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Nanotech - Too big for little Israel?

Israeli nanotechnology outside the university? Yes, there is such a thing. Israeli funds that invest in nano-technology? Yes, there are some. Support from the government? So far, none whatsoever.

Gilad Nass 21 Mar 02 17:20

What's small, cute, makes a lot of noise, and has several funds that are already investing in it? Nano-technology. This year, private market investments will surpass government investments in nano-technology – no small feat, considering that \$500 million has already been allocated in the US for assisting companies and institutions dealing in nano-technology. It's time to check what Israel's doing.

A unscientific survey of the Israeli funds reveals mostly hesitation where nano-technology investments are concerned, both in Israel and around the world (for those investing overseas). The trendy thing for the funds to say is "We're thinking about it", but to admit there's not much activity. For this reason, for better or worse (depending on your opinion of nano-technology) no momentous announcements are in prospect.

Is there anything at all to invest in? Gilai Dolev of the science and consulting firm Dolev and Abramovitch believes that 25 nano-technology companies currently exist in Israel. He qualifies this number, however, by saying that not all of them fit the narrow definition of nano-technology, which stipulates components with a maximum size of 100 nanometers. The figure of 25 companies is for a broader definition on the border of pure nano-technology. Most of the companies are still housed in technology incubators and most deal in micro-mechanics, nano-mechanics, and materials. Only a few deal with biotechnology applications and medical equipment. The funds actively involved confirm these numbers, more or less.

A hastily-compiled list of those who have declared the field off limits for themselves includes Benchmark Capital, Sequoia Capital, the Challenge Fund – Etgar, Carmel Ventures, Tamir Fishman, Jerusalem Global Ventures, and the Alon Technologies Venture Fund. Some of these funds have invested in biotechnology companies. An extensive discussion of the difference between biotechnology and nano-technology will be presented below.

Dot.com phobia

So who is investing in nano-technology? Jerusalem Venture Partners (JVP) joined forces with Kleiner Perkins Caufield & Byers for nano-technology investment in the US. Millennium Materials Technologies Fund invests in exotic materials; the fund has invested in at least two nano-technology companies that deal in materials. Formula Ventures invested in a British company. Pitango Venture Capital and Giza Venture Capital are considering the matter. Evergreen Partners has lost interest for now, and Gemini Israel Funds was investing in the field even before it was even called nano-technology.

Millennium Fund founder, CEO, and managing partner Nir Belzer may be the person most in demand among nano-technology companies dealing with materials. After all, two Millennium funds have declared investment in special materials a priority and are consequently looking carefully at nano-tech companies.

Belzer however, will not invest in a company just because its name contains the prefix "nano". "I share the concern that nano-technology could become the next dot.com in terms of the hype it creates. We took a look at a lot of companies that had a nano-technology angle, but we didn't invest in many such companies."

Millennium Fund classifies nano-technology applications by their development timetable. In this way, they believe, it will be possible to make the technology commercially viable and achieve a saleable product. Applications on the agenda for the next few months include pigments, cosmetics, suntan lotion, coatings, catalysts, drug delivery, and lab on chip.

Belzer: "In one to five years, there will be applications in which I think the capital market should invest. Nano-sized materials will make possible more effective flat panel displays. The materials include both polymers, which facilitate better electrical conductivity for the panels, and the transparency of the screen-coating materials. This is a big field for companies manufacturing nano powders. Other fields are sophisticated batteries, fuel additives, data storage solutions, and the capability to manufacture printed circuits using current ink printing methods."

"In six to ten years, there will be carbon nano tubes whose molecular structure will ensure stronger parts for

cars, for example. Manufacturing of printed circuits will become more sophisticated, and parts will be built from the molecular level on up. Micro-electronic components, such as smart resistors, will be built by combining molecules, rather than trying to miniaturize resistors.

"In 11 years or more, we will see fuel cells, advanced nano-electronic applications and manufacturing of smart components, and perhaps even entire systems at the molecular level."

The Millennium funds have invested in 16 companies to date, a quarter of which could be considered nano-technology investments, including NanoPowders Industries and NanoLayers. When asked whether it is too early to leave the academic incubator and set up a commercial nano-technology company, Belzer says, "I don't believe in slogans. Every nano-technology applications must be examined on its merits. If someone has an idea for developing fuel cells, he should stay in an academic institution for now, but money can certainly be raised now for commercial activity involving some applications."

Nano-technology as a high-priority sector

Like many interviewed for this article by "Globes", 4HighTech chairman and CEO David Solomon describes his fund's attitude to nano-technology investments in Israel as "interested, but it will take time before the first investment."

Solomon: "The European funds, some of which we work with, invest in nano-technology as a strategy. I'd even say it's an investment in generic technology, which will remain at the research stage for a long time. In my opinion, it's a mistake to include most of the companies that already have products in the "nano" category. It doesn't matter if they've managed to produce a powder that spreads more easily than what existed several years ago. That's fine, but all it means is that there will be a more delicate gold coating. That's not real nano."

