Israel's founding fathers were concerned at the country's absence of natural resources. They need not have worried, for while the land lacked resources, the resourcefulness of the people more than compensated. In the State's formative years this resourcefulness was channeled into defense technologies to give the Israel Defense Forces the qualitative edge that would guarantee its existence. Innovation made Israel a global leader in a range of military technologies, including unmanned aerial vehicles, missile-systems, night-vision, lasers, radar, intelligence systems, C4, military communications and homeland defense solutions. Israel became one of the few countries to develop an independent space launch capability and satellite technology. Over the years, this know-how formed the basis for the development of the country's commercial high-tech sector.

Even the few natural resources that Israel does possess in the Dead Sea and the Negev – mainly phosphates, bromine and potash – have been transformed into annual exports of nearly $4 billion in 2007 through innovative extraction technologies and the development of products requiring those minerals. The most striking example of such innovation has been the ability to extract magnesium alloys from the Dead Sea in a joint venture between Israel Chemicals and Volkswagen, for use in vehicle and aircraft manufacturing.

This resourcefulness and innovation is reflected in a diverse range of national achievements ranging from the invention of disk-on-key, the development of ICQ the first Internet messenger program, and the world's first large-scale solar-
powered electricity generation plant.

In 2007, Israel exported $54 billion worth of goods. About 60 percent of this amount was in high-tech, with much of the rest of the revenues generated by traditional industries using advanced technology applications. And this sum is only part of the story, with billions of dollars more raised by Israeli companies from venture capital funds, private investors and stock exchange offerings in New York and London, as well as in Tel Aviv.

Moreover, many of the world’s leading high-tech corporations have acquired Israeli firms – Cisco and Kodak have each purchased half a dozen Israeli companies, and have also opened R&D centers in Israel where they have been able to develop breakthrough technologies. It was in Israel that Motorola developed its first cell-phones, that Intel produced its Pentium MMX Chip technology and that Microsoft put together much of its NT and XP operating systems.

A Thrilling Experience
It has been my privilege to have been at the heart of Israel’s advanced technology sector for more than 35 years. It has been thrilling to witness and be a part of the emergence of Israel as a global high-tech force. Like so many Israelis, I first focused my attentions on defense technology before moving into the commercial sector. As Head of the Electronics Division and VP R&D at the Rafael Armament Development Authority, I sat on the board of many start-up companies involved in adapting defense technology for commercial applications. As a Venture Partner with Giza Venture Capital, I was able to survey the wealth of start-up talent that Israel offers in advanced technology sectors.

Then, in 2002, I was appointed Chief Scientist of the Ministry of Industry, Trade and Labor. Since the early 1990s, the programs of Office of the Chief Scientist (OCS) have played a major role in enabling Israel to become one of the world’s most important centers for high-tech entrepreneurship. Thanks to the innovative thinking of my predecessors, the OCS has developed a range of programs that have nurtured the world’s highest concentration of start-up companies in such sectors as electronics, electronics, communications, IT, semiconductors, medical devices and biotech and cleantech, including environmental and water technologies.

Sharing the Risks
Within the framework of the Law for the Encouragement of Industrial R&D, the OCS, with an annual budget of about $425 million, implements government policy regarding support of industrial R&D, thus enhancing the knowledge base of Israel’s high-tech industries. The Israeli government shares in the risks of very early stage ideas, which would find it almost impossible to attract investment.

By supporting industrial R&D, the OCS encourages entrepreneurs in high-tech start-up companies, leverages Israel’s highly capable scientific and technological labor force, facilitates the academic industrial interface for the transfer of scientific know-how and technology and stimulates cooperation in R&D at national and international levels.

During my official visits abroad or my frequent meetings with international delegations visiting Israel coming to learn from the OCS experience, we tell them about our R&D Fund, the main support channel of the OCS, which disburses about $250 million per year on about 800 projects being undertaken by 500 companies. Grants of up to 50 percent of R&D expenditures are given, with royalties of 3 percent to 5 percent of sales to be repaid if the project generates commercial income. On average, we earn back over half of the Fund’s budget from royalty repayments from successful projects, and remember this is less than 5 percent of the overall revenues generated for the economy.

Success stories include Given Imaging, which has developed the first ingestible video camera, so small it fits inside a pill, and enjoys annual revenues of over $100 million, and Alvarion, the world’s leading provider of innovative wireless broadband network solutions, which has annual sales of $240 million.

