – market acceptance being the primary consideration. Investors did not cite

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health and safety concerns as a factor which caused hesitation when making an investment decision.

One of the drawbacks that investors see in companies which approach them is too narrow a focus on the technology possibilities, rather than the business opportunities which their technology creates. Investors consider technologies which are more likely to gain market acceptance, which ideally should be proven by having customer feedback (and best of all, orders).

Finally the primary concern for investors in all sectors, not just nanotechnology, is ensuring that their portfolio companies are able to withstand the current economic downturn. Materials companies – which typically have higher costs than the equivalent IT company – need a strong cash position to withstand a period in which sales slow or cease altogether.

5. References

<https://www.pwcmoneytree.com/MTPublic/ns/moneytree/filesource/exhibits/National%20MoneyTree%20full-year%20Q4%202009.pdf>

¹ Introduction to Nanotechnology, http://ec.europa.eu/nanotechnology/index_en.html