IT, Innovation – Israel

Ed by Dr Bengt-Arne Vedin

teldok. Report

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TELDOK was initiated in 1980 by the Board of Telia, Sweden's largest telecommunications operator, to facilitate early and easy-to-read documentation on the use of new IT applications.

TELDOK aims at documenting, as early as possible, actual use of new information systems and arranging study trips and seminars directly related to this task.

TELDOK activities are coordinated by an Editorial Board with wide representation from the IT corporate user community, academia, trade unions, government authorities, and suppliers. TELDOK and the Editorial Board can best be reached by email to teldok@ett.se or to its Secretary PG Holmlov, pg@stones.com.

TELDOK has issued close to 200 publications, mostly in Swedish, that are distributed regularly, at no charge in single copies, to 5,000 professionals in Sweden and abroad.

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TELDOK Report **116:** *The TELDOK Yearbook 1997.* December 1997.
TELDOK Report **111E:** *IT—Visions at work.* December 1997.
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TELDOK Report **94E**: *IT Myths.* November 1996.
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Foreword

TELDOK activities comprise study tours to regions and countries where IT development offers something special to report on. Recent visits include such regions as northern Italy, with its dynamic industrial districts, and Singapore, the "intelligent island".

The current trip, in January 2000, was focused upon Israel and its dynamic vencap market. Israel looks upon itself as an international "hot spot" when it comes to IT start-up companies, and rightly so. It is a country on par with, or beating, most states in the USA.

Our group was privileged to have as an equally knowledgeable and intense planner of our visits Mr. Yehuda Hefer, Senior Partner of Honeycomb Ventures Ltd., also serving as our guide. He and sometimes his Honeycomb colleagues took us through a host of companies belonging to Israel's "New Economy". In addition, Dr. Arnon Perry, CEO at Lahav Executive Education, Tel Aviv University, contributed overviews and background insights to the comprehensive program. Thanks to their efforts we got rich opportunities to meet with both policy decision-makers and to experience the boiling enthusiasm among all these entrepreneurs opting for the global market.

We would like to express our gratitude to Mr. Hefer and Dr. Perry but also, and not least, to all those people that greeted us with such gracious openness at companies and organizations.

Hopefully, some of this will be reflected in our report, for which professor Bengt-Arne Vedin has had the demanding task of acting as the editor. As always, however, factual reporting on information and impressions from any single visit has been allocated to individual study tour participants. In addition, opportunity for the expression of personal subjective judgments has been offered; these are presented separately (chapter 4).

Despite all good efforts from our hosts and from those reporting, our report can never claim to produce a fully comprehensive or authoritative picture. There was much that we did not have time to study, and quite possibly we have misunderstood some of what we experienced. It should also be mentioned that this English language version is somewhat abbreviated in comparison with the Swedish report. We have, for example, felt telling Israelis about background facts on their own country entirely superfluous.

We hope that the report may contribute to changing and updating the ingrained but outdated pat picture that many Swedes still hold of Israel as a country of orange groves and kibbutzes. The fact is that agriculture makes up about the same share of the Israeli economy as the Swedish one, 3 per cent, and that the remaining kibbutzes are engaged rather in space technology than in orange farming. On the other hand, the pat picture of Sweden has not entirely lost its hold among the Israelis; the one of a country featuring an economy dependent upon dark forests, iron ore, and traditional engineering manufacturing. Today, the similarities between the two countries as two hot spots are evident, so we should have more and more of experiences to exchange, more and more to learn from each other.

It is a memento, from a Swedish perspective, to recognize the immense feat of the Israeli society integrating almost one million immigrants from the former Soviet Union, even though with high scientific grades. Again we are discovering a field where "The New Economy" offers new opportunities, well worth taking.

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1. Israel: from agricultural pioneers to IT enthusiasts

What may explain the transformation of the Israeli economy? Why has this with what looks like Internet speed become number three or number four among American states in raising venture capital and creating news businesses? New businesses, a plethora of I. P. O.s, and more companies on the NASDAQ than all of the European companies combined.

Several factors seem to work together, synergistically. There is not much of an old industry that might hamper changing gears. "The old" is represented by what several of our interlocutors described as a socialist economy, referring to kibbutzes and a governmentally owned infrastructure like telecommunications and electricity, and government is now in the process of selling off portions of these companies. The military has built its own industrial base and much like in the US, the scaling down of military expenditure and associated research, development, and production has freed up a host of advanced competency.

Competency, that is education and training, is one of the keys. Apart from the military, which should be equated with telecommunications, encryption, software, missiles, aircraft, and the like, the immense wave of immigration from the vanishing Soviet bloc has been another powerful injection. Over a few years, almost one million immigrants had to be accommodated, corresponding to the transfer of a country like France to the US. Skills include language abilities and cultural affinities; there are close relationships to the Jewish community abroad as well as the habit of spending a couple of years in America. And then there are no markets in the proximity and a rather small domestic one so selling on the world market, starting in the US, is a must. In information technology, the local market accounts for some three per cent at the most, if we exclude pure service business like cellular telephony operating companies and Internet service providers.

Success in high tech ventures creates its own dynamics too. Venture

capital funds and firms get alerted to the fact that there is an opportunity. Successful entrepreneurs cashing in through selling out use part of the proceeds to act as business angels. Success contributes to a "can do" mentality (fostered already during military service), awe, and a will to repeat what others have demonstrated to be immensely rewarding. Thus we would seem to have another example of the benign spiral of development coined "the regime of increasing marginal returns" by economists: the more you have the more you will get.

There are a lot of figures to substantiate what has been just discussed. Thus even in the 60s, agriculture constituted four fifths of exports while today it makes for one twentieth of industrial exports and three per cent of total exports. The difference is explained by the fact that the Israeli diamond business is so large and successful that it makes for a category all on its own. Just one European company, Siemens, has made investments directly in more than fifty Israeli companies, and then indirectly, through partly owned investment funds, in another hundred.

The point about competency can be elaborated by a table showing the number of engineers and scientists per ten thousand working population in a few countries:

Israel	140
US	80
Japan	75
Germany	55

You meet a number of languages even during a cursory visit to Israel; apart from Hebrew, English. But also Russian and Arabic are current. The Israelis themselves often express concern for the deep divides existing within their society, manifested in, e g, the number of political parties represented in the Knesset, and for that matter the frequency with which new parties are being founded. Since diversity and multiple stimuli are said to be conducive to creativity, this just may be the case in Israel, but in all fairness, this is pure speculation. The fact that most Israeli companies that we met formally were the subsidiaries of American ones, for tax reasons, could also be construed so as to contribute to the effect of transcending borders. The other side of the coin is the tensions that divisions are bound to create, also between Internet millionaires and austere kibbutz pioneers believing in an egalitarian lifestyle.

Business conditions

What now follows must be regarded as the subjective judgments of a few people who have tried to express their own experiences of doing business in Israel, so it is not the result of any research, polling, or systematic comparing. Consequently, contradictions and paradoxes are only to be expected (and exceptions are bound to exist):

- in the defense forces, the style is famously egalitarian and there is little drill or blind adherence to orders, all the while leadership in industry is authoritarian and the boss is always expected to know best about just any subject. This might be one of the explanations to the fact that there are very few companies with more than a couple of hundred employees (we met some, like Comverse and Iscar)
- Jewish culture is ever present and to a foreigner especially so at the Sabbath with its rules about what machines may be relied upon and how, all the while those profoundly religious constitute less than a fifth of the population
- everything in business is performed at lightning speed so that what takes a week in Europe will be done in just one day here. This may be the effect of the Army's dictum "everything is possible", "can do". But Israel resembles the US also in its infatuation with legal procedures, read: lengthy contracts and lots of lawyer involvement. The Yellow Pages contain two pages of car retailers, three of M.D.s, and 36 of lawyers. Since there are no standard contracts, business agreements imply a lot of time and economic investments.

Friendship is an integral part of Jewish culture: never lose contact, always be in touch. Relationships established while working or studying abroad, particularly in the US, constitute the basis for future business.

Informality reigns supreme; no one sports tie nor jacket; short sleeves are ubiquitous. And this applies everywhere, also in meeting a government minister or any other high official in private or public service. Israelis wouldn't like their country to belong to the Middle East and there is no corruption but it is OK to discuss with officials; they are pragmatic and recognize arguments for their worth, provided that they are factually based.

It is a tough society to live in, very intense, thick skin is compulsory, and new and old contacts must be maintained all the time. Demanding it is, just because the Israelis are so competent, so clever, so active, and so pro-

ficient. One of our Israeli interlocutors asked, in a fit of self-criticism, whether he and his fellow countrymen weren't only too pushy but this is rather part of their recipe for success. It may well be, however, that toughness is the flip side of a coin that may be expressed as a lack of service mentality (speaking of exceptions: in Ch. 3 we will meet a company thriving on the quality of its services, NetVision). Possibly attention to detail, even minute details, constitutes part of that flip side also.

The banking sector, being part of the financial infrastructure, has been privatized only recently. The power grid and the electric utility are still in government hands. Though today everything seems to involve IT, it is worth noticing that Sandvik's perhaps most fierce competitor in hard metals is Iscar, a company entering that business only a quarter of a century ago (see Ch. 3). In the Negev, there are phosphate mines, the reason why, after a lot of international mergers, an Israeli company is now the world leader even though one can discuss whether it is Israeli any longer. This is of course a query that a Swede would recognize easily not least after recent mergers in the pharmaceutical, forestry, and banking industries. There is also Technoplast, a plastics company renowned as one of the leaders in advanced technology. As its IT colleagues, it has much of its market in the US.

In contrast to what would be the case in Sweden, we didn't meet a lot of tax complaints even though business leaders are unhappy with taxation as well as with high salaries. That may be because there is the default solution previously mentioned: companies are formally American. Options are taxed rather favorably, though, even if the US is even better here too.

To a Swede, the country is small, like one of our more moderately sized counties. "Business Israel" is even smaller, described as the triangle Tel Aviv-Haifa-Jerusalem. The incubator program that we will come to in a minute is one of several designed to ease this concentration.

IT in Israel

It was a shock when after the Six Days War in 1967 "our friend Charles de Gaulle" interrupted weapons sales to Israel. Now many observers regard this as a blessing in (heavy) disguise because that necessitated the creation of a domestic high tech defense industry. As mentioned, this comprised production also. The Defense Department still owns, through its development arm, almost half of the Rafael Development Corporation that controls four companies; the other investors are three private companies.

Men have to do three years, women two of compulsory military service, which then comprise qualified training in various technologies. There is also the (quite favorable) option to sign on for two or three more years which provide for much more specialized training, a university education of sorts. This is a source for competent personnel as well as for entrepreneurs.

One observation is that many of the new Israeli IT companies seem to be "technology push" rather than "demand pull". With such a small home market, and with many companies created out of military experience, that may be quite natural. Content for the Internet (or for TV or WAP) is not in focus, nor is e-commerce while enabling technologies and their translation into products are.

Government always controlled telecommunications, quite natural in a country with overarching defense concerns. The government monopoly is now being dismantled, step by step; it has been a great disadvantage to the country. The first step was to allow for competition on international lines, which happened in 1997, and while most expensive, Bezeq still maintains almost half the market, probably because it got to stay with the established and simple prefix 00. This is now going to change, as domestic traffic will be liberalized. By the way, prices tumbled 85 per cent at the advent of competition on international calls.

Cellular telephony is open to competition and government allocated a third license in the spring of 1999. This was also the first GSM digital system, while the two previous ones rely upon older analogous American standards (something to bear in mind when reading about the companies we visited). Israel may, with less than fifty per cent cellular phone penetration, have some way to go to reach Scandinavian levels of seventy per cent. But many of the individuals we met took pride to underscore that their country features the world's highest consumption of cellular phone time, 350 minutes per capita and month. Cellular subscriptions also supercede fixed lines with 2.9 versus 2.5 millions.

There are heady plans for fiber optical connections with Jordan, and with Syria and Lebanon as well, provided that peace is established. If those links are combined with another one to Alexandria, then there will be an integrated Middle East network with Israel at it center. And possibly as its engine for growth.

There was general agreement as to the sources for new business:

- universities and institutes
- the defense establishments

- repatriate Israelis, especially those returning from the US
- new immigrants, particularly those from the former Soviet Union
- spin-offs from research centers and from industry, not least from American companies with substantial activities in Israel, like Intel, Motorola, and National Semiconductor

"We here at Silicon Wadi vie with Washington D C for second place after Silicon Valley". The flop side is that it is hard to convince investors to invest in more long-term prospects, including biotechnology and medical technology, which previously was a successful industry.

Today, seventy per cent of new companies have been judged to be dedicated to the Internet and to telecom. For 1998, investment statistics tell the following story:

- 28 per cent computer software
- 27 per cent telecommunications
- 12 per cent computer and electronics hardware
- 16 per cent medical equipment (some but not all IT related)
- 10 per cent biotechnology
- 7 per cent other categories

If the companies we visited are typical, Israeli companies in IT hardware are proponents of the eponymous hollow corporation, i e, they do research and development (read: development) as well as marketing and selling, but production is outsourced. Outsourced it is because of salary levels, and production is often allocated to Singapore, Indonesia, or alike.

A government involved

In Sweden, five different governmental organizations to foster and promote technical development got consolidated into just one in 1968. This was the period when many governments looked with interest to the British Labour government's forays into industrial and indeed technology policy. Setting institutional differences between countries aside, one may discern many similarities in policy ideas. Even the country of free markets, the US, has had an industrial policy, and a powerful one at that, in the way that defense expenditure has been used to strengthen the industrial and high tech base. Here too is a parallel to the case of Israel.

In Israel, there is already one organization providing a number of different support mechanisms, the Office of the Chief Scientist in the Ministry of Industry and Trade. In the Swedish version of this report, these mechanisms are described in detail but it would seem superfluous to provide the same description in a version written primarily for an Israeli audience. We will dwell on just some and summarize the others.