"Evolution, a public investment fund in Britain, which also holds 40% of 4HighTech, is investing in what it believes will be relevant in the next three years, such as micro-computers and the transistors that make them run. These are very interesting investments, which Israelis don't understand. In my opinion, the Europeans will preempt the US in the nano-electronics field. For now, I don't see Israel on the map in this field."

A talk with Giza Venture Capital senior VP Eli Opper reveals that Giza may practice on several nano companies "guinea pigs" before finally deciding whether investment in the sector is worthwhile. "We're not alone in seriously considering investments in nano-technology companies," Opper says. "Several months ago, we even classified nano-technology as a preferred sector for investment. When we invest, we won't deal in materials or nano-mechanics; optical communications and life science nano-technology applications would suit us."

"Up until a short time ago, we never even went near seed investments. Since the fund founders are essentially oriented to finance, rather than technology, it's no wonder that investments are concentrated in the later stages, later followed by a move to the earlier stages. Only recently, however, I'd say in the past two years, have we been openly investing in the seed stage. This because people whose focus is technology have joined the fund, and they have filled in what was needed to evaluate investments at these stages. This change in focus is also leading us to consider nano-technology investments, because most investments in a nano-technology company's commercial activity will be at the seed stage."

"In a field like this, where it's still too early to speak of expertise and the ability to immediately spot companies that can 'do it', simple mathematics dictates investments in a large number of companies, because we are clearly aware that while the failure rate will be higher than usual, the return on the investment will be greater. Look, when you invest at the seed stage, the exit isn't always the most important thing."

Have you become philanthropists all of a sudden? Forgive my ignorance but I thought funds were looking for something that would lead to an exit.

"In the end, the fund certainly gets its return by making an exit, but statistically you have to be willing to invest in a number of companies in a given field and be prepared for a higher proportion of failure. No one will enter a new field if they don't have the tools to know that there will be a bonanza after a certain length of time. That would be completely foolhardy."

Opper, who spent 27 years at the Israel Armaments Development Authority (Rafael), is counting on the military market to be one of the catalysts and future customers for nano-technology. "The desire to miniaturize has always existed. Miniaturization is something that always has a market. It's true that you can bet on a field in which miniaturization is less important, but in the military applications with which I am familiar, there are

developments and a demand for developments that will facilitate smaller and more effective military applications. They don't call this nano-technology now; they just say micro. There have been all sorts of sensors and detectors that came from micro-mechanics, and the desire to miniaturize may have led them to look for nano-technology solutions. Keep in mind, though, that no companies made money out of it, even at the micro level."

The slow pace of high speed

"It's a little odd for me to try to make a connection between the current and future nano-technology investment policy of Israeli funds and their investment policy in the past year," says Concord Ventures general partner Batsheva Elran, when asked for her opinion of the chances that Israeli funds will jump on the nano-technology bandwagon. "In principle, the Israeli venture capital industry trails behind its US counterpart by two to four quarters. Where the size of the funds operating is concerned, if we assume there are only a few funds in the US that invest in nano-technology, you wouldn't expect to find a single fund in Israel investing in nano-technology, taking into consideration our size in comparison with the US.

"Off the top of my head, therefore, and I admit I haven't conducted much research in this, I don't think investment policy here should be compared with or channeled in the same direction as the investment policy there. The model for discussion should therefore be when a nano-technology venture should really leave the academic incubator, what risks are involved, and what the field's dynamics are. I say categorically that nano-technology is closer to biotechnology than communications and software in this respect. Like biotechnology, a large proportion of the companies will be set up on the basis of technology transfer from the university to a commercial company. Most of the research in the semiconductor industry is done in the industry, not the universities, because there are enough parties with the means to finance this research. The situation in the pharma industry is similar, but slightly different, since huge sums are invested there in developing drugs, not technology."

The discussion on the difference between biotechnology and nano-technology will probably not result in a single clear answer. The size of the atom is 0.6 nano-meters, and some biotechnology companies move molecules whose size certainly meet the definition of nano-technology (less than 100 nano-meters). The concept in both fields is also similar – "The profile of biotechnology and nano-technology companies is very similar," says Solomon. "The time required for an exit is virtually unlimited, i.e. very long, in both fields, and huge sums of money are required. You won't find angels investing in nano-technology, just as you won't find them in biotechnology. The presence of private investors in biotechnology was a result of the boom and the herd effect. In a normal situation, however, in which investors have to understand in what they are invested, you won't see this happening."

Elran: "On the one hand, nano-technology companies must progress beyond the research phase to the development phase as quickly as possible in order to survive. On the other hand, in nano-technology, just as in biotechnology, 'as quickly as possible' is a concept that encompasses a long time. It's therefore possible that a nano-technology start-up that spends too long in the research phase will not reach its goal, and investors will see only losses. It's true that funds specializing in the life sciences have already proven they can invest in stages and have the patience necessary to wait until the research is finished. If we apply this to funds specializing in nano-technology investments, we might come to understand how there could be someone to take care of these companies. Since the field is so young, however, it is hard to form an opinion about it."