Incubating Ideas
We are especially proud of our incubator program, a unique national network of 24 technological incubators, most of them in peripheral regions, which since their inception in 1991 have nurtured over 1,000 earliest stage high-tech projects, of which 57 percent have attracted investments of over $2 billion. It has produced ideas like Protalix, a biotech company that produces recombinant therapeutic proteins and has raised over $400 million in investment capital. Protalix would have remained an idea had the incubators not existed. While each incubator was initially set up as a non-profit venture, success has seen most of them become privatized, profitable entities owned by investors.

WEB RESOURCES:
Israeli Industry center for R&D: www.matimop.org.il
Research & Development Funds in Israel - Israel Science and Technology Home Page: www.science.co.il/ Research-Funds.asp
The OCS also promotes cooperation between academia and industry through the MAGNET program, which establishes about 12 consortia annually to engage in generic R&D. For example, consortia are currently active in the commercialization of stem cell therapy, nano-size functional materials and advanced low-power high-end applications.

**International Cooperation Opens Up Overseas Markets**

In addition, the OCS is responsible for signing agreements with other governments that support industrial R&D cooperation between Israeli industry and overseas industries. Through MATIMOP – Israeli Industry Center for R&D we have also set up bi-national funds with the United States, Canada, Britain, Singapore and Korea, and we are the only non-European country participating in the EU’s Framework Programs for R&D. These funds and other programs play an important role in opening up foreign markets for Israeli high-tech companies.

**Emphasis on Life Sciences**

At the OCS, we have always paid special attention to Israel’s biotech sector, an industry where the risks are much higher and there is a much longer time until investors see returns, making it harder for projects to raise funds. Israeli researchers have developed highly successful medications, usually sold under license to overseas pharmaceutical companies. The potential profits can be seen from Teva Pharmaceuticals’ Copaxone treatment for multiple sclerosis, the first ethical drug marketed by an Israeli firm, which generates annual global sales of $1.8 billion. Of course, biotech is about more than just profit, and the groundbreaking research in Israel has led to cures and therapies for diseases from cancer and heart problems to Parkinson’s, diabetes and more.

Although a relatively small industry in Israel, Life Sciences receive 27 percent of the grants from the R&D Fund and comprise 55 percent of the projects in our incubators. In 2005, we set up our first incubator dedicated to biotechnology in Jerusalem with far larger grants of up to $1.8 million available per project over three years. A second such biotech incubator is planned.

**New Horizons**

Israel’s unique human capital is the most significant and important resource we have. Translation of this into a global competitive advantage requires the implementation of R&D programs not only in the high-tech sector, but within traditional industries, as well. The important role of these particular industries in the Israeli economy is well-recognized. Furthermore, as they supply an essential platform for the smooth functioning of the entire industry, they also need significant leveraging of resources, partly done through developing internal R&D programs, which will enable them to successfully operate in Israel, as well as in increasingly competitive foreign markets. I am certain that from the point of view of both the investor and technology developer, prominent and yielding niches, technologies and products may be found in this sector.

At the OCS, we cannot afford to rest on our laurels. We continually strive to identify new trends and anticipate changes. A major new area of endeavor is cleantech, in particular the development of water technologies. This has stemmed from our own need to provide for over seven million people in an arid region. Through more efficient management and irrigation, innovative desalination, the reclamation of wastewater and purification, we have been able to make a little water go a long way. IDE Technologies, with support from the OCS, has developed desalination plants using reverse osmosis and mechanical vapor compression to reduce energy costs for desalination.

The prosperity generated by Israeli advanced technology has indeed been a wonder to behold. But more importantly, those technologies have brought added value in health, nutrition, quality of life and the environment not only for Israel but for the entire world.
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Israel’s High-Tech Contributions that Changed our World

Written by Hanan Sher

Solar Power
The idea of concentrating the energy contained in solar rays has been around for a long time. Legend has it that Archimedes used polished shields to aim blinding sunlight at the invading Roman fleet during the siege of Syracuse in 212 BC, and Leonardo Da Vinci used condensed solar power to get the temperatures needed to weld copper in the 15th century. But it wasn’t until the late 20th century that Luz Industries, based in Jerusalem, succeeded in erecting the first “utility-scale” plant capable of using the sun’s rays to generate electricity for commercial distribution to thousands of consumers. Luz, which was founded during the 1970s oil-price crisis, closed down a few years later, when fossil fuel costs dropped. But the nine plants it erected in California’s Mojave Desert, at Harper Lake, Daggett and Kramer, known collectively as the Solar Energy Generating System, still provide 353 megawatts of electricity to 400,000 Greater Los Angeles consumers.