For inventors, there are two, first, Meser or Messer, both spellings are used, that offers an early stage development support of up to 25,000 USD per project, and then another support program, Bashan, dedicated to immigrant inventors.

A law of 1984 allows for support to risky new development projects within existing companies. For new projects, up to half the project cost may be covered, for improvements up to thirty per cent. The support is paid back, up to its full amount with some discount rate added, through royalties. In addition, new companies may get support amounting to two thirds of the cost up to a quarter of a million USD the first year; in regions singled out for development, R&D gets extra support. Market studies, business plans, and beta tests are also subject to support.

The first category of projects comprise some 1,200 projects and about 300 mill. USD per year. It has been subject to an evaluation, showing, i a, that mostly larger companies with an annual revenue of more than 10 mill. USD had been the recipients of grants. The electronics and telecommunications sectors display projects with significantly larger risk levels commercially and technically, the chemistry and defense sectors significantly lower. Defense projects show very substantial spin-off effects, which also to some extent holds for automation, control, and software. Big companies have more problems with technical than commercial risks. Just to apply, companies must have a certain internal critical mass of competency, an explanation to why small companies are less represented. Those smaller companies that did receive support were more prone to contribute investments themselves than were larger firms.

Israel has a fairly large number of international and especially of bilateral agreements on joint development efforts. Thus there is, close to the Chief Scientist's Office, an organization Matimop to assist Israeli companies and institutions in partaking in such projects. "Close to" is an appropriate name since Matimop formally is created by three industrial organizations and thus qualifies as an NGO, non-governmental organization. Matimop serves as the contact center for the European innovation net-

work IRC, Innovation Relay Centres, and for Israel's participation in the Eureka program. A database on opportunities for technology transfer, partnerships, etc is updated daily.

It was somewhat of a pleasant surprise that Israel became an associated member of the European Union and thus a participant in its Fifth Framework Program. Again, it is a formally independent organization, ISERD, that is responsible for information, contacts, and other activities, this time set up by a number of governmental departments. So far, the sub-program on the information society is that which has been the greatest success within Israel, and then mostly with industry.

Governmental programs to create research consortia or competence centers can be found in Sweden as in the US as elsewhere, and then, of course, in Israel. This program is called Magnet and is rather young: it was started in 1994. Thus companies and academic institutions work together in 21 consortia for various types of technology R&D. The government contributes two thirds of the approved budget. Another type of effort, technology transfer between companies, has been less successful but for in the electronics field. The third effort started a week before our visit so that is still early days; it concerns technology transfer from academic research to industrial firms.

Even a free market proponent might defend some government intervention referring to the fact that early stage ideas are so uncertain and "perfect information" here is even more elusive than usual, this making some societal measures appropriate. So the US created the small business investment companies with government sharing in risk-taking. In the next chapter, we will look at some Israeli venture capital funds and companies. This is an area were government also tried to jumpstart development through the creation of a government fund that initially put money into other vencap funds and companies, later also invested directly in startup companies. When the vencap industry began to take off in earnest, its representatives complained about unfair competition from governmentally supplied money, and the result was the privatization of the government agency, Yozma.

Israel Export Institute

The Israel Export Institute is a non profit organization with the charter to promote Israel's export. Government and industry contribute equal shares of its financing, companies paying fees varying with their revenues. Its

2500 members make up 90 per cent of the country's export; all sectors but diamonds, tourism, and defense are included. The annual budget amounts to 20 mill. USD and there are about one hundred employees at the Tel Aviv office; there are no offices abroad but the Institute collaborates with the commercial attaches at the Israeli embassies around the world.

Main activities include:

- exhibition activities, some sixty or seventy each year
- information service and environmental scanning; databases are available, sometimes at a fee
- export advice regarding transportation, EDI, marketing etc
- the web service "Israeli Exporters Catalog"

The sea change in Israel's economic structure implies new and different demands, such as finding partners for international projects, joint R&D and marketing and also licensing of technology. Turnkey projects are also of growing importance.

As we have seen, there are a lot of new thriving IT companies and there is a special program within the Export Institute geared at start-up companies. Such a company must be officially registered and not more than four years old. It must have a product or service to ship within twelve months. Six hundred companies are currently participating, chipping in 3,000 USD each. More than 80 per cent of the companies are into software, IT, and medical technology.

The program comprises training in presenting the company, in approaching the vencap market, and help in establishing a presence in the market. When it comes to attract venture capital, it's the individuals behind the company that weigh most, and also what solutions are offered to the market. The firm's technology as such is of secondary importance.

Here too, corporations may get financial support for developing a business plan and for hiring consultants to help explore foreign markets. The Institute may assist in producing promotional material and it produces sector reports to inform and educate foreign interested parties. Here companies may also procure full information on the various free trade agreements that Israel has entered.

Israeli firms may advertise themselves in a web-based catalog, Israeli Exporters Catalog, *http://www.export.org.il*. Through a service linked into that web page, InfoLink Connect, interested parties may respond directly.

Ramot

Improving the contacts between universities and industry is a headache in most countries. There are several different tasks that may be identified, such as the selling of knowledge (licenses), joint development projects, special training and education, the creation of spin-off companies. Sometimes there are different institutional arrangements for different tasks, sometimes some of them are left to individual initiative, and sometimes several universities rely upon the same organization. At the Tel Aviv University, there is one organization, Ramot, catering to all such tasks, and it is an incorporated company because it started out as a private company later taken over by the University. The necessity for some kind of interface organization is easily explained by the fact that corporations and universities have completely different goals and goal structures; values and measures are worlds apart.

Ramot is the body that is the front for the Tel Aviv University participation in European Union and in Magnet projects; it is thus the interface to Magnet, Matimop, and ISERD, organizations that we just met. Ramot partakes, for example, in nine Magnet projects. There is also direct collaboration with industry, Ramot being the formal partner in contract research.

While Matimop advertises possibilities for joint projects between Israeli companies and those from foreign countries, Ramot has the concrete task to sell licenses for results from the University's research. It is the University that holds the patent rights (in Sweden, it's the researcher) but it is for Ramot to identify what knowledge developed by six thousand scientists that might be commercialized. It is then for Ramot to formulate, file, and pay for patents, and then to sell the rights. At the time for our visit, three hundred projects were being evaluated and as many as three hundred scientists were working on the transfer of knowledge to industry.

Ramot is expected to operate profitably, and it does, dividends paid to the University. It operates one of the incubators within the national program, see below, and it is a publishing house for academic literature. For the training of industry leaders, there is another institution, LAHAV, geared at practical knowledge rather than degrees. Working in intimate contact with Israeli industry, LAHAV is of course close to the high tech and venture capital sectors of the economy. Thus they have concluded that there is a lack of training opportunities for small business leaders (as there is in many other countries), something which is now being mended: a training program will get started in the year 2000.

The Incubator Program

The enormous influx of immigrants from the former Soviet Union seemed to constitute a potential resource because of their excellent educational background, but how to make use of it? These were people that had little experience of the workings of a free market system so why not create some environment where they might get support to "get started" in their new country and in the workings of another type of economy? Thus was born the idea of the incubators, creating an environment for new firms to get some assistance early on.

With an eye to private business, three guiding principles were generated:

- every project must correspond to a need, it must never be an exercise just in getting researchers established
- incubators must always be open to everyone, not just to immigrants
- an incubator should not be "just another governmental organization"

The goal is to get new companies started, not to generate employment. The point is that while there were programs for assisting existing companies, none existed for non-existing ones. So the argument is that aid at the seed stage of an idea goes towards correcting a market failure: uncertainty is high, information is lacking. Such support, however, should not be just resources, such as advice and money, but a supportive environment, daily contacts as well as a shared telephone switchboard, access to conference rooms, and the like.

Every incubator is a partnership, perhaps between a company or a university and then, most often, regional organizations. The incubator at the Tel Aviv University, mentioned in conjunction with its managing organization Ramot, is a partnership between the University and a company, RAD Data Communications. The incubator gets some economic support, especially in the beginning, and so do the start-ups. They are independent legal entities, non-profit organizations. Voluntary experts from industry and universities provide a lot of expertise and are described as the "soul and heart" of the incubators.

Projects are required to be innovative. All in all, 20 per cent of them have been about software, 27 per cent about each of electronics and chemistry, medical instruments accounting for 17 per cent.

The annual contribution from the Chief Scientist's Office is now some thirty mill. USD; since starting in earnest in 1992, some 160 mill. have

been allocated while 240 mill. USD have been attracted from "external" sources. By mid-1999, some 540 projects had graduated from the incubators, 52 per cent of them deemed to have been successful; out of those 52, 40 (so far) had received additional funding. Successful companies are expected to pay a royalty to the incubator.

Apart from Ramot, we visited with Meytag, an incubator on the Golan Heights, one of the oldest in the program. At any time, there are some 12–15 budding companies in the incubator, the result of a screening process where 60–100 proposals are vetted each year.

No company may remain for more than two years in the incubator but before formally registering as an incubator intern, there is a "qualification" process. During those two years, a lot of development steps have to be gone through, and it is typical not just of the Meytag start-ups that there is a prolonged process of searching for partners after graduating from an incubator. Consequently, such search is now getting started earlier in the process of firm creation. Of the twenty-two firms that have left Meytag, one has gone under, one has been successfully integrated into a larger company, nineteen are continuing on their own, and one is missing simply because the Meytag managers have lost track of it. An excellent result so far, possibly implying that the scrutinizing process is a bit too selective.

An important discovery or conclusion is that the individual with the basic idea for the start-up most often is not the right person to run the company; an excellent inventor is not necessarily a good entrepreneur. An important task early on is thus to find an entrepreneur for the inventor to team up with.

Most incubators advertise a competence profile, guiding what projects may be allowed in. Aircraft and autos are not for Meytag, nor is software (except for expert systems, possibly); it is geared more to electronics and materials technology. While the immigrants from the Soviet Union are diminishing in importance in the entirety of the incubator system, they are very much present at Meytag.

The Tefen Industrial Park

To create an environment conducive to the creation of new firms is not exactly a new idea. Thus a famously self made Israeli entrepreneur, Stef Wertheimer, an immigrant from Germany in the early 1950's, has started not just one but so far four industrial parks, all operating on market prin-

ciples. He is planning several more, and then in other countries like Jordan and Turkey.

The first of his industrial parks is the one at Tefen, and many of the companies are satellites or spin-offs from his largest company, Iscar, mentioned above as vying with Sandvik for world leadership in hard metals. Wertheimer has also supported inventors and entrepreneurs who came to him for advice. One of the IT companies we visited, OTI, started at Tefen but grew out of it. A company for moulds for plastics forming, Plasel, also grew too large to be accommodated at Tefen and thus became one of the pioneers at Lavon, one of the three other parks, one that is at a small distance from Tefen. Of all the start-ups at Tefen, just two have failed.

Tefen makes for associations with the French Sophia Antipolis: it is the result of a private initiative, it is pleasantly located allowing you to see both the Mediterranean and the Golan Heights in clear weather, and only environmentally friendly production is allowed in, thirty companies all in all. There is, like at Sophia Antipolis, a near by industrial zone with more lax requirements, hosting another thirty firms.

At Sophia Antipolis, culture is provided through music and theatre performances; at Tefen, there are four museums and an art exhibition, and pieces of art placed onto the spacious lawns between the buildings. The Tefen industrial park receives some 150,000 visitors each year. There is, adjacent to a museum, a restaurant, and the Industrial Park is running its own transportation service for those employed there. Many of them live in a neighborhood also created by Wertheimer. This "village" offers comprehensive community services, including schools. An attempt to establish a unit of Israel's prestigious technical institute the Technion at Tefen proved to be a failure, however, so instead there is close collaboration with the technology college at Zur (also spelled Tzur) nearby.

The park at Tefen was instituted 1982–85. The other three are more recent. Apart from at Lavon, there is one at Kiryat Shimona (Quiriat Shmona) close to the Lebanese border, host to, apart from some ten companies, Israel's only photography museum, and one at Omer at the outskirts of Beer Sheva in the Negev. The latter has been a great success, the first building filling up quickly with a dozen firms, a second now being constructed, integrating fiber optics into its frame.

Web sites:

http://www.tau.ac.il/Ramot
http://www.export.gov.il
www.iserd.org.il
http://incubators.org.il

- We have relied upon material provided by Jackie Jakubowski in a lecture in Sweden as well as from Israel's Central Bureau of Statistics through its booklet Israel in figures
- Yehoshua Gleitmann, Micha Engel, Arnon Perry, Yossi Vardi, Micahel Eilan, and Yigal Erlich provided a lot of the general background; reporting: Johan Jörgensen, Bertil Thorngren, and Bengt-Arne Vedin
- Bo Andersson, Ericsson Israel CEO, is one of several Swedes with quite some experience of doing business in Israel; Bengt-Arne Vedin reporting
- Sven-Åke Ström reported on Israel Export Institute, where Yair Ofek and Eyal Meshulam contributed presentations
- Ilan Peled described the Magnet program, Marcel Shaton on the Fifth Framework Program; report: Bengt-Arne Vedin
- Reporting on Yair Amitay 's presentation of Matimop: Bengt-Arne Vedin
- Rina Pridor, the person behind the incubator program, told of its outline; Lev Diamant, chief technologist at Meytag, described the workings of this particular incubator; reports: Bengt-Arne Vedin
- Reporting on Rami Finkler's presentation of Ramot: Hans Iwan Bratt
- Rafael Wertheim described the Wertheimer industrial parks; reporting: Bengt-Arne Vedin

We have of course also utilized a lot of the brochures and booklets that we received, as well as material gleaned from web sites. Furthermore, some multi-client studies have served to provide useful input.