Elran tells about a colleague who after telling her about a very large investment in a nano-technology company, admitted that the catalyst for the investment was the hype created in the field, not just business and technology. "Healthcare investors don't usually act that way. They invest in the early stages, let the company grow, and follow it until they think it's ready to act as a completely commercial company."

The obvious resemblance to biotechnology

Now that you've explained that despite the difference in the technology, the model of activity and the timetable of nano-technology is very similar to that of biotechnology, isn't it reasonable to expect that biotechnology investors would be the pioneers and specialists in nano-technology investments?

"I agree with this thesis, and I assume that these funds really will enter the nano-technology field. We have companies dealing in biotechnology and medical equipment in our portfolio whose activity borders and even crosses the border into nano-technology. They will make profits and give the investors a good return. I don't have to define them as nano-technology companies just for the hype, though."

"Nano-technology is confused and unfocused"

Some of those we spoke to said that companies with "nano" in their name do not necessarily operate in the field to which the prefix refers. For his part, Gemini Israel president and cofounder Ed Mlavsky has a different problem. He has financed nano-technology companies since 1994, although no one used the word at the time. Holo-Or, founded in 1989, develops various products, based on light diffraction technology. Some people in Japan, for example, are walking around with multi-focal contact lenses that include Holo-Or's technology.

Mlavsky preference for partners in seed investments in nano-technology is due not only to a desire to share the risk. "Say the company in which we have invested reaches a milestone we set for it," he explains. "Now it needs more financing. If other investors joined at the seed stage and know the company, raising more money will be much quicker than if the company has to spend six months going around looking for more investors."

Gemini Israel principal Daniel Cohen says the fund is currently negotiating an investment in an Israeli company in the field, after studying the matter in recent months and talking to the "right people" (US and European funds).

Pitango principal Yoav Samet is also interested in nano-technology, mostly from the company side. "One Israeli and two US companies have contacted us so far. In the current global economic climate, when you have to gamble on companies asking for investment, a clever idea and a brilliant team still aren't enough. You need an experienced, and no less important, a well-connected management to get a company on its feet, and that's a very rare resource in the nano-technology field. We are considering the matter, but haven't yet decided."

Another new addition to those sitting on the fence is Evergreen partner Adi Gan who describes nano-technology as "confused and unfocused. It's still hard for people to understand exactly what it does. Take the Internet on the one hand, where every programmer could found a company, and the optics field on the other hand, where you need 12 PhDs just to get started and still might wind up with something very hard to apply. Nano-technology's requirements are even higher, because it requires the same expertise as optics, while the time required for development is longer.

"The practical way to succeed in nano-technology investments is to look for the small advances, not those designed to leap 10 years ahead. You have to invest in something that may not solve all the world's problems, but will make an immediate contribution to specific field or product."

Evergreen Partners is not currently considering investments in the field, although one company already came looking for investment with a business plan in hand. Gan: "Six months ago, we looked at a company that makes nano-crystals, but they hadn't even finished the application they were going to develop with it, and we decided to leave it alone. That doesn't mean, however, that we won't go back to it later. The train exists and is about to leave the station, but it hasn't begun traveling yet."

The extensive support given to the nano-technology industry in foreign countries (the US, Britain, Germany, Japan, and others) raises the obvious question: When Israel will get into the act? and will government intervention in such a young science be of any avail?

Belzer: "I'm always in favor of government support. The materials field has been neglected in the past decade, but I sense some awakening. There's a lot of know-how in this field, at least as much as in communications. The number of chemical and physics engineers in Israel is second only to the number of software and computer engineers, which puts us in a good position, compared with other countries. The plan being formed to designate \$100 million for biotechnology companies should also take nano-technology companies into account. Nano-technology should not be treated as a separate field, however; the support should be channeled into specific sectors of nano-technology."

Samet: "At this stage, work is being done mostly at the universities and isn't attractive or developed enough for investments by the funds. On the other hand, the technology is promising for the future and could put Israel in the forefront of the field. Investment through the various government instruments is certainly a priority."

Shahaf: "The funds have a definite time frame for investments. It depends on the fund, but in most cases, the investments will yield greater value as time passes. The curve shows that the risk falls and the value of the investment rises at a more moderate pace than when the real hype begins later and everyone, or almost everyone wants to invest. It's best for the funds to invest close to the breakthrough point.

"This is exactly the right place for investments by the Office of the Chief Scientist, in contrast with communications start-up investments made in direct competition with the funds. If I had the power to influence the Chief Scientist and his office, I'd tell them to stop making investments that compete with the funds. The Chief Scientist shouldn't prevent the funds from taking risks. I'm a customer who benefits from his investments, but

from a national and objective viewpoint, it's a mistake. If a communications or IT start-up is good, it will find a fund to invest in it. Reducing the VC funds' risk is not the Chief Scientist's job. His job is to bridge the gap between the funds relatively short time frame and what is good for the country. This dictates investments in long-term technologies. I'm not saying the Chief Scientist should start investing in nano-technology right away, but that's one example of an investment that requires a great deal of stamina, and is by nature infrastructural, not financial."

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