Recent oil price rises and concern over global warming have revived interest in the solar-thermal technology developed by Luz, which uses long rows of parabolic mirrors to heat a liquid and produce the steam that runs a conventional turbine. And Solel, the Israeli company that acquired and developed the original Luz technology, is currently building new solar-thermal plants for public utilities in California and Spain.

Solar electricity is just one of the technologies that has become part of the world’s daily life, while hardly anyone knows that they originated in Israel.

Instant Messaging
Immediate exchange of messages via Internet-linked computers has become commonplace today. Long before Instant Messaging was popularized by giant firms like Microsoft, Yahoo and America Online, it was introduced as ICQ (for “I Seek You”) by Mirabilis, a company founded in the mid-1990s by four young Israelis. Largely via the then-unique system of “viral marketing,” in which a product is given away free, with no obligation and no advertising, in order to build a user base, ICQ accumulated close to 100 million devoted users before it was sold to AOL in 1998 for over $400 million.

Disk-on-Key
Developed by Dov Moran of M-Systems, an Israeli company specializing in computer memory. Over the last decade Disk-on-Key has replaced the floppy disk and the CD as the preferred medium for transferring data between computers. And in 2005, only five years after the device hit the market, PC World Magazine already placed Disk-on-Key ninth in its list of the 50 greatest gadgets of the preceding 50 years. The device, a stick-shaped circuit board encased in plastic, metal or rubber small enough to be carried on a key chain and attachable through the USB (Universal Serial Bus) connection found on most computers, has been adopted by other manufacturers as thumb drives or flash drives. The technology has become the basis for other miniaturized devices, including portable MP3 music players; some record companies have already begun issuing albums by popular artists on USB sticks.

Sales of devices using the flash drive technology are expected to rise to 175 million this year; use has increased by an annual average of 66 percent over the last five years. And, in late 2006, M-Systems was acquired by SanDisk, an industry leader headed by Moran’s close friend, former Israeli Eli Harri, in a share-swap deal valued at over $1.5 billion.
Anti-Virus Software
In the late 1980s, the spread of rogue programs called viruses, via “infected” diskettes or the then-infant Internet, threatened the rapid expansion of computer use. Among the pioneers in the development of software to combat the growing virus menace were four students at the Hebrew University of Jerusalem — among them Nir Barkat, today Jerusalem’s deputy mayor.

The two main virus threats in those days were the Ping-Pong Virus, which caused a bouncing ball to appear on screen and was first detected at the University of Turin in 1988, and the Pakistani virus, which according to urban legend was concocted by two brothers from Lahore, Pakistan. (There was also the Jerusalem virus, so named because it was discovered in Jerusalem, which destroyed key computer files in machines it infected only on Friday the 13th.) The virus was transmitted through infected diskettes and affected computers equipped with the then-popular Intel 286 processor.

The HU students formed BRM Technologies; its main competitor then was the Turbo antivirus program of Carmel Software Engineering of Haifa. BRM sold its technology to the Symantech software house and used the money to invest in other Israeli companies, notably Check Point Software Technologies, which parlayed its anti-intrusion “firewall” protection for computer networks into world leadership in computer security.

Centrino and Wi-Fi
The wireless linkage of laptop computers to the Internet, which has become commonplace today, is largely dependent on the Centrino technology package of computer processing and wireless connectivity developed by Intel, the world’s largest and best-known computer chipmaker, at its Israeli facilities. Intel began operations in 1974, employs over 7,000 people at development centers in Jerusalem, Petah Tikva and Haifa, at production facilities (called “FABs”) in Jerusalem and the southern town of Kiryat Gat. In 2007, Intel Israel’s exports amounted to $1.54 billion.

Internet Telephony
Connections for international and long-distance calls has brought about a dramatic lowering in phone rates over the last decade. Only a handful of those who benefit from the improved, more accessible communications with business associates and loved ones are aware that VoIP (Voice over Internet Protocol) was first developed commercially in February 1995 by Israel’s VocalTec Communications.