2. Venture capital in Israel

A brand new idea is not only risky; it is associated with uncertainty. Whether it will be successful or not depends to a large extent upon the personal qualities of the individual or individuals running the venture. Thus it is impossible to secure financing through ordinary bank loans or, initially, the stock market which expects full information and quarterly reports. So there is the need for more risk prone investors, for the provision of venture capital. The case has been made, even in the US, for the government supporting very early stage financing. It is generally agreed that a well functioning supply of venture capital is a key ingredient in high tech firm creation and in regional development.

Since quarterly reporting is inappropriate, many venture capital ("vencap") corporations are organized as funds or partnerships rather than incorporated companies. It should be noted that in the US, where the important role of vencap has been acknowledged and underscored, the larger part of it comes from "business angels", rich individuals who invest in start-up companies. They as well as the "venture capitalists" take a very active part in the running of the firms in which they have invested, their "portfolio companies". Employees in those companies are motivated to stay with their project and work for less pay through the issue of options, options that will acquire great value if the project is a success.

Wealthy individuals, wealthy perhaps because of their own success in high tech entrepreneurship, pension funds, but now also technology based companies looking to acquiring better first hand knowledge contribute to the vencap funds. Profits are generated through the introduction (IPO, initial public offering) of the new company on the stock market, in the case of Israel often enough the American "technology company market" NASDAQ, or through selling it to some large corporation. Normally, there have then been several rounds of financing. Only a small minority of all vencap-supported start-ups grows to great success, a rule of thumb suggests one in ten.

One of the observers of the Israeli scene is Michael Eilan, a leading

journalist and now also the cofounder of a company (see next chapter) aiming at keeping track of the country's start-up companies (an idea to be exploited abroad too). He is frustrated by the flippant use of non-existing statistics. "The proposition that there are six thousand high tech firms in the country is most probably a myth; let's guess that they are two thousand" says he. He also warns that the current focus on making an IPO severely distorts entrepreneurial activity. Since there are no exit strategies for biotech or medial technology firms, almost no such ventures can get funding and so they aren't started. And thus IT corporations make up about 95 per cent of all new firms. While the Israeli electronics export increased by 15 per cent last year, capital inflow grew by 200 per cent, another sign of a lack of balance.

A Swede may nod approvingly to Eilan's suggestion that rumors and bragging are part and parcel of the recipe for success. Of course also success begets more success.

Yozma privatized

As mentioned in the previous chapter, government tried to jumpstart the vencap business in Israel. Yigal Erlich, previously Chief Scientist within the Department of Industry and Trade, outlined the situation prior to 1993:

- lack of funding for start-up companies
- lack of professional vencap expertise
- successful technology development projects failing in the marketplace
- telltale signs of huge potential: the start-ups were three times more numerous in 1992 than in 1988, despite the negative factors just mentioned

That year, 1993, meant the creation of Yozma, the government's vencap fund. Erlich, who had been instrumental in its design, took on the task to head it. Initially, Yozma provided capital for other funds but soon it started to invest directly in new companies too. Ten funds were created within a short period of time; Yozma might later be bought out according to a formula favorable for the private investors.

Much like previously in the US, the governmental initiative may well have been crucial to the growth of the private vencap industry. In short order criticism was being vented: why should government use tax money to compete with the private sector, now that there was a market operating on a purely commercial basis? So, in 1999, Yozma was privatized, after half a dozen of years during which it had contributed to attract at least half a billion USD.

All in all, at least three billion USD in venture capital has been invested in Israel, of which some 700 million in 1998 alone. The forecast is for 850 mill. USD a year for the next five years. The amount going into seed financing actually decreased between 1997 and 1998, which may signal problems ahead.

Erlich is also the chairman of the country's venture capital association so he has the statistics readily available. He provided us with one of several examples of the Israelis placing their nation in a ranking list of American states, this one for venture capital in millions of USD in 1998:

- California
- Massachusetts
- Texas

4. Israel 567
5. New York

In an international comparison in absolute figures (not per capita, that is) it looks like this, the US excluded:

Great Britain	1988
Germany	756
Israel	567
France	544
…	
…	
Sweden	122

Uzia Galil father of Israeli high tech

Uzia Galil is a living legend, the company or rather group of companies he created, Elron, now being valued to around half a billion USD. He has just retired after 38 years at the helm, retiring instead meaning starting Uzia Initiatives and Management that aims at supporting start-ups.

Elron was created within the confines of a university laboratory and has always drawn heavily upon academic and military research. It was the very first Israeli company to be introduced on the stock market, both in the US and in Israel, in 1972. "All new technology creates defocusing" Galil claims, which is why a number of spin-offs have been started. "We are all about change."

The statement about a high level of education in Israel applies also to the medical profession, which makes Galil believe that there will be a good future for Israeli tele-medicine undertakings. The defense sector will continue to play an important role.

Web site for Elron: www.elron.com

STI Ventures means entry to a global network

STI, Steinmetz Technology Investments Ltd., a private investment group active globally, established itself in Israel in 1997, even though its origin is to be found in a well-known Israeli diamond company. In 1998, Scorpio Communications Ltd. was acquired. As an investor, STI supports entrepreneurs with "forefront ideas", especially products and services for the Internet and also telecommunications. It features a global network for the new company to plug into and it stresses its flexibility and ability to be fast on the feet.

Going global rapidly also means a rapid increase in company valuation. STI may decide to invest in a company at any stage. The company has identified a particular stage in financing, the mezzanine level. It always takes at least a quarter share in a portfolio company. Products for business are judged more interesting than those for the consumer market, and especially generic solutions for vertical markets are a priority.

At our visit, there were some forty companies in the STI Israeli portfolio. The majority of those are active in the fields of the Internet, telecom, e-commerce, and biomedicine; thus Compugen is a bioinformatics company.

Dr. Yair Be'ery, one of the persons we met, is chief technologists but doubles as professor and chairman of the department of electrical engineering at the Tel Aviv University. We may recall that Uzia Galil started Elron from his base at the Technion; dr. Be'ery obviously is in close contact with the latest research findings and he also has the contacts needed for recruiting and finding expertise to evaluate new ideas.

We met with two of the STI portfolio companies, Interwise and ComView Graphics, see next chapter.

Web site: www.stiventures.com

Sequoia Capital Seed Fund: from the Valley to the Wadi

Sequoia, founded in the US in 1972, is a world leader in the venture capital industry; in their entirety, the companies Sequoia has been involved in now have an aggregated revenue of more than one trillion USD. One of many successful investments was the one in Intel in 1983. In 1996, Sequoia joined forces with Cisco to start operating in Israel. The very first investment here gave the money back ten times in the brief period of eight months!

The fund is focused entirely upon the Internet, on network technology and communications infrastructure. Within the last eight months, investments have been placed with five companies, and the fund that was planned to be lasting for a four-year period is now already fully booked, so another fund has been launched, also in partnership with Cisco. Whether the partnership should apply for new funds in the future is an open question; Cisco only wants to participate at the very early stage.

The Israeli Sequoia is very much a networking operation. Its CEO Haim Sadger is the only employee but he can draw upon eleven local partners. The initial contact with a potential portfolio company may be very informal and speedy. There are two features that qualify especially, whether a company has products that are difficult to imitate or if it may be the first one to enter or even establish a substantial market, thus capturing a dominant position. The former category is the more common in Israel.

Sequoia prefers never holding the majority in a company; that is for management, preferably. Like a number of other observers and venture capitalists, Sequoia stresses the personal qualities of the individuals starting a new company. Some of these qualities are recurring:

- many entrepreneurs come out of poor circumstances
- they understand the value of money and the difference between need and demand
- their self-confidence is balanced by a realistic view of their own shortcomings
- they opt for fast growth but realize the necessity of balance here too

Next chapter's Airslide is a Sequoia company.

Web site: www.sequoiacap.com/sequoia_israel.htm which also contains a useful FAQ list

Formula Ventures, vencap within a software group

Formula Group is the largest software company in all of Israel and they started their own venture capital and internal incubator activity a year ago. The word "group" carries meaning since there are several holdings of Formula on the NASDAQ and the Tel Aviv stock exchanges. Out of 3,000 employees, as many as four fifths are software engineers.

Out of the 90 mill. USD that constitute the first venture fund, 15 mill. came from the Formula Group itself so the rest was raised externally. Thus Formula Group is kept at arm's length; the company must not be allowed to pick the most promising start-ups for its own benefit. But one advantage with the association with the Group, apart from readily available expertise, is its channels and experience in financing new ventures.

Investment focus is on the early stages. The internal incubator has an even tougher time schedule than the one applying to the incubators in the national program that we met in the previous chapter. Here at Formula one third of them must graduate within six months, another third within twelve months, and after eighteen months, no company older than that must be left.

Formula Ventures has about a dozen employees, evaluating some thirty business propositions every week. All employees have a business background, many from software, and there are – this is emphasized – no lawyers in the group! At the time of our visit, investments had been made in eleven firms. Apart from the immigrants, the defense and academic establishments, people returning after a year or more in Silicon Valley or the Boston area represent a recent, important trend in Israeli entrepreneurship.

Web site: www.formulasystems.com/units/units_vent.htm

Cedar helps feeding as well as weeding ideas

Among the seventy or so vencap funds in Israel, Cedar, started in 1997, sports a quality stamp, especially when it comes to telecommunications and software start-ups. The Israeli high tech sector is judged to be export driven, thriving on the availability of excellent human capital, and a good infrastructure. The fund's managers worry, however, that while the Israeli business climate is excellent precisely for start-ups, the country has problems in having companies grow.

Perhaps as a sign of this belief, Cedar specializes in early stage funding, even at the stage before a company has been incorporated. Again, the fund opts for an ownership in the range of 20–30 per cent.

So far, Cedar has been instrumental in assisting some ten companies grow from "two people with a paper (the business plan)" to firms with more than a hundred employees. An example is a venture doing "real broadband" which means transmission speeds much in excess of what is mostly referred to as broadband; another venture is about laser technology.

Investing at an early stage corresponds to the contribution that Cedar sees itself lending, apart from funding. And that is advice, contacts, and serving as a sounding board for the entrepreneurs, helping setting directions; it is even weeding out ideas and replacing them with better ones.

Cedar in Israel also provides Cedar Fund with advice pertaining to business in that country, Cedar Fund being an international private venture capital fund specializing in technology companies.

Web site: www.cedar.co.il

Aura Investments Ltd starts early

Yet another investor that opts for the very earliest stages in company development is Aura Investment Ltd. One reason is that value added may be much larger that way, quite another a dire necessity: with a dearth of venture capital, competition for promising projects is fierce. Here again we find a venture fund that gets involved even to such an extent that it partakes in the recruitment of key people in the start-up team.

This approach necessitates a large deal flow as well as the capacity for fast handling, sorting and sifting of those deal propositions. Aura must attract a lot of offers and remain in good standing with potential entrepreneurs despite the fact that a vast majority of the deal suggestions has to be turned down. Thus Aura stresses the importance of a vast network to provide input to that deal flow.

A recent development may be rather beneficial: the advent of the Internet. Here Aura sports a home page where the "Due Diligence Process" is spelled out in detail. Though it would be an exaggeration to call it an expert system, here is a way to establish which rules that apply and for allowing the entrepreneur to refine his proposal. Thus this makes for shortcuts in a cumbersome and sensitive process, and certainly for higher quality in the business proposals eventually discussed.

Web site: www.aura.com

This chapter is based upon information from Michael Eilan, Micha Engel, Yigal Erlich, Uzia Galil, Yehoshua Gleitman, Joseph Rabi, Erez Aluf, Yair Be'ery, Haim Sadger, Shai Bellis, Moshe Shahaf, Amnon Shoham, Gal Israely, Nimrod Schwartz, and Avi Mazur. The following persons held the main responsibilities for reporting:

- on Uzua Galil: Hans Iwan Bratt
- on STI Ventures and Cedar: Gull-May Holst
- on Formula Ventures: Johan Jörgensen
- on Sequoia: Sven-Åke Ström
- on Aura: Bertil Thorngren
- on Michael Eilan and on Yozma: Bengt-Arne Vedin

3. The Companies we visited

The first report here covers an initiated view as to what will be in the field of IT development, the second a report on a company operating at the "meta level" in the sense that it keeps track of start-ups and their development, as a service to such companies. Then we describe a number of Internet firms, so other IT companies, and after them, the "rest". These include a winery and a producer of hard metals, no IT operations those but certainly fascinating examples of knowledge based corporations.

Many of the visits coincided with a visit to one of its principal investors, investors that we met in the previous chapter. In one case, Comverse, a larger company has been the base for the spin-off (or perhaps spin-in) of new operations. Thus there should be no surprise that there are numerous "hyperlinks" between the various reports in this document, and that the disposition of the various sub-chapters might have profited from being 3-D instead of linear.

The reporting is of course based upon what the companies themselves offered of information. The Swedish visitors have not been able to refrain entirely from providing personal comments but these are kept at a minimum.

Yossi Vardi, ICQ, and the future

Report: Bengt-Arne Vedin

"I am mostly known as Arik's father". Dr. Yossi Vardi and his son Arik started the Mirabilis company, better known for its product, ICQ, sold with the company to AOL for 400 mill. USD. This sum held no relationship to any reported profitability: "It's much better to explain why losses are good than to tell why expected profits are late to appear." ICQ is freeware so the company's revenues at the time of AOL's acquisition were all of 30,000 USD: "revenue is bad for business". No advertising was ever necessary but with 54 mill. users (or that was then, mid-January, 2000; the figure grows by 110,000 a day) this freeware must be one of the most popular in the world. It's all achieved through word of mouth, future's harbinger.

And the future was the subject that Vardi addressed. The ICQ application serves to alert a net surfer which friends are surfing at the same time, so as to make chatting possible. This is synchronous e-mail, and synchronicity is one of the important trends for the future, the simultaneity. The telephone beats voice mail, chat beats mail, on line games beat looking at videos.

The Internet is currently undergoing two fundamental changes, in technology but also business-wise:

- wireless
- broadband

Broadband is the more important since it allows for permanent surfing, we may call it constant synchronicity. If the Net now is like an enormous library, it will evolve into a Net of relationships, where collaboration on line will thrive. E-mail will be the killer apps' killer app, the lifeline of every individual. Applications providers, ASPs, will substitute Service providers, ISPs. The service will move from one's own computer to the one delivering the service; it's the old idea about downloading applets only when they are needed, not installing them permanently.

Continuously hooked up, we will have access to different applications in every room of a home, or an office, applications integrated into each and every type of equipment. The personal computer, "a product with one of the worst designs ever provided", vanishes in this externally and internally hooked up home. (Bad design: contemplate the fact that there are more

than two thousand drivers just for the Wintel platform, e g, for 70,000 different keyboards, with the associated lack of reliability and user friendliness).

– We won't need a big operating system but just a couple of integrated circuits, costing all of fifteen dollars, up to two hundred for Net browsing equipment. One particularly important type of new platform is the one represented by games. There is, e g, some 70 mill. Sony Playstations out there, and in a few months, the new 128 bit generation will arrive for which the partner in the venture Toshiba has been paid a billion dollars for the microprocessor. The new console may surf, display images in 3-D and with high resolution – a new dimension in the field of entertainment. (After the introduction, we may report, however, that there is no built in modem as yet since Sony feels today's modems too slow and prefers waiting for broadband.)

Broadband will be associated with rich media experience, interactive television, games, and new media opportunities in general, music of course but also services as mundane as meter reading. The cost for being constantly on line will be very reasonable, something like going 20–40 dollars a month.

The third important trend after the shift away from big operating systems and the introduction of new types of equipment is wireless: cellular phones will become the most common access route to the Internet. Within two to four years, such phones will be more frequent than PCs but then that phone will have developed into a personal digital assistant.

As an example of an application that has to go through a revolution, Vardi mentioned Internet shopping that today offers a very poor experience; it's just like browsing through a catalog. We will see a future of 3-D, new ways of navigating, vertical portals … Vardi himself is a believer in micro-payments.

We will, furthermore, create our own personalities on the Net but will also have to adapt or rather develop ourselves: conceptually, it's an entirely new world. We will display digital personalities: "tell me your bookmarks/favorites and I will tell you who you are". The challenge is to stay on top of it all, a challenge for individuals as well as for commercial actors, as is obvious from the great changes in the top-ten list of web sites from three years ago.

The world of finance will likewise undergo a revolution. Attention, i e, traffic will be the most scarce resource of all but then not just traffic gener-

ated but a profitable one as well. Just fifty companies account for ninety per cent of all advertising income on today's Internet.

A key concept for the Internet as well as for Vardi's current activities in some fifteen firms is collaboration, and then in three dimensions:

- harmonic but excited and challenging individuals that one has to listen carefully to; Vardi's youngest consultant is a thirteen-year-old
- the Internet culture of exchange, society, "the free": free software, music exchange…
- reliance upon the Internet for furthering social issues or creating colloquialism and personal exchanges.

Datasphere/Koldoon, facts about new companies

Report by Bengt-Arne Vedin

In the previous chapter, we met Michael Eilan as a leading journalist on innovation, technology, and venture capital. He is now also one of the founders of a company establishing a data base on start-ups as well as on resources for them. The database, and thus the firm in a way, grows at a tremendous pace. "There were some 800 companies registered in October, now, in January, we have 6,000." Or, rather, data units, since, as mentioned, also resources are included, which means experts, managers, and consultants.

When prying into the database in February 2000, we find some 6,500 companies, of which 4,500 technology based firms, some 1,300 investment companies, and about 700 those offering professional services. There were also almost 6,000 individuals ("executives").

Thus we may have hinted at the business idea, to offer a means for companies and people to locate each other, to find capital, advice, board members, joint venture partners, perhaps even competitors. The database is very detailed, with some fifty facts for each firm, and never ever any "N.A.", not available; in addition, there are intelligent search tools. Among all those facts, there are those pertaining to the product offerings of a company and also on how they have developed after, e g, market introduction of a product.

Most of the customers, so far, are to be found in the US. At the beginning, the ambition was to map Israel but very soon ambitions grew when Dutch partners were found, and Europe is now an area of expansion. A problem is the heavy workload on all people involved; according to a leaflet, 150 companies a week are added but the growth of 5 200 in just three months bespeaks a much faster development.

Eilan and several of his co-founders are journalists, a background serving well when it comes to ascertaining the quality of data and the ability to analyze and to create new associations and links, as well as giving intelligent answers. These will be tailor-made, even in their design. They will be combined with material from journals and analysts' reports as well as analyses on technology developments of importance in judging a company. The production of specialized newsletters is also on the agenda.

The company itself is now into its second round of financing. The ex-

periences from data gathering are extremely good: when people in a company in Finland first said "no", they changed their minds when they understood the concept. Just three out of 6,000 firms have declined to supply data. Brand new start-ups may utilize the service for free; this is Koldoon's way of sharing the Internet spirit, offering something free of charge. This means that start-ups may access the database every three months if only they themselves keep it updated on their evolution.

A user license costs 2,000 USD. Non-subscribers may also get access to and correct information on themselves. No secret information is part of the input and no non-disclosure agreements are signed. Sponsors contribute 40 000 USD per year and in exchange they get ads and links included in the Koldoon site. Visiting that site, one is met by a number of such ads and links but the number is promised to be restricted.

Web site: www.datasphere.co.il

PassCall – Bridging the Internet and the Wireless Worlds

Gull-May Holst reporting

PassCall is an exciting start-up company developing products to bridge two previously incompatible worlds, the Internet one of text content and the cellular world of voice communication protocols. The basic idea is to bring content to mobile communications devices, such as regular cellular telephones, smart phones, and PDAs. The company counts on 1.2 billion users of mobile telephones by 2003. Some 500 million of the mobile phones will be connected to the Internet.

– So we saw a need to bridge the Internet and the wireless worlds without rewriting the Internet, says CEO Nicky Pappo. Our technology offers users wireless Internet browsing via regular cellular phones. The users of cellulars will want to access the content of the Internet, so we bring content to mobile phones. Today, most of that content is text.

The technology is called GateWave™, which is a wireless Internet platform based on PassCall's breakthrough technology IML™, Internet Mobile Link, allowing data browsing, voice browsing, and SMS, Short Message Service, while also serving as a wireless portal. Portals need their own version of the PassCall software. IML is basically a set of sophisticated algorithms, rearranging existing Internet content to special content that may be adjusted to any cellular display or voice protocol.

Voice browsing is a method to surf the Internet, using voice transmission. The user receives the Internet information by voice from his/her phone and can navigate through any web site either by using his/her voice or by touching the appropriate keys on the keyboard. So, for instance, if you press 1, you get the headline news on your display as short messages. You press 2, and the latest sports news will appear, and with 3, business news. But if you need to have your hands free, you just say whatever number required and the text will appear.

The PassCall engineers have had to cope with a large number of standards and protocols, including the much talked-of WAP, Wireless Application Protocol, when developing their products. The three company founders all have a background in Internet security, so when the idea of the bridge between the Internet and the cellular worlds appeared, they could move fast to take a technology lead in this bridging. Their customers will be all the world's providers of cellular telephony. These, in turn, will be able to offer their customers value-added services including possibilities of browsing the total Internet content.

In brief, the PassCall technology makes it possible for the mobile phone user to get access to Internet information on line, to receive and respond to e-mail and faxes as well to have calendar support, and there is no need to modify the Internet content.

– The company now has its focus on the development of the third generation technology for the platforms, says Nicky Pappo, who sees a bright future with e-commerce, instant messaging, and entertainment as cellular phone applications. – Especially e-commerce users need full security. We will provide that.

At the helm of the company we find, except for CEO Nicky Pappo, the VP for Research and Development Eyal Zohar, the VP for Marketing and Sales Ran Karan, the project leader Sergey Korabalnikov, and the chairman Eyal Sherazky.

In many ways, PassCall is a typical Israeli start-up company. The founders saw a need and moved rapidly to meet it, using their advanced knowledge in a "hot" high tech area, cellular telephony. They worked to find capital from respected venture capitalists, and they took their product to market – now, early January 2000, an IPO in the US is around the corner along with the next product generations.

– We have all the characteristics of an Israeli company, and we want to keep those in spite of the IPO in the US. That is for tax reasons, concludes Nicky Pappo.

One of the venture capitalists behind PassCall is Dr. Yehoshua Gleitman, former Chief Scientist of the Ministry of Industry and Trade, among other things also former CEO of Ampal, the American Israel investment company. He has a technical/scientific background in electro-optics and a specific interest in the cellular industry. The TELDOK group met with Dr. Gleitman during the first day of our visit in Israel. Among many interesting messages he conveyed was the one that the Internet offers specific opportunities since it is the first time we have an application before the technology. Usually it is the other way round. In many ways, PassCall seems to fit into this description.

Facts about PassCall Advanced Technologies LTD:

Founded in late 1998, the company got its first patent in Israel granted for its GateWave IML™ technology in February 1999
CEO and co-founder: Nicky Pappo
Three founders with a background in Internet security
Number of employees on the day of our visit, i e January 10, 2000: 20
Web site: http://www.passcall.com

Trivnet makes for e-commerce to function

Report: Bertil Thorngren

With its catchphrase "Making Digital Commerce Pay", Trivnet is a company, vintage 1997, that is developing a pay system directed at simplifying secure payments over the Net. A primary target group is companies offering access to the Internet, often enough telecom operators or their subsidiaries. In most countries there are also a host of independent Internet Service Providers, ISPs (the most well known is most probably AOL; we met an Israeli one, NetVision, see below).

Trivnet's software allows ISPs to offer both buyers and sellers simpler and faster ordering and payment. Buyers won't need to fill in time-consuming order forms for each and every delivery but the information necessary is already stored with the ISP, once and for all. Thus buyers are saved from having to send personal information, credit card information etc via the Net every time. Instead the ISP acts as a guarantor for the authenticity and credibility of the buyer. The ISP may even take on the debiting function as an extension of its ordinary invoicing. This might be especially attractive in the case of recurring small payments (micro-payments) which else risk being much too expensive to handle; this is an application that Trivnet emphasizes. Patent protection for the Trivnet systems has been obtained.

As a consequence, special weight is applied to digital products on the Net, i e, those that may also be delivered in "bit format", such as computer software, music, images, and economic reports, and providers of such content are also offered appropriate solutions.

Among the arguments for the Trivnet product are that it is takes just an hour to install and that it is compatible with and does not preclude the utilization of other solutions as well. The one who insists on using his or her Visa or MasterCard may continue to do so. The message directed at the third target group, the end users, focuses on speed and simplicity. A purchase requires nothing more than one click on the mouse, and the end user is not required to install any new software.

Security risks must also be said to be less since personal information does not have to be transferred repeatedly. Ordinary business risks remain, though. How can we be sure that the buyer is the one he claims to be? How is responsibility for delivery failure guaranteed? It is conceivable that those

risks are minimized with the current Trivnet focus on everything being delivered and paid over the Net where mistakes may be discovered immediately.

A comment would be that environments vary from country to country. In Scandinavia, it's not just ISPs who have been active in the payments field. One example is the launch of the "Solo service" by the Merita Nordbanken which also offers the opportunity for paying with just one click on the mouse, in this case mostly for the transfer between accounts in this particular bank. At the same time, the service is more extended in the sense that some responsibility is exerted even for the authenticity and reliability of products that are not transferred just over the Internet. This bank, like several other Scandinavian ones, already features user numbers in the millions, i e, even more than large American banks. Examples of other actors are the postal services' "Torget" ("the market square") and Scandinavia On Line, i e, content providers rather than ISPs.

Trivnet has some thirty employees and has been through a couple of initial rounds of private and vencap financing. Veritas is one of the investors. As so many other Israeli companies, it lives a double existence; formally, it's American.

About Trivnet:

Saar Wilf, Chief Technical Officer
Efrat Boker, General Manager
Web site: www.trivnet.com
For a demo of the Trivnet offer, see "WiSP DEMO STORE" at http://www.trivnet.com/html/prod.html

Tashilon aims for entirely secure Java based encryption

Report: Bertil Thorngren

Tashilon is one of the start-ups thriving under the wings of the Aura vencap company (see presentation in the previous chapter). Focus is on developing and selling bulletproof encryption for both web servers and individual users. Encryption is a field where Israeli companies since a long time have worldwide reputation; we may recall this technology's relationship with the military field. While this is an advantage when marketing on the world market, there is also tough competition from other Israeli firms.

Currently, the Tashilon web site displays information on two beta versions so there are no products commercially launched as yet but they are already sufficiently advanced to allow for realistic testing with customers interested in partaking.

The Tashilon development philosophy comprises the idea of undertaking challenging tasks. They manage an active discussion forum, the "Tashilon Encryption Lab", communicating with universities, forefront encryption companies, and specialists all over the globe, and within this network, there is also the staging of a dedicated "Encryption Forum" every two months. Thus there is the maintaining of openness necessary in an effort to proactively counteract new threats to integrity and confidentiality.

At the same time, it is obviously necessary to secure absolute confidentiality regarding mechanisms and design of the new solutions being developed. Already at the Tashilon web site examples of a means to balance between openness and confidentiality is offered. At least part of this requires identification and password.

About Tashilon:

David Alosch
Web site: http://www.tashilon.com

Peach Networks opens up a cable multiverse

Report: Bengt-Arne Vedin and Anna Karlstedt

Just think of accessing the Internet by means of the ordinary cable TV, ordinary TV set, ordinary remote control … This is the idea behind the Peach Networks product, a product that the user, consumer, couch potato, surfer does not see as any hardware, just as a function, as one more channel if we like, as several new channels even.