Camera in a Pill
Gavriel Iddan, a military establishment scientist, developed a tiny power source, camera, light and transmitter in a container no larger than a capsule that can be swallowed to spot diseases and damage to the digestive system, upgrading less effective systems for endoscopy and colonoscopy. Iddan’s research was the basis for the establishment of Given Imaging based in Yokneam near Haifa in the late 1990s, and the birth of its camera in a pill. The principle is simple. After the capsule is swallowed, normal processes propel it through the entire digestive tract in about eight hours. Images of the interior of the esophagus, stomach and large and small bowels are transmitted to a recorder in a pouch strapped around the patient’s waist, to be later viewed on the physician’s computer screen. Approved by the Food and Drug Administration and EU authorities, Given’s device has become widely used in both the U.S. and the Continent.

Drip Irrigation
Simcha Blass, a Polish-born engineer who was one of the founders in 1937 of Mekorot, Israel’s national water company, is accepted as the father of modern drip irrigation. In the 1950s Blass and his son Yeshayahu designed low-pressure plastic drippers that could deliver from one to 20 liters of water an hour directly to a plant without the loss suffered when sprinklers are used. Today, this inexpensive device is used in arid regions around the world, and Netafim, founded by Blass in partnership with several kibbutzim, is a world leader, with 2,200 employees and 13 manufacturing plants in 11 countries, and operations in 100 countries.
When it was announced in the summer of 2006, the sale of 80 percent of Stef and Eitan Wertheimer’s Iscar Ltd. to U.S. mega investor Warren Buffett for $4 billion was the biggest deal in the history of Israeli business. The purchase price puts the Wertheimers, with a personal fortune estimated at $4.6 billion, in second place among Israelis (and 222nd in the world) on the prestigious Forbes Magazine list of the world’s richest people. But wealth wasn’t the object, insists Stef, the 82-year-old founding father of the company, a world leader in the manufacture of precision cutting tools based a few kilometers from the Lebanese border. “I don’t need the money,” he says. “I still eat the same yogurt.”

The proceeds of the sale, Stef insists, will help him do more of what he’s been doing for the last 25 years – building an industrial base in and around the Iscar plant in the Western Galilee area and in other parts of Israel’s periphery. It’s done through a special kind of industrial park, a kind of combination between a conventional workplace, an educational center and a cultural campus, all for one purpose – to bring decent jobs and the increased standard of living that come with them to oft-neglected areas of Israel’s periphery, far from the commercial and cultural concentration in the center of the country. There are now six parks – five in Israel and one in Turkey – built along Wertheimer’s model.

The focus is on modern industry, not necessarily high-tech. Stef doesn’t discount the value of high-tech, which today accounts for as much as half of Israel’s exports but only 7 percent of its jobs; he contends that’s only part of the path to a healthy economy. “Those who want to have a future should not belittle industry,” he says. “Agriculture’s role has declined, security is important but hopefully it can be provided over time with a few less people, and there are tens of thousands of people who don’t have jobs because they never learned a good profession.”

The success of Iscar over the years – together with Blades Technology, which makes blades and valves for jet engines for companies like Pratt & Whitney and Rolls Royce, in which the Wertheimers founded and own a 50 percent share – has fortified Stef’s status as somewhere between maverick and prophet. The conventional wisdom, and the educational system, are among his favorite targets. “For the last 30 years,” he says with more than a touch of indignation in his voice, “the Israeli public has been educated to the idea that working in industry is Grade B, second-rate. It’s simply not true. Many people who work in industry don’t have fancy diplomas. But they are curious, and they learn while they work. That’s the important thing, not just a certificate,” he says, scoring educational experts “who think that everyone has to be an intellectual and not productive.”

Another of his targets is reliance on the stock market, though he grants that offering shares there may be good for some companies, but not Iscar. Explaining why Iscar has remained in private (mostly Wertheimer) hands over 50 years, he argues that regulations designed to protect stock-market investors are often bad for...
business. “Companies listed on the stock market have to file quarterly reports, and quarterly reporting does not allow industry to develop properly, it is not appropriate. Modern industry needs to look four to five years ahead,” he contends, not worry about shorter-term profits or losses that might affect share prices.

But most of all, he sees his model as a vehicle for political stability, raising the income level so that people have something to lose – and something to live for. “Peace will come when people in the refugee camps have meaningful work,” he said in receiving Germany’s prestigious 2008 Buber-Rosenzweig Prize (given for promoting Christian-Jewish understanding). “The secret is to provide people with an income so that they won’t have to fight solely in order to fight. People who fight for nothing are dangerous, they are terrorists.” He says the experience in the Galilee, where Jews and Arabs and Druse work together, “shows that there is tranquility when people have something to lose – when there are jobs and good, vocational education which is constantly being improved.”