Instead, the product is placed with the cable operator as a modular system. It's not just the Internet that is offered but also education, games, e-commerce, e-mail – applications within these fields beside the Internet, conceivably better. Since the channel of communication between subscriber and server is a dedicated one, and since commerce needs the exchange of information, the transfer of credit card numbers and alike may be made much more secure than on the Internet.

While this is more than an Internet solution, it may well be that it's the Internet that will be the "killer app" for Peach; at least it offers a direct and easily transferred sales message. The company stresses the other features also, of course. The company was started in 1998 and is in the process of gaining its first customers, quite naturally in countries with a high degree of TV penetration but a low one of PCs, like Mexico and Spain.

For the cable operator, the Peach Networks system offers new services which the competing satellite systems are unable to provide, and it is up to the operator to decide which new "channels" for shopping, game playing, education etc to introduce. These may then also be priced separately, conceivably an advantage to the competition.

As mentioned introductorily, the system works already with existing cable TV components in the home. The remote may work as a mouse and be relied upon to call forward a keyboard on the TV screen so acquiring a keyboard is not necessary even though it would make typing easier. The optional keyboard would communicate with the TV set through the same infrared receiver that the remote control employs. The hard disc function would be located in the server with the operator that is where on demand software would be available also. Here is another opportunity for fine tuning pricing. Anyhow, the operator will obviously be in a better position to hold a larger software library, and to keep it updated. One can easily have the TV screen divided into several fields, following a TV program at the

same time as surfing the Internet, playing a game, or contemplating an e-commerce catalog. On the other hand, it won't be as easy to hook up a printer at home to make printouts because any and all computing really takes place within the operator's server.

An important feature, one subject to particular pride and one that Peach believes is its own exclusively, is a coding method allowing one channel to be utilized by a large number of users in parallel. This is done through a bit stream in the MPEG-2 format, thus not the Internet protocol. Communication speed is much higher and two hundred subscribers may be accommodated on just one 4 Mbit/s connection, a method for which patent applications have been filed. In the patent descriptions, there is also the feature that the blinking in still TV images and text is eliminated; overall image quality is much enhanced.

Peach Networks is partly owned by Elbit that is partly owned by Elron. This is the company we met with in the previous chapter, founded and headed for 38 years by Uzia Galil. Peach was co-founded by its Chief Scientist Meir Feder, a professor whose co-founders are his ex-students Ofir Paz, CEO, and Avashi Keren, VP for R&D. We met with COO Eyal Katz.

Web sites: www.Peach.co.il
www.peach-networks.com

Interwise – e-learning products for e-business

Report: Gull-May Holst

Enter Eran Katz, VP International Operations for Interwise, a global leader in synchronous online learning, e-learning, or distance learning. This is one of the STI Ventures (see our previous chapter) portfolio companies on the verge of an IPO, most likely within the next six months, i e, in the summer of the year 2000.

Interwise started out in Israel in 1994 with the idea of bringing teacher-led sessions over the Internet to students in need of on line training and education, preferring to do it over the Internet. Any session can be either on line or off line since it is possible to record any session or part of it and replay it when needed, using streaming technology for sound and movement. Any session can also be from teacher to one pupil or to many. Each pupil may pose questions all along a session by "waving his/her hand" to get teacher attention. Questions are posed and answered in real time.

Interwise is a mature company, now on its third generation product platform for e-learning. Headquarters have been moved to Santa Clara in California. The company has 115 employees so far, and users/customers all over the globe, in the UK, Switzerland, the US, Germany, Greece, and South Africa. Among these are forty of the largest corporations in the US. In Europe also, leading firms are Interwise customers. In Germany, e g, the software company SAP AG, a global leader in ERP systems, is using Interwise products for international training programs (ERP = Enterprise Resource Planning, also called integrated business systems). SAP has created a virtual classroom, which can be visited on *www.mysap.com*. It is used mainly for customer training.

There are users of Interwise products in Sweden as well, such as the Folkuniversitetet running interactive courses at a distance.

Eran Katz runs a demo of the system on two of the computers on the conference table. For this demo session, there is just one student on line, a student somewhere in Tel Aviv who usually helps Katz perform his demos. The student is instructed on what to do. She responds either over a chat program or by asking questions over a phone line, so voice communication is possible. On a whiteboard, the student solves some tasks given, and the teacher responds immediately to the solutions suggested. With several students, the function "wave your hand" may be utilized. One hand for each

participating student is shown on the screen. There is one type of interface for the teacher, another for the student. In between, there is the entire, complex Interwise platform.

Interwise also signs partnership agreements with some of its customers. Organizations offering courses can become "Learning Delivery Partners" or "Learning Technology Partners". Any company wanting to interact with the visitors to their web sites may become a "dot.com Partner".

Web site: www.interwise.com

NetVision, Internet services always reliable

Report: Johan Jörgensen

NetVision is Israel's largest Internet Service provider, located at Haifa, an hour's drive north of Tel Aviv, at a technology park boiling with entrepreneurship. We are again at an Elron company (well, to about a third), run by none else than Ruth Alon, daughter of Uzia Galil of Elron fame. She has an engineering background and a fourteen year career in Silicon Valley before returning to Israel and starting up NetVision, a place abundant with young people whom Ruth Alon affectionately (and laughing) calls "my babies".

When NetVision started selling Internet access in Israel in 1994, none such existed, or was even allowed, outside universities. So of course there were cheats that used the universities to gain access anyhow, and the government had no option but to cave in. Initially, NetVision had access to a grand total transmission capacity of 64 kbit/s via satellite, as compared to the current 10 Mbit/s over fiber.

Right at the outset, there was fighting with the Israeli government telecom operator Bezeq over data communications tariffs, and at that time even over access to international lines. Those then constituted a monopoly but even today there are only three operators offering international lines. The telecom market is a shambles. "We would have been offering IP telephony for a long time, had we only been allowed" Ruth Alon emphasizes. "The fact that the market is regulated has tremendous impact. Currently, we pay 30,000 USD per month for a 2 Mbit/s fiber link to the US. That's crazy."

The objective has always been that NetVision should offer a simple and reliable service where the user would never be met with the "line occupied" signal. First, the infrastructure, modem to modem, customer to service, was established, and a comprehensive support department was quickly built up. Today, there are some 600 employees of whom one third are full time, the rest students and others who work part time to offer support. NetVision has been entrusted with the support functions for several very large international corporations, both domestic and from abroad, among them Microsoft. The government has even provided an important exception in that NetVision is allowed to operate at all times, seven days a week, even during the Sabbath.

Customers are both companies and individuals and the services provided may be simple Internet or any number or combination of value added services. Out of all Israeli firms using the Internet, three-quarters are NetVision customers. (One of our accompanying Israeli guides relies upon NetVision as the Internet host for him and his company, and he professed to being extremely satisfied with their performance, providing concrete examples of its alertness.)

"It's a small market and competition is real tough. That's why we cannot opt for a particular niche but have to be comprehensive to survive. NetVision is a one-stop-shop for Internet solutions. Our base, however, is support. There must always be people underneath."

It is not that the infrastructure lacks impact, though. NetVision has developed its own Unix based technology that in 1999 allowed for an increase in capacity by a factor of five without one single shekel in additional investment.

Apart from the purebred ISP services and the huge support department, which also offers capabilities to which other companies may outsource their IT systems, NetVision designs and implements Internet solutions for other companies. Some 45 people are involved in these intranet and e-commerce operations.

In addition, NetVision has established its own portal "Nana", which means mint leaf in Hebrew, and there is an e-commerce department profiting from relying upon this portal for a number of its projects. The Nana portal was started a year ago and now features four languages, Hebrew, English, Russian, and Arabic. Recently, a women's portal was acquired which now will be translated into a recipe for success like I-village.

As if all this would not be enough, NetVision sports Israel's largest site, the auction site Netaction, selling for more than two million shekels a month.

Following Ruth Alon, there is no problem finding good people but she allows that there will be a lot of competition from start-ups, making it more difficult to convince employees to stay on, despite the fact that NetVision pays competitive salaries. A good programmer takes home at least 3,000 USD per month, but easily also twice as much.

Web sites: www.netvision.net.il
Nana – www.nana.co.il

Tundo: packet switched telephony

Report: Gull-May Holst

1999 was an award-winning year for the 1998 start-up Tundo. Its Network Telephony System was appointed Product of the Year by C@llCenter Solutions, Product of the Year by Internet Telephony, Product of the Year by Communications Solutions, Best of Communications Solutions, Best of Show at the Internet Telephony Expo, and the company also won the Interoperability Achievement Award at the ConvergeNet Expo. Impressive indeed, for a company having existed less than 24 months. But what are so many nice words all about?

Briefly, the awards were won because Tundo has built an open platform for packet switched telephony that can be integrated with existing circuit switched gateways, PBXs, and automatic call distributors. The platform provides opportunities for enterprises, call centers, and telecommunications service operators to deliver voice, data, and video at lower costs and with new, value-added features. Tundo's solution is called the Tundo Network Telephony System'. It consists of five main components:

- The Distributed Open Telephony Operating System, DOT-OS
- Endpoints
- Gateways
- Multi-point conference units
- Applications which run on the platform.

The DOT-OS, in its turn, includes two major components, DOT-Framework and DOT-Server. The DOT-Framework is an object oriented software development environment that enables developers to integrate existing voice applications. The DOT-Server is a server-based call processing software platform for monitoring calls, highly scalable and reliable. Reliability along with scalability and functionality has so far caused major problems with earlier packet telephony applications. The Tundo platforms overcome these problems and provide smoothly running solutions, including such endpoints as IP-based telephones and softphones, i e, software-only telephones, running on general-purpose computers, for the time being PCs. In order to meet future demands, Tundo has developed a Java-based

softphone and intelligent line-access devices for interfacing between analog telephones and packet networks.

As always in high tech, it's applications that count. For the time being, voice mail, unified messaging, IVR, automatic call distributors, call recording, conferencing, and predictive dialing are the most important value-added services to any telecommunications services provider. In order to help the development of present and future applications, Tundo is developing several services of its own, although it is expected that most applications will be supplied by third parties.

Tundo not only features a very exciting product program. The company has developed a comprehensive market strategy to sell its technology solutions. Thus Tundo has specific programs for various types of resellers and affiliates. For the time being there is the Tundo qualified Resellers program for resellers with a geographic or vertical focus. There are the Tundo Technology & Marketing Affiliates for companies that integrate their products with those of Tundo. There are Tundo Solution Integrators for systems integrators that deliver complete customer solutions. And, finally, there is the Tundo Embedded Component Companies for suppliers of telephony systems in need of embedding CTI or IP telephony technology into their products. So far, Tundo has announced formal partnerships with Interactive Intelligence and Melita – more are in the pipeline.

There is more information about Tundo also in a company profile, produced by the Aberdeen Group of Boston, MA, USA, in October 1999, see the web site http://www.aberdeen.com for a start.

Company facts:

Privately held, funding from the Cedar Fund, Gilde Fund, and Singapore Telecom
Management team:
CEO, president and founder Eitan Baruch
CTO and co-founder Dr. Pinchas Ziv
Executive VP marketing: Gordon Payne
The TELDOK group met with Hillik Nissani, VP Sales & Marketing
Web site: http://www.tundo.com

Vsoft: advanced image treatment in a digital environment

Report: Johan Jörgensen

As a start-up, Vsoft seems rather advanced, and the technology is easy to identify with. The idea is that Vsoft will allow for advanced image treatment in a digital environment, an application well suited to future broadband networks. It's MPEG based and makes it possible to add more information to the video material and to edit it. Thus everyone will be able to integrate and manipulate data. These are value-added services well suited to video on demand.

A typical example would be when a company making image material available on its server wants to add more information. It would, e g, be feasible to affix "bookmarks" onto the goals in a soccer match, or to allow for searching for keywords. Vsoft claims to be alone with the feature of playing a digital movie picture by picture.

Vsoft envisages two different types of environment, the professional where it will be possible to work together over shared video information, and the domestic where a number of personal video services may be offered. This is probably the field where most people would get in touch with Vsoft technology. Today, there is a module available that looks like a video recorder on the TV screen, though with a number of extra functions added to the usual start, stop, forward, reverse etc.

There is no Swedish representation but there is one in Norway, Open Human Digital AS, found on the web as *www.ohd.no*.

Company facts:

We met with Gil Aharoni, Business Development Manager
Web site: www.vsoft.com

ComView Graphics – Advanced Image Processing

Report: Gull-May Holst

Meir Aloni, managing director of ComView Graphics Ltd., is taking over after Eran Katz of Interwise (see above). ComView Graphics is an Israeli company founded in 1996, again one with backing from STI Ventures. Meir Aloni tells about an advanced technology for large displays, the Perfect Pixels Technology, which his company has developed and now is selling on a global basis thanks to an agreement with the Dutch multinational Philips, signed in June, 1999. Philips has launched the VidiWall concept for advanced presentation power, based on ComView Graphics' large-scale visualization technologies. The web site www.vidiwall.philips.com provides a very good idea of the concept.

Unfortunately, Meir Aloni's presentation has to be cut short – the TELDOK group is running out of time. But he manages to present the basic ideas and features of his company. The fundamental goal has been to develop seamless displays in any size for true interactivity. Back projection as well as front projection may be used on wall-size displays; they are always seamless. And they can be made interactive thanks to ComView Graphics' View Maestro Electronic controller. Next time you visit a fair or an exhibition featuring very large, interactive screens, take a careful look – it is very likely that you are looking at a ComView Graphics product.

We have time for but one question, regarding the average cost for an interactive, seamless screen like the one Meir Aloni has presented. It will cost some 15,000 USD per square meter. The deal with Philips means that this multinational company takes care of marketing on a global basis, while the 32 employees of ComView Graphics look after product development and new concepts.

– The engineers working for us are the very best ones in image processing in Israel, Meir Aloni proudly claims.

The contract with Philips just confirms this.

NetGameCable

Report: Sven-Åke Ström

NetGameCable was founded under the name of NetGame in 1994 and is a subsidiary of BRV, traded on NASDAQ. Initially, the company focused on providing servers for various types of games, distributed by way of cable TV; thus the name. Strong graphics competency was available, acquired while working on radar problems for the Israeli Air Forces. Conditions for gaming changed radically with the advent of free games, not least distributed over the Internet.

So, today, focus is on offering broadband solutions with cable modems, routers, and a number of software packages so as to live up to the business mission of always delivering the best, most appropriate communications solutions. Flexible software platforms are designed to allow for the adaptation to different needs and environments.

NetGameCable has two offices, one in Israel and the other in California. There are sixty employees and annual revenue is 10 mill. USD. The forecast for the year 2000 is that this figure will double, to 20 mill. USD; possibly this is a rather cautious guesstimate.

The market targeted consists of small and medium size cable operators including closed systems like those within hotels and resorts. These customers are characterized by

- price sensitivity
- need for robust solutions
- minimal maintenance costs
- lack of IT know-how
- demand for tailor-made solutions (in practice, standard items combined to fit the particular need)

65 million analog and one million cable modems are estimated to have been sold worldwide in 1999. NetGameCable regards cable modems as

- too expensive
- lacking of standard
- making the customer too dependent upon the modem provider

The firm concentrates its marketing efforts on establishing a stable and com-

prehensive network of distributors and also market relationships for licensing and OEM. Technology transfer through licensing is, in fact, a priority.

The product line consists of

- Proprietary Cable Modem System
- Standard (Docsis 1.1 based)
  - QuarterBack – CMTS
  - QBM Management & Provisioning
  - Juno – Internal Cable Modem
  - Phazer – External Cable Modem
- Vertical applications
  - NetHotel
  - Utility rebilling

NetHotel is an interesting concept for hotels that want to provide guests with fast Internet access and other value-added services. For a guest to hook up his portable to the hotel line is cumbersome and may even be dangerous to the computer; transmission speed is low, and the line is occupied, precluding incoming calls.

Since NetHotel relies upon the existing hotel cable TV infrastructure, a speed of 10 Mbit/s is attainable, whether the guest uses his own computer or one from the hotel. The guest needs to know nothing about networks; the computer needs no reconfiguration or software installation, it's all "plug and play".

Apart from Internet, e-mail, access to printing and faxing, the guest's computer becomes part of the hotel's intranet, which may develop to provide a host of new services. A billing function is integrated into the system.

All production is done through outsourcing, mostly to Singapore (where actual production may be in Indonesia). A separate company is engaged to ensure that quality criteria are met. This costs one dollar per modem, sizeable enough but necessary, as past experiences tell. In addition, software is extensively tested in Tel Aviv. Customer support is provided via telephone mostly. There are customer training programs in systems utilization.

NetGameCable's ambition is to grow from sixty employees in January 2000 to some one hundred later in the year. The idea, however, is to continue operating as the eponymous hollow corporation, outsourcing everything that is not crucial to the very business idea. Emphasis is on development and design and on marketing and selling, and then, of course, on controlling the whole system, including outsourcing etc. Margins for soft-

ware are some forty per cent so there are good reasons for concentrating on what really generates profits.

– The key to any Israeli company's success is, NetGameCable COO Yoram Salinger asserts, the employees' talent and competency, mostly acquired in the Army. Previously, only rich persons could start and grow corporations. Not so any longer, not with the advent of the fast growing venture capital market.

A Swedish customer, Telia Infomedia, was the very first one for NetGameCable, and it is still the largest. This is an ideal customer, not least because of its demand for tailor made solutions. In addition, volume is sufficiently large. The first contract was signed in August 1998, and one month later, market tests started in southern Sweden. In March 1999, final testing was carried out so delivery could begin in June, including a billing functionality.

The firm has learnt a lot about quality and customer service through the relationship with Telia, something that will serve well in working with Tele2, described as very ambitious and eager to be the best. To NetGameCable it seems as if Tele2 can be more selective in choosing customers whereas Telia is burdened by a public service role. Through Telia, contacts have been established with Telenor Vision with activities in Denmark and Norway. Here video signals will be sent in bulk to various installations and hotels. The Finnish market has proven more turgid but the hope is to get involved with Sonera in the year 2000.

The Swedish market is seen as very interesting. The country is advanced and an important test market. Swedes don't shy away from new technologies when new solutions are offered. The high Internet usage is another positive factor.

Besides the Scandinavian markets, old Soviet bloc countries like Poland and the Baltic ones are important. NetGameCable are step by step establishing themselves in German, France, and Great Britain.

But NetGameCable's top management confesses that markets have been chosen not through research efforts, market surveys, or following any rulebook. It has rather been pure happenstance, catching opportunities as they arise.

We met:

Mr Yoram Salinger, Chief Operating Officer
Mr Moshe Yannai, VP Sales & Marketing

Comverse Network Systems offers value-added telecom

Report: Bengt-Arne Vedin

Comverse is a large company but also with some smaller ones under its wings, as will be reported separately presently. It was established in 1984 and offers comprehensive systems solutions for enhanced services. The number of employees exceeds 4,000 in thirty countries, of which 1,300–1,400 in R&D to which one fifth of revenues gets dedicated.

The corporation is included in the S&P 500 and the NASDAQ 100 and has a market valuation of some ten billion USD (in January 2000). Among the most outstanding IT companies, it has been ranked number nine by the Wall Street Journal and number sixteen by Business Week. In 1996, it received the award for fastest export growth of any Israeli firm.

The products are providing enhanced services for Telecommunication Network Operators, increasing revenues, increasing customer loyalty, and decreasing churn, Peretz Gurel, assistant vice president, explains. Comverse Network systems products are network-based servers, providing messaging services (e g call answering and voice messaging), mobile Internet services (e g SMS and WAP services), Internet Protocol-based services (e g Internet Call Waiting), natural speech recognition services (e g the Speech Portal branded Tel@GO) and Intelligent Network implementations (e g Prepaid Systems or Network IVR).The competition is stiff; with a 42 per cent share of the voice messaging market, Comverse Network Systems is ahead of Lucent (24) and Unisys (13). Revenue and profit development, in mill. USD, has been as follows:

1995	1996	1997	1998	1999
252	390	489	696	872
2	42	35	112	172

It must be taken into account that Comverse has made some acquisitions, particularly the merger with Boston Technology some eighteen months ago. This is the largest Israeli acquisition in the US so far and has worked out well, corporate cultures found to be compatible. Almost everything produced is exported, and if the company formally is incorporated in the

US, for tax reasons, most of top management is Israeli, and two thirds of development takes place in Israel.

Customers are more than 300 service providers, many offering wireless (more than 180 of those 300). Comverse technology serves over 80 million end users in more than 90 countries. Out of the world's twenty top telecommunications operators, only four are not Comverse customers.

Though it is somewhat of a delicate balancing act, the company has implemented a matrix organization around customers and their needs. Thus one matrix dimension is regional, the other product line oriented.

Products consist of hardware like racks and electronic circuit boards but also to a large extent of software. The user interface may consist of WAP, micro browser, keyboard, PC; behind it, there are integrated functions such as a personal portal and communication, messaging, speech portal services, personal unified messaging, and personal call management.

In the Comverse call management system there are functions for

- call answering
- voice mail
- call return
- call screening
- Internet call waiting
- prepayment of calls
- network IVR
- roaming

The personal portal, compriseing transaction features, may contain

- information services
- corporate intranet
- network account data
- personal interest management
- PDA synchronization
- browsing with WAP
- voice browsing
- music (MP3)
- interactive games
- instant messaging

Personal transactions, on the phone network, are expected to develop as follows

- commercial service providers
- billing relationships
- micro-payments
- extend credit
- enhance security
- stock trading on the go
- money transfer
- network provider mall

Personal unified messaging will look like this

- any message from any source
- any message from any message aggregator
- read and send e-mail from handset
- listen to e-mail on wireless phone
- reply to and forward e-mail with wireless phone
- use personal address book
- notification services

Comverse has identified a strong trend away from circuit switching to packet switching. The operators' heavy investments in Third-Generation Mobile Networks and in broadband access systems will force them to look for new income, not just transporting bits. E-commerce will evolve into m-commerce, where m stands for mobile.

Web site: www.comverse.com

Star*home wants to make the domestic mobile phone global

Report: Bengt-Arne Vedin

Shlomo Wolfman is vice president for technology and cofounder of Star*home; as his colleague cofounder, responsible for business development, he was employed by Comverse, Wolfman since a decade, when they presented their business idea to the Comverse top management. This idea is "enhanced global services for roaming subscribers", "feel at home while you roam".

This means that a wireless phone or any other equipment, like a PDA, should be able to work in exactly the same way everywhere abroad as it does at home. One should be able to call a person, not a place, the same PIN code and the same abbreviated numbers should apply. Obvious demands? Even if they are, they are not at all met by today's systems.

Comverse got established in the wireless market in 1990 and in 1992 in the GSM market, especially voice mail systems. GSM allowed for an increase in market share from 45 to 60–70 per cent. When looking at how value added services like voice mail systems are used, the picture is thus

	Users	**Operators' income**
Home	65 per cent	21 per cent
Roaming	21 per cent	10 per cent

So, the network should solve the problem of "feeling at home", and that is a value added service for which the operator should get some income. Star*home aims at providing them with this service through the establishment of their own dedicated international network, using leased lines. This will provide

- global access, also to corporate extensions, home short codes, voice mail…
- global authorization, to access data, m-commerce…
- personal global information, news when abroad, ticketing…

The network will rely upon the Internet protocol, which also will be an advantage with the advent of convergence between telephony, wireless,

computers, and content. Star*home's services are independent of medium or terminal type. Some of their solutions are in the process of being patented.

The company is about a year old, and during the second half of 1999, some fifteen installations were performed, mostly pilots. About a hundred are forecast to be made during the year 2000, while a center for network management will be established in Switzerland. In January of that year, there were fifty employees, a figure set to double in the same year. A large number of suppliers are engaged and there has not been any competition.

The relationship with Comverse is seen as a strength; the group has a solid customer base and a lot of know-how. At some stage, there will most probably be an IPO of Star*home to get access to development capital, because within Comverse, there is a lot of competition between different projects for such resources. All employees are also shareholders.

Netology is a firm believer in text for the wireless

Report: Bengt-Arne Vedin

Voice mail is a big product for Comverse. Some five years ago, some entrepreneurial individuals left the company to launch their own venture for a technology that had few applications then, SMS, small message services, i e, text messages mostly for mobile phones. Now this whole field, wireless data transmission, has become a hot topic so Comverse has acquired the spin-off, Netology. Michal Kahan, vice president marketing, reveals heady plans for Netology's future. The ambition is that this field will constitute Comverse's single largest business area within the next five years. The company had some luck in that as a latecomer but associated with Comverse, it got a second chance as a second source, and also because of its agility and ability to respond quickly.

Among many features with SMS, one is the possibility of telling the status of the voice mailbox, a very natural extension of Comverse's offering. The switch from talking SMS to talking mobile data reveals an ambition and a vision. Identification is an important field involving more than simple text messages. The vision may be described as bringing the Internet to the wireless phone, through the operator, and to become a market leader for mobile data.

There is consensus that this particular field is growing rapidly. Forecasts talk of 200 million subscribers in 2003 and then more than fifty per cent of all mobile phone users will employ mobile data. Then there is the case of Scandinavian operators already turning it into a profit, not least in Finland. What holds for Finland holds for Asia, especially China. The US is lagging since pagers hold a strong position but there is belief that this country too will go for SMS.

Netology's history is described as follows:

- established in 1996
- focusing on product development and marketing, outsourcing production
- self-sufficient engineering, product management, marketing, and support
- will have delivered 170 systems to 75 operators next year
- 80 employees as of January 2000, 24 in April 1999, 150 by the end of 2000; out of those 80, 60 are in R&D

- the culture is entrepreneurial, that of a start-up, no-nonsense

The company sees and describes itself as an Application Service Provider, a concept popular within the Comverse group. Several applications have to share data and the architecture is modular and scalable, open for new applications. The ambition is that everything should be adapted to existing standards. Reliability levels must be those of the telephone world, not of the computer field. It must be possible to control and monitor functions and utilization and must be possible to connect to various standard systems.

To the operator, the addition of equipment for mobile data means that he may offer new services and generate new revenue streams. The initial heavy investment in infrastructure may be employed more and generate higher returns.

When starting to think of mobile data that might be location dependent, new ideas pop up. Cell specific data may be sent to each cell in the cellular network, such as advertisements: what about the special offer from the nearby pizzeria? Or available parking places in the vicinity? And of course the user should be able to order specific information, such as regarding the traffic situation at the place where he is going. Messages may also be linked to triggering events. There may be tailor-made address books for targeted messages with the operator, or perhaps the change in a particular stock's valuation will trigger a signal directed in accordance with a previously placed instruction.

CipherIT for more secure wireless e-commerce

Report: Johan Jörgensen

CipherIT is a purebred start-up. It consists of two persons, has not yet acquired any financing but dreams heady dreams and holds high hopes. And we have to admit: the two are no neophytes. As a vice president at Bankers Trust, Herbert Zlotogorski was responsible for security, and his partner professor Benjamin Arazi from the Ben Gurion University is a founder of Fortress Ltd, another security company.

CipherIT aims at providing a component for the emerging infrastructure for mobile e-commerce. The concept involves, broadly speaking, freely available encryption systems for mobile systems, utilizing Public Key Infrastructure, PKI. Authentication involves proving without a doubt who sent a message, an order, a payment. CipherIT sets out to deliver such proof.

It's the cellular telephony operators that will constitute the trusted third party verifying that the two parties involved in a transaction are authentic. This may be done with a PKI associated with each telephone. The system is not based upon SIM cards (which are not used in the US) but somewhere in each phone there will be a "secret" with a matching "secret" with the operator.