Part of the Iscar money will go into a new park planned near the predominantly Arab Israeli city of Nazareth, and part will go into a second park to be built in Turkey (the first, built with the cooperation of Turkish partners and the government in Ankara, now houses 70 companies). And though he himself had tried in the past to replicate the model near Gaza in the 1990s (“I had permission from the late Yitzhak Rabin and the late Yasser Arafat, but it has remained only a plan, nothing happened”) and near Aqaba in Jordan (“It did not succeed because of the unclear situation between us and our neighbors, and after Rabin died, the idea receded.”), Stef recognizes that he now needs outside intervention.

Money wouldn’t be a problem (the cost of starting a park, he says, is about half of that of a state-of-the-art fighter aircraft), and the question is convincing Israel’s neighbors. “We Israelis can’t do it with the Palestinians, at least not right now. There is no doubt someone has to be in the middle to help this work, to create the kind of industrial trade education so that people can have professions and move into industry. That’s what we did in the Galilee, educate skilled people.”

Stef says he has “asked the European Union and the United States and anyone else who can to build industrial parks in places where we do not have good relations,” he says, expressing certainty that the idea would catch on.

Income in neighboring countries, he says, is one-tenth of that of Israel. “The level of the people in all those places is very good; they are the same people, the same families, as we have here in the Galilee. If only they could devote the same energy they do today to being deprived of new workplaces and new jobs. Our goal should be helping them succeed. Teaching them to fish is much better than having them dependent on aid agencies, like the U.N.”

It’s a major mission that has preoccupied Stef Wertheimer for decades. It still does at the age of 82. “I deal with vocational education and industrial parks every day,” he says. “And I’ll continue to do that as long as I can.”

HANAN SHER

Hanan Sher recently retired after 40 years as an Israeli journalist, for The Jerusalem Report (as Senior Editor/Business) and previously the Jerusalem Post. He grew up in Florida and immigrated to Israel just after the 1967 Six-Day War. Sher and his wife Sara, who live in Jerusalem, have three children.
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The Real Secret Behind Israel’s Start-Up Success

Written by Hanan Sher

Yossi Vardi, widely known as the guru of early-stage Israeli high-tech companies, is an unconventional kind of investor. So it’s not surprising that Vardi’s explanation of why Israel is second only to Silicon Valley in the number of start-up companies it produces transcends the conventional wisdom.

It’s not that Vardi discounts the high level of scientific research at Israeli universities, the experience would-be entrepreneurs gain by serving in super-secret Israel Defense Forces tech units, or the fact that technology is the driving force behind Israel’s rapid economic growth. “All these are important,” he says, sitting in his office just off the garden of his home near the campus of Tel Aviv University. “But there is another element – part of our heritage that is normally not associated with high-tech.”

Vardi is referring to a capacity to take chances. “Europe and the United States have great education, Japan has wonderful technology,” he says. “What we excel in is very different – it is the very early stage of building technology companies, a stage where you have to assume risk, where you have to jump into the water and start something new, leaving everything you have done behind you.”

That capacity, he posits, was developed over two millennia of the Jewish Diaspora. “You can think of us as a 2,000-year-old start-up nation,” he says. “For centuries we moved from place to place, and everywhere we went we had to start all over again. Most of what we could take with us was between our ears.” As a consequence, the ability to adapt and innovate, to take chances, developed in the genetic pool of the people who are now Israelis.

This innate ability to take risks is a special trait. “In most cultures, risk-taking is treated in different ways. In Japan, losing face is a big issue. If you have a start-up and don’t succeed, you lose face, and that is bad. In Israel, like in the Silicon Valley, it’s acceptable to fail in a legitimate way. It’s like mountain climbing – you return to base camp, regroup and then go back and try to reach the summit again. Conquest of a mountain is rare on the first attempt.”

Admitting failure is also important. “In addition to the companies that have been very successful, I have a long list of companies I have invested in that didn’t go anywhere. The difference between a good investor and an amateur is how you handle failure. If you can walk away from a situation that didn’t go very well, in a way which a minimum number of people will be harmed, that a company will meet its obligations,” he says. “I don’t regard failure as a badge of honor, but it is the stage where a business starts. High-tech starts in something that is very risky and very unclear, but if you are not willing to take risk, you will not have an industry of start-ups.”