Obviously, then, the telephone producer has to be involved. CipherIT will sell a platform to be integrated into the operator's switching system. The cryptography system involved allows for an exchange of keys in something less than one second, versus 10–15 with current systems. Up to 50,000 users may be accommodated and such an installation will cost about half a million USD.

Herbert Zlotogorski, whom we met, regards cellular operators as something akin to credit card issuers and points towards the possibility of branding telephones for credit cards. In this way operators will gain another way of raising revenue.

And the market will grow, of course. IDC research reported that there were 257 mill. cellular phone subscribers in 1998. In the year 2002, the figure will have grown to 550 mill. out of which one fifth will be WAP.

With CipherIT and similar systems, it will be easier to gain customer loyalty and to reduce subscriber churn. In addition, income per customer will increase, e g, when charging for the certification possibility.

Goals are ambitious, as are growth forecasts. In the year 2003, CipherIT counts on revenues of 37 mill. €.

Airslide for more efficient wireless

Report: Hans Iwan Bratt

Airslide Systems may be regarded as a typical Israeli start-up. The entrepreneur, Stephan Ouaknine, 26, is an immigrant from Canada with an excellent business education from the McGill University.

Despite his youth, he has several years of high-tech experience. He was a co-founder and head of business development at the GEO Interactive Media Group, which he helped to go public in London. After having established the US subsidiary, he worked on developing the firm's international distribution system.

After moving to Israel, Ouaknine and Oren Shmulevich, now head of development, started Airslide Systems. Shmulevich has many years' experience from technical development, e g, of the infrastructure for streaming video and audio, as well as of Internet telephony. At the helm of the company, there are several more people with technology experience from radio, telephony, and the Internet, all trained in technology. None seems over thirty. The one exception is Samuel Regev who has turned fifty and who has many years with Motorola and Ericsson to his c v.

The company has fourteen employees and is looking to recruit another handful of engineers. The web presentation encapsulates the firm: "Airslide Systems possesses all of the charms of a start-up company. We eat pizza, sleep on the floor and develop some very cool technology. Every once in a while we will document some of these and other bizarre occurrences by uploading some pictures to the site. So keep checking because you never know what's bound to pop up …

If you like to join gatherings and drink Coke, contact us …

If you wouldn't mind seeing the sun set over the sea while sitting at your workstation contact: jobs@airslide.com …"

The company office sports a few rooms; where Ouaknine resides, furniture is sparse. The firm will soon move, however.

The Airslide business idea is to consolidate the three networks used in cellular telephony into one single. Today, such a network actually relies upon three subsidiary networks, one for signaling, one for voice, and one for data. "That's wasting expensive resources" Ouaknine suggests, so Airslide develops one integrated network for these different types of communication. No security risks will be involved, no infrastructure needs to be substituted.

Cellular telephony is currently undergoing a major technology shift. An important result will be the harmonization of the three dominant standards, GSM, CDMA, and TDMA. This development means that the networks will have to handle much larger data volumes, and here the Airslide system will help.

In addition, cellular telephony operators see their revenues shrink. Telephones are becoming less and less expensive, as are connection charges. Thus operators look to offer more services, and Airslide features a product making it easier to produce them. One example is directly connecting a cellular phone to a corporate intranet without having to rely upon the public, less secure network.

Currently, Airslide is still developing and not yet on the market. But the goals are clear, to become a leading company providing solutions for switching systems relying upon that hardware but with proprietary software. The ideas have been well received. One of the investors is Sequoia that we met in the previous chapter, and collaboration with Cisco, represented on the board of directors, is intimate.

Personal comment:
As with many other companies visited, one is struck by the self-confidence that characterizes top management. They are convinced that they will be winners, and like so many other firms, Airslide will be so on the global marketplace, in niches with tough competition and advanced customer demands. While the market launch has yet to happen, there are no qualms about telling of plans and ambitions.

Web site: http://www.airslide.com

On Track Innovations, reading cards at a distance

Report: Anne-Marie Bratt

A petrol station branded credit card, held close to the gas pistol when filling the tank. The wristwatch functioning as an e-wallet to pay for dinner, just placing the wrist close to a reader. These are some of the applications for wireless smart cards developed by On Track Innovations at Rosh Pina in northern Israel. We are met by Ofer Tziperman, responsible for marketing, who provides an enthusiastic introduction to the product, its advantages and usage.

OTI was started in 1990 by people coming out of the military. It started using its technology the year after and in 1993, the company acquired an American patent for its "system and method for the transfer of data without physical contact". The method allows for more efficient power supply, dynamic response, and reception quality than most other non-contact smart cards. In the card, there is a chip with a microprocessor sending and receiving data. No energy source is necessary but that which is sent to the card from a transponder when the card is moved through a magnetic field. Thus the transponder functions both as the energy source and for communication. The card may handle as many as sixteen different applications and may also be re-programmed.

The main market is to be found in the field of "electronic wallet applications", such as credit card, telephone card, passport, driver's license, ID card, public transport ticket, parking place ticket etc. The card may be combined with biometric identification, such as one relying upon fingerprints, palm or face characteristics.

The great advantage is the absence of an internal energy source despite the fact that the card is an active one. The card is very compact and may be read up to a distance of six inches from the reading antenna, which in its turn may be placed at a distance from the actual reader, which may integrate signals from several antennas. This distance may be 35 yards so that the reader may be placed protected by a wall, secure against vandalism or manipulation. Since the cards contain no moving parts, they will feature long life. They are easy to use and may be given an appropriate design and size. There is no static electricity nor corrosion, a distinct advantage in humid climates. Production costs are relatively high but the long life compensates for this.

Ofer Tziperman claims that no other company utilizes the same technology even if some large ones like Philips and Siemens have plans in the same direction. OTI has made agreements with some leading firms such as HP/VeriFone, Samsung, and Microsoft, and there are discussions going on with other smart card companies.

OTI started its international expansion in 1995 and now has 75 employees. Plans for expansion in Scandinavia are under way.

Company facts:

- Granted US patent in 1993 for its "system and method for the non-contact transmission of data".
- Awarded ESCAT Award for the "Most Innovative Smart Card Accomplishment" in 1998
- Listed on the Neuer Markt from August 31, 1999
- Revenues grew last year by 79 procent to 2.57 million USD
- Gross profit grew by 241 procent to 1.70 million USD
- Net loss decreased by 41 procent to 1.44 million USD

Web site: www.oti.co.il

BMC Software, eating the cake and still keeping it, or?

Report: Anna Karlstedt

New Dimension started in 1984, with an agreement with the Israeli Air Forces, allowing the company to exploit some computer software aimed at maintaining very large computer centers where downtime is totally unacceptable. After a number of years of product development, New Dimension was one of the first Israeli firms to be introduced on the NASDAQ, valued at 40 mill. USD. Two dramatic years later, the company was on the verge of collapse, and Dan Barnea, whom we met, was called in to rescue it. Valuation was down by half; top management in Israel and in the US was fired. Then, in one year, hefty losses were turned into balance, and success followed.

For a substantial part of the world market, New Dimension used an agent and when negotiating a prolongation of that relationship, the agent wanted a clause compensating it if New Dimension were to be bought up. New Dimension agreed readily, with the only provision that such a clause be mutual. And so, when BMC Software, an American company, wanted to buy the agent, they discovered the protection clause but also that the relationship with New Dimension was very valuable indeed. When a deal was consummated and New Dimension bought out at a valuation of 700 mill. USD, this was the largest sum ever paid for an Israeli computer company. The two companies had complementary products and complementary market strengths so there was a good match.

The BMC group has some 3,000 large customers around the globe, among them air carriers, banks, insurance companies, and federal agencies in the US. Thirty different computer systems are serviced. The applications are the most demanding existing. All efforts are concentrated on software development, and it's high reliability rather than clever algorithms that constitute the focus. Thus software experts with a background in the military are ideal; they are good at avoiding bugs but not so enticed to invent all those clever algorithms. Software is delivered on line and installation assistance is offered, but not servicing; maintenance and training is left to other companies. Ideas for new products emerge out of customer demands.

While the company no longer is Israeli owned, the new market impetus makes for heady expansion plans. The company may be sold but opportu-

nities seem to have grown. Because of the tough competition for personnel, stimulating work tasks and an attractive corporate environment are key. "Friends bring a friend" is one of Barnea's prescriptions, and the immigrants from the former Soviet bloc are seen as a good recruitment base.

Dan Barnea is concerned with the situation for young IT firms in Israel, however. There is no balance because there is just too much venture capital available, capital vested in ideas that lack maturity. Competition for qualified personnel means high salary levels, with associated problems. Too many people are thinking too much in the short term only.

While there was a good match between New Dimension and BMC, Barnea is realistic and rather cautious about working together with the new partners in the group. Cultural differences must not be underestimated. All of a sudden, ways for communicating grow tremendously in importance. Houston, Texas, where the headquarters are located, and Tel Aviv, Israel are located in time zones half a world apart.

Just a few words about the office we visited. All employees but Dan Barnea looked very young. Mentality seemed to be informal and without stress. Workplaces were neat and orderly. A message board with photos of all employees. Dan Barnea, friendly, humorous, with natural authority, in jeans, like all his young team members.

Web site: www.mbc.com

Phonetic Systems understand what we say

Report: Johan Jörgensen

Voice control has been "on the verge of a breakthrough" for a long time. What Phonetic Systems' CEO Hezi Reznekov tells and demonstrates makes for the argument that computers and algorithms now will allow for that breakthrough to happen, eventually. Voice control applications constitute Phonetic Systems' focus. "Previously, we called and talked to the switchboard. In a few years, we will talk to the network all the time", Reznekov claims. Simple commands like "yes", "no", "connect" and so on will allow for complex services to be executed.

The demo is a catalog service for finding and calling telephone numbers just by voice commands, a basic service hitherto difficult to manage. We are randomly picking names out of telephone books, and the system works painlessly. But what about diphthongs and dialects? They have constituted the great problem previously, not least in Sweden. Just think of homonyms, like "knight", "nite", and "night", which all sound exactly the same in English. Letters like b, p, f, s, i, j, m, and n also cause problems.

So, what are we looking for? And what happens if we spelled the word wrongly? Or when we are mistaken about a word's pronunciation? To search through vast databases with so many sources of error is no simple task. Just in the US there are 1.5 million different family names, which may also be pronounced differently while spelled the same.

It is of course hard to judge after a short meeting with an enthusiastic person having something at stake, but my name, Johan Jörgensen, certainly contains a number of sounds difficult enough for an English-speaking person. So let's try with my name. We enter my name into the database. Mind you, we just enter it through the keyboard, I have not pronounced my name. I then call up and ask to be connected to this Johan Jörgensen. I give my name in Swedish and the computer has no problems in finding me in a database that in printed form is a catalog one centimeter thick. We are truly impressed.

Phonetic Systems is a company with quite some experience, started by Hezi Reznekov and his colleague Atzmon Gilal, both coming out of Amdocs, an Israeli company dedicated to invoicing and cataloguing systems for the telecom industry. The start-up is now a market leader in voice activated cataloguing services, used at call centers, hotels, telecom opera-

tors, etc. Nortel is one of their partners. The market potential is vast; independent sources estimate that the market for voice activated products will increase from 100 mill. USD in 1998 to more than 1.6 billion in the year 2002 (TMA Associates). The single largest market is the American one, and, consequently, Phonetic Systems focuses on it.

The product consists of three components:

- Phonetic Operator, a catalog search function for up to 250,000 names
- Phonetic Attendant, allowing you to be connected to a person just through mentioning a name
- Phonetic Systems Directory Assistant, a product platform allowing for many different services to be offered on the basis of a database of more than one million names

Such services may be very useful in situations where today a human is responding to routine queries. With the assistance of various voice-activated functions, people may be arriving to the right network destination with much less human involvement. And names remain while telephone lists have to be updated almost constantly. The investment involved is rather small. The system is based on Windows NT and pricing starts at 21,000 USD for a thousand names in the database.

Phonetic Systems has been through two rounds of financing and at our visit they were in the process of establishing an infrastructure for marketing, sales, and support. Product development goes on continuously, of course. At the CTI Expo in Washington D C in the summer of 1999, the firm was awarded the mention as “best of show”.

Web site: www.phoneticsystems.com

Celletra Ltd aims at revolutionizing the antennas of cellular telephony

Report: Bertil Thorngren

Dr. Shapira, CEO and co-founder of Celletra, stresses that his company sets its goals higher than "just selling technology". "And, mind you, this is not software, no Internet." The goal is rather an entirely new paradigm, a new architecture if we like, for cellular telephony networks.

Dr. Shapira stresses the fact that most of today's networks were established when tariffs for mobile telephony might be set sky high in comparison with fixed lines. Therefore, designs and network solutions need not be truly efficient and costs were allowed to skyrocket.

This period will soon be over, competition and growth on a mass market always implying more price sensitivity. This is already happening on the Israeli market where usage is the highest in the world while tariffs are so low that many operators until recently would have regarded them as unreasonable.

We won't go into any detail in describing the new designs and architectures that Dr. Shapira and his company have developed. (It involves, e g, the integration of the whole system into a beamer according to a modular system, affecting the dimension of cables, and the antenna, affecting … etc. The reader curious about the technology is rather recommended to consult with the company's web site: *www.celletra.com*.) In drastically simplified terms, the intelligence previously located at the base station on the ground is being moved out to and up into the antennas. The argument is not just cost and energy savings but also flexibility and the ability to control that is necessary for coverage and other concerns allowing for cost efficiency (there is, e g, automatic supervision to assure that the antenna is operating properly). A key word here is "solutions", the idea being to make products solving problems rather than force-feeding some technology onto the market. Design redundancies allow for a mean time between failure of two hundred years. "Operators should no longer need to recruit their own radio frequency engineers."