He started “playing the start-up game,” as he puts it, 39 years ago when he founded Tekem, one of Israel’s first software houses. After a career which included numerous public posts, including the director-generalships of the Ministry of Development (at age 27) and the Ministry of Energy and head of the economic negotiations leading to the 1994 peace treaty with Jordan, Vardi turned his
attention to private business. In 1996, he backed four young men, including his son Arik, as the founding investor in Mirabilis, developer of ICQ, the first Internet instant messaging program. Two years later, Mirabilis — whose marketing strategy was based on the “viral” concept of free distribution in order to develop a base of millions of users — was sold to America Online for over $400 million.

Since Mirabilis, Vardi has turned to investing. Over the years he says he’s put his money into about 65 companies, some of which “can barely be called companies, because they consist of only two people. About 40 of them are still around, and 12 have made it to the final mile,” where they are prospering. A couple, including Mirabilis and the Jerusalem-based Answers.com, are what he calls the super-star class.

The problem, he observes, is that at the start, an investor has no idea which of the companies will become a superstar and which will fail: “Louis B. Mayer, the movie mogul, said he knew 50 percent of what he spent on advertising was effective and 50 percent of the money was thrown away. It’s the same with start-ups.”

Vardi’s famous willingness for spotting promising tech companies and putting up his own money to get them started attracts what he says are thousands of would-be entrepreneurs each year. The lucky, or perhaps the most promising, ones make it to the unpretentious one-man office at his home (there’s no fancy executive suite in a high-rise building, no secretary or receptionist, and his home number appears in the Tel Aviv phone book) to be received by Vardi, in his retro-style trademarks, an open-necked shirt and a slightly rumpled look.

At this stage other investors, be they early-stage “angels” or later-stage venture capitalists, usually require a business plan or a demonstration of the technology. That’s not what interests Vardi. “Technology and knowledge are like a piano, and you need a pianist to extract the right sounds from them,” Vardi says. “They need to be very talented — there are an enormous number of talented people here — nimble and focused.” He mentions his previous visitors, two young men. “I can tell you the exact moment I said to myself that they are worth investing in. It was when one of them told me he is still riding the bus in order not to exhaust the company’s resources. They are honest, modest and very committed to what they are doing. It’s not the business plan, the idea or the PowerPoint presentation, I’m interested in the guy who plays the piano, and which of them can be Daniel Barenboim,” he says, mentioning the name of the world-famous Israeli musician.

Given Israelis’ inherent cultural edge for creating start-ups, he does not expect anything to change. “That propensity has been around for 3,500 years, and I think it will continue. Don’t forget that the recorded first ‘exit,’ the term used for the sale of a tech company or issuance of its shares on the stock market, was the exodus from Egypt, though it did not have all the classic attributes of today’s exits. First of all, it took much more time: No investor would wait 40 years to reach the promised land of profit. And, in a way, you could say that the PowerPoint presentations used by tech companies were invented by Moses as well. You know, those two tablets with five bullets, each representing a single point, on each stone. There were also good ‘visuals,’ with all the thunder and lightening,” he says.

“Every three years I see a new half-generation of entrepreneurs. They’re all smart, they are more versed in the Internet, and above all they are fearless,” he says. “There’s no reason that will stop in the foreseeable future.”

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**WEB RESOURCES:**

- Center for Incubators for Technology Initiative: [www.incubators.org.il](http://www.incubators.org.il)
- Israel start-Up Guide: [www.start-ups.co.il](http://www.start-ups.co.il)
- Globes Technology Guide: [www.globes.co.il](http://www.globes.co.il)
Why Israel is a Top Destination for Venture Capitalists

Written by Dr. Orna Berry

When John Lennon was once discussing the early years of rock 'n' roll and the influence this had on him, he said, “Before Elvis, there was nothing.” And while the accuracy of this statement can be debated, what is true is that at the time of Elvis Presley’s first hit in 1956, “Heartbreak Hotel”, the popularity of rock ‘n’ roll had only just begun to take off. It then grew exponentially to the point that the genre very quickly became the dominant form of music around the world, with the Beatles at its apex.

To paraphrase John Lennon, “Before Yozma, there was nothing.” Yozma was a program that the Israeli government set up in 1993 to build a venture capital industry from scratch, and within a few years, dozens of local firms had been established and hi-tech companies were routinely raising more than $1 billion a year from domestic and foreign sources. In 2007, the total figure was $1.76 billion, which on an absolute basis is comparable with the United Kingdom, France and greater than Germany and on a per capita basis is comparable with the United States. Major foreign VCs have set up branches in Israel, including Sequoia Capital (the firm behind Google, Apple and many more), Benchmark and Greylock Partners, while numerous others have provided financing to Israeli firms.

What attracts venture money to Israel is, as shown in a survey of U.S. VCs by Deloitte Touche Tohmatsu, the quality of the deal flow. Israel is a seething hotbed of start-ups, support R&D and encourage investment in hi-tech firms.

If it were purely about the technology, Israel would be an easy sell; some of the innovation is mind-blowing. (See previous article for examples).

However, while exciting technology is important, what also attracts VCs to Israel is the possibility of a successful exit. Israel has more companies listed on Nasdaq than any other country outside North America, and between 2004 and 2007, Israeli firms raised $2.3 billion in IPOs on exchanges around the world. Moreover, the market capitalizations of many listed businesses have become considerable. Checkpoint Software Technologies, which pioneered Internet security, is listed on Nasdaq at a value of $4.8 billion, while Nice Systems, a leading supplier of digital recording systems, is worth $1.9 billion on the same exchange. Amdocs, a major developer of telecom billing software, has a market cap of $6.4 billion on the New York Stock Exchange.

In addition, many firms have been acquired in high-profile transactions, and between 2004 and 2007, almost $18 billion was spent on the purchase of Israeli hi-tech companies. The most significant deals include HP’s acquisition of IT optimization software firm Mercury Interactive for $4.5 billion and SanDisk’s buy of msystems, which invented the disk-on-key, for $1.5 billion. It is worth noting that these deals were announced during Israel’s war with Hezbollah in the summer of 2006, as was Warren Buffett’s acquisition of Iscar Metalworking for $4 billion, and are thus extraordinary testaments to how the world’s top businessmen view investment in Israel despite the geo-political situation. Dozens of other multinational firms have made acquisitions in Israel as well, including Microsoft, Intel, IBM, Applied Materials, Siemens and Cisco Systems. This is important to VCs because it means they know that there is a long list of potential buyers for a successful start-up.
Many of the giant corporations that have bought Israeli companies also have research and development facilities in the country, attracted, among other things, by a superior workforce. As Bill Gates said, “For Microsoft, having an R&D center in Israel has been a great experience … the quality of the people here is fantastic.” This is also a factor for VCs, because they base their investment decisions on the quality of a start-up’s management and because they know that there is a large talent pool from which to recruit. Per capita, Israel is among the leading countries in the world for the number of engineers, PhDs, patents, scientific papers published and citizens with a tertiary education. The World Economic Forum ranks Israel highly for the quality of its research organizations, which include the Technion – Israel Institute of Technology, the Weizmann Institute, the Hebrew University and the Ben-Gurion University of the Negev. In addition, at an early age, many Israelis receive life and death responsibilities that provide them with strong leadership and teamwork skills, and allow them later on in life to put into perspective the pressures they face when working in business. For some, these qualities are augmented through employment at large multinationals, which also play an important role in the development of a top-quality workforce. This is because they provide a great education for their staff, such as in managing on a wide scale, completing big projects and dealing with large customers. These are skills that can be used in start-ups as well, while the connections made can help with forming partnerships and winning clients. An excellent example of someone who worked at multinationals and then at hi-tech companies is Moshe Yanai, who developed technology for storage software above: The Tel Aviv Stock Exchange.

**ISRAEL’S GOVERNMENT BOND RATING IMPROVED:**

Moody’s Investors Services upgraded the credit rating of Israel’s government bonds to A1 from A2 to reflect “Israel’s improved debt sustainability … fiscal discipline and reformminded economic policies.” In the last eight months both Fitch and S&P also upgraded Israel to A from A-.

source: SHEKEL: Economic and Financial Trends in Israel, June 2008

**SOURCE:**
The Israeli Economy at a glance - 2007
giant EMC that generated billions of dollars in revenue and later co-founded Diligent Technologies and joined XIV as Chairman. The latter was sold to IBM for a reported $300-to-$350 million in January 2008.

It would not be surprising if Yanai went on to form another start-up, as Israel is full of serial entrepreneurs who have achieved successful exits and are building their next companies. Because of their previous accomplishments, they more easily attract VC capital. One such entrepreneur is Dov Moran, who founded msystems, which, as noted, invented the disk-on-key consumer storage device and was sold to SanDisk for $1.5 billion in 2006. When he established his latest start-up, cellular device company modu, VCs queued up to invest. Another repeat entrepreneur is Zohar Zisapel, who through the Rad Group has created a distinctive model for founding and managing numerous hi-tech start-ups. Rad comprises a family of 15 independent companies that design networking and telecom equipment and earned aggregate sales of $740 million in 2006. What Moran, Zisapel and others like them have in common is that because they have “done it before,” they know what elements are needed to build big companies, such as being able to develop products on time, attracting top-quality management and workers, and manufacturing on a large scale. As with those who have worked at multinationals, they can use the contacts they have built up in their careers to attract partners and customers, which are in turn willing to trust these repeat entrepreneurs because they have proved that they can deliver on their promises to clients. It is for all these reasons that VCs come flocking when successful entrepreneurs start new ventures.

While these repeat entrepreneurs build on their previous experiences, they also build on the work carried out by successive Israeli governments, which have played a major role in the growth of the hi-tech and VC sectors. The state not only set up the Yozma Program in 1993, it contributed $100 million of funding and helped ensure its success by attracting foreign VCs to provide their capital and, just as importantly, their expertise. Although Yozma had a fixed life of seven years, the government was able to privatize its 40 percent holdings by 1997. Israel has also encouraged investment through regulatory changes, such as liberalizing foreign currency rules to ease capital raising in Israel and abroad, cutting tariff and non-tariff barriers, and reducing labor, capital income and other taxation.

While Yozma and the regulatory changes have directly stimulated VC investment, the government’s Office of the Chief Scientist indirectly encourages this type of financing by running programs designed to increase the chances of hi-tech companies succeeding. One of the most important initiatives is the Israel-US Binational Industrial Research & Development (BIRD) Foundation, which provides funding to joint projects between U.S. and Israeli companies. Since its inception in 1977, BIRD has invested over $245 million in 740 projects that have produced sales of over $8 billion. Israel has similar bi-lateral arrangements with several other countries as well and even signs agreements with multinational corporations whereby the OCS helps them identify Israeli companies with which they can carry out R&D and then provides the subsequent partnerships with financial assistance. Aside from helping to generate revenue, these programs have enabled Israeli companies to learn valuable lessons while working with large corporations. In turn, the eyes of the multinationals have been opened to Israeli technology to the point that they are enthusiastic about becoming partners, customers and, as noted, acquirers of Israeli businesses. These elements are crucial in helping to build successful start-ups, which is what VCs are aiming to do, and it is in this way that ongoing government initiatives are important in making Israel attractive to such investors.

Many of the factors that make Israel a top destination for venture investment form interlocking virtuous circles. For example, Israel produces great technology because it has great technologists, and this has attracted multinational corporations. These corporations help improve the quality of the technologists and their commercial abilities, whether as partners, employers or clients, and this contributes to the formation and/or success of start-ups. Some of these are bought by foreign firms, and the circle starts again. Financiers attracted to Israel by the initial potential of the outstanding technology and workforce continue investing in the country if they achieve good returns, such as through a sale to a major international buyer. This also brings in more investors and encourages the establishment of more start-ups, thereby increasing the opportunities for venture investors. Underpinning this whole construct is the government, which created the VC industry and has done much to help it succeed.

Disclosure: Gemini is an investor in companies mentioned in this article, modu and Diligent Technologies, and in RadLive, a member of the Rad Group. ◆

ORA BERRY
Since 2000, Dr. Orna Berry has been a Venture Partner at Gemini Israel Funds, a Yozma fund created in 1993. One of Gemini’s first investments was in Ornet Data Communications Technologies, a company that Dr. Berry co-founded and which was sold to Siemens in November 1995 for $32 million. After that, she served as the Chief Scientist of the Israeli government before joining Gemini. In January 2007, Dr. Berry was elected as Chair of the Israel Venture Association, a post she still holds.

1 Israel Venture Capital (IVC) Research Center, “2007 Summary of Israeli High-Tech Company Capital Raising”, (Tel Aviv, 2008).
3 IVC Research Center
4 Ibid
5 Cited by The Investment Promotion Center in its publication, “Invest in Israel, where breakthroughs happen”, page 4. Israel Ministry of Industry, Trade & Labor - Foreign Trade Administration