Celletra has already won innovation prizes as well as international contracts from, e g, Hyundai Electronics whose new base stations incorporate solutions from Celletra. The company aims at an annual revenue of 200 mill. USD in the year 2003. Dr. Shapira doesn't shy away from the fact that

he is throwing a challenge to a fifty billion USD industry (we got the impression that it is precisely that challenge that is part of his motivation). The firm was still, at the time of our visit, privately held, having gone through two successful rounds of financing on its way to an IPO. There are some forty employees, and this firm, like several others that we met, does not intend to produce its hardware itself, but rather resort to outsourcing. So far, it has filed for some ten patents.

Up till now, Celletra follows the prescription for other successful Israeli businesses. But in this case, unusually enough, there is the proximity to a real domestic market, one with rapidly decreasing tariffs for mobile connections and associated demands for cost reductions. And Dr. Shapira is no young neophyte with his sight set on an IPO but rather a hardened veteran with thirty years of telecom business experience. He has held central positions within the Israeli military sector (e g, within the large and very ambitious Rafael project, and at missile development projects) as well as with Qualcomm. He was a key person in the development of CDMA. "My professional life has been rewarding and is really already behind me." He combines advanced theoretical knowledge with engineering competency and is the vice-chairman of the world organization for radio science, URSI. Fed up with large organizations, he has now set out to demonstrate the power of a small one!

Convinced that Celletra will be a stock market success, he concludes that this will be satisfying mostly for children and grandchildren. He himself is motivated more by the satisfaction of realizing a vision, of having been able to attract and work with "the right people for the right project".

Web site: www.celletra.com

IMS, keeping track of your cattle

Report: Bengt-Arne Vedin

Innovative Monitoring System has developed a cattle-guarding system where cows, and possibly other cattle, carry an intelligent collar. The impetus for this product, developed within the Meytag incubator in Katzrin on the Golan, came from one of Israel's largest milk-producing farms, the owner being creative as well as the owner of a problem. Our interlocutor is Tamir Friedrich who tells of how three antennas are employing radio technology to get the exact location of every animal equipped with such a collar.

As a matter of fact, every animal in a herd moves in a rather rigidly repeated pattern each day. Collecting data about an individual thus reveals any irregularity, making it possible to discover anything from theft to malady. The hardware is combined with software serving for the statistical treatment of data gathered, and also stored for future deployment. Another possibility is using the equipment for inviting the cow to go feed. A radio signal transmitted to the collar may tickle the animal or call forward an audio signal, stimulating the cow to go to its feeding place.

A number of different technologies are employed: radio, electronics, microprocessors, ultrasound, biomedicine, and telemetry. Not just movements are monitored but also pulse-beat, body temperature, walking speed and so on. The equipment may be programmed so as to further alarm signals to, e g, a cellular phone, possibly using SMS. The communications protocol utilized is TDMA.

Relying upon frequencies that do not require any licensing (433 MHz in Europe), antennas with their associated compact equipment will have to be placed every two hundred yards; for an area of 100x200 yards, six antennas are recommended. At a base station, data are aggregated and sent on to the computer of choice. Flexibility and scalability are features stressed. The technology concept is proven and the search for strategic partners has started. Early autumn 2000, functional prototypes will be subject to beta testing. Demos at, among others, an exhibition in Germany, have generated a very positive response. The company also partakes in international standardization efforts.

The firm is in its second year in the incubator. Activities in the next fifteen months will require an additional million USD.

Golan Wineries: amazing grape variety

Report: Gull-May Holst

Noah was the first man known to grow vines in Canaan, at least according to Exodus in the Holy Bible. Since the days of Noah, much has happened to vine growing and wine making in the Promised Land. A good representative of modern Israeli winemaking is the Golan Heights Winery in the Industrial Area of Katzrin in the northern part the Golan, to the east of the Gallilean Sea.

The Golan landscape is made up of a number of long extinct volcanoes with deep and protected valleys between exposed hilltops. The climate is rather cool, subject to snow in the winter, and a fair amount of annual rainfall. In this area, the Golan Heights Winery has a number of vineyards, the highest one, called Odem in northern Golan, climbing to 1 200 m above sea level, the lowest ones, Tel Phares, Ramat Magshimim, and Geshur, thriving at 400 m above sea level. Each one of the twelve vineyards has its own geological and meteorological characteristics, making it possible to grow an unusually wide variety of grapes in a fairly small area. As is well known, each grape variety needs its own specific conditions to give good yields.

The favorable climate and the right mixture of soils are combined with modern winemaking methods and advanced technology in order to control the vinification processes. The results are agreeable wines, marketed under three different labels, Yarden, Gamla, and Golan. There is a whole range of wines, from sparkling Yarden Blanc de Blancs, made in accordance with the Champagne method of 100% Chardonnay grapes, to the classic Cabernet, Yarden Cabernet Sauvignon, a gold medal winner, which has been aged in French oak barrels. In between, there are other dry red wines, such as the Yarden Merlot and Golan Village, and dry white wines, such as the Yarden Katzrin Chardonnay, which has been aged "sur lie" for nine months in new French oak barrels – "sur lie" simply means that the skin of the grapes is present during the whole aging process and separated from the wine at bottling. There are semi dry white wines, including the Yarden Johannisberg Riesling and the Gamla Muscat Canelli. And there even is a semi dry blush wine called Golan Cabernet Blanc.

In my opinion, the most interesting wines we found at the Golan Heights were two Rieslings, the Yarden Johannisberg Riesling, made with the clas-

sic Riesling grapes, and the Golan Emerald Riesling, made with Emerald Riesling, a grape variety that is a cross between Muscadelle and white Riesling. Mind you, we did not test any wines on location with the exception of the Yarden Muscat, due to lack of time. The Golan wines we tasted were enjoyed with food in a number of restaurants during the entire trip.

The pride of the winery is the Yarden Muscat, a sweet dessert wine, which has been fortified with oak-aged brandy. In my opinion – too much brandy. There are many much better muscats to be found in other parts of the world.

A general impression of the winery, which we unfortunately did not have too much time to visit, is that it has taken over too much from the industrialized winemaking processes of California, and not learned enough from the traditional European winemakers in France, Italy, and Spain. The Golan wines of today are promising and agreeable but they lack personality. Having tasted a few of them, they do not offer that specific taste that would immediately place them on the map as Golan wines and nothing else. But that may come – winemaking always involves a long learning cycle. All the other prerequisites are certainly there.

In Sweden, some of the Golan Heights Winery wines can be bought from Systembolaget. A few of the Gamla labels are sometimes available.

Fact about the Golan Heights Winery Ltd.:

Founded in 1983 in the Golan Hills; there are now 68 employees

In 1997, there were 163.4 ha for white wine grapes, 235.3 ha for red wine grapes

Golan Heights Winery produces 38% of all wine exported from Israel

Grape varieties produced: Chardonnay, Merlot, Johannisberg Riesling, Gamay Noir, Cabernet Sauvignon, Gewurztraminer, Sauvignon Blanc, Semillon, Chenin Blanc, Syrah, Pinot Noir, Emerald Riesling, Muscat, French Colombard

All the vines are drip fed

Some 80,000 visitors a year come to the Visitor's Center

Traditional winemaking techniques are used, such as barrel fermentation for Chardonnay; the Champagne method; carbonic maceration for light red wines; maturation in French oak barrels for premium red and white wines

Contorum AB in Malmö imports the Golan wines to Sweden

Web site: www.golanwines.co.il

Iscar sets its sights on being no 1 in hard metals

Report: Bengt-Arne Vedin

In Sweden, we have learnt to be proud of our hard metal proficiency. We look upon Sandvik and Seco as leaders in a mature industry, where market positions are ingrained and a tradition from the steel tools era counts for something. Thus it is striking, and more than a bit surprising, for a Swede to encounter an Israeli company that is vying with Sandvik for the number one position, and this is a company that started out in hard metals as late as in the 70s. "Yes, we want to become number one!" Rafael Wertheim asserts.

The company itself was started by the colorful and self-made Stef Wertheimer who arrived from Germany in 1952. But what he started was a mechanical engineering factory, producing various mechanical parts and components, not least for the military. While its Dutch turbine blade making subsidiary had been sold, de Gaulle's embargo on defense equipment delivery to Israel made a domestic production of turbines necessary. That is tricky production, requiring also sophisticated cutting, and in working on this process, a new way of arranging the cutting tools was invented, a wedge-shaped arrangement. This was just the first of many inventions; the tool may work in two directions, the number of tool changes may be reduced, and so on. The customer, the user will need much fewer different tools, as well as fewer tool holders. Cutting speed may be increased as well.

By the mid-70s, annual revenue was in the order of 6-8 mill. USD. Today, this figure has increased to 420 mill. USD for cutting tools and growth is at some 16–18 per cent per year. The rate of renewal is breathtaking: sixty per cent of all products are younger than five years and no single one from 1975 has survived. 8–10 per cent of revenue is invested in R&D: "we aim at being, we must become our own most fierce competition". The company has acquired some three thousand patents. During the last fifteen years, production has increased by a factor of ten while personnel has doubled. Everything, sintering, surface treatment, etc, is highly automated, as we can witness, looking down on the well-swept, sparsely populated factory floor. Out of the 1700 employees, half are in Israel, whereas 97 per cent of production is exported. There are 25 subsidiaries and another equal number of agents, and there is production in Texas, the Netherlands, and Switzerland.

The product range comprises 80,000 variations and types, of which 30,000 are held in stock; 22–25 per cent are standardized. To be held in stock does not necessarily mean that they are in store physically but that they may be ordered from a computer that controls their production, making sure that shipment will take place within 24 hours. The development cycle for a new product may be squeezed to one week but normally is four to six weeks, compared to two or three months only a couple of years ago. Collaboration with companies like Caterpillar and Boeing is so close that one may speak of integration. The automated production line has been developed in-house, robots being acquired but automatically guided vehicles developed within Iscar.

The prescription for success is simple to express, the Iscar people assert: "Flexibility". "We invest in people, that's almost for free." Thus motivation is at the core.

After some years as a publicly held company, the Wertheimer family has taken it private again to be able to stay innovative, taking a long term view instead of catering to quarterly reports.

New units have been created as needs have arisen. Thus there are, e g, tools for cutting wood also. Tool holders constitute another quite natural extension to the product line. Precision techniques acquired, "details like human hair", are relied upon for manufacturing miniaturized mechanics for computers, electronics, and opto-electronics. The production of turbine blades is a continuing activity and another subsidiary concerns itself with the molding of plastics components. On turbines, there is great pride over the intimate relations with companies such as Pratt & Whitney and Rolls Royce as well as a large Chinese one. Some of the companies in the group are the results of inventions made within the company or inventors having received the backing of Stef Wertheimer.

Web site: www.iscar.com

4. Personal comments

Beware the pat picture and technology push

Bertil Thorngren

One main impression is that Israel and Sweden today share many more trends and preconditions for IT development than is generally recognized in either country. Both countries feature a rapid and dynamic development with a large and growing number of venture capital companies as mentors and pushers-on.

In Israel, there is pride in the fact that this part of the economy already beats that of most states in the US. Another example is the fact that Israel is among the world leaders in cellular telephone utilization. The costs for making such phone calls are very low, too, much lower than in most countries, including the US and Sweden. And this is something that the Israelis do not hesitate to underscore. Just as these examples demonstrate, there is the necessity to update the rather pat historical image of Israel that many Swedes still hold, one of a country inhabited by orange farmers. Those kibbutzes still existing are more geared towards space technology than to agriculture. The fact is that the latter sector of the economy now provides about as low a percentage of employment as it does in Sweden, i e, some three per cent. (The flip side holds true also in that many in Israel tend to regard Sweden as a country where the economy principally consists of forestry and associated products, iron ore, and mechanical engineering industry.)

There are of course historical differences that cannot be neglected even for the limited period after the birth of the Israeli nation in 1948. Defense, and thus defense R&D as a driving force, has for well-known reasons been more fundamental in Israel than in Sweden. There have been many more components of industrial policy intervention also in the civilian sector in Israel, given a situation when the country had few large companies resourceful enough to finance and perform their own R&D or exert any presence on foreign markets.

Today, market forces reign supreme – in Israel as in Sweden. The market to approach is mainly the US for many Israeli companies. New high tech firms are aiming directly at the NASDAQ, often even without any attempt to establish a presence at the home turf. The argument is that the home market is all too small, and also not sufficiently advanced. Thus Internet usage is at a relatively low level, astonishing in the perspective of the popularity of cellular telephony. Today just one of the three operators in the latter field offers digital systems (GSM) so there is a vast heritage of mobile systems resorting to analogous technology. Such solutions work fine for voice messages but constitute something of a barrier with respect to migration into new generation of text and data services. When it comes to wholesale liberalization of fixed networks, Israel has been slow to come out of the starting-blocks compared to the US and Europe. Thus the Internet is far away from being part of daily life. Neither datacom nor Internet could be found in the dictionaries even at some international and recently constructed hotels. It is therefore understandable that Israeli technology developers look at themselves as laboring on something of an "insulated island". Compared to the state of the domestic market, they are often only all too much ahead.

The market is also much too small to support the development costs. Here there is a semblance with the situation for Swedish IT companies. The latter, however, may gain from a more developed home market even if it is just on a laboratory scale, before venturing onto the global market. This is a background that may explain why the risk capital industry has become if possible even hotter in Israel than in Sweden. This industry is a dire necessity when it comes to bridging the great problem created by the wide gulf between advanced technology and minimal domestic market demand.

An important part of the picture is the fact that Israel has received a large number of immigrants in the last decade, almost one fifth of the population just from Russia. These often feature a very good scientific background but for obvious reasons close to zero understanding of the workings of a market and the importance of meeting customer demands. It is plain impressive how fast Israel has succeeded in getting these immigrants into productive work, and the availability to international vencap markets goes some way to explain this. Just compare this with being forced to spend years passively waiting for "comprehensive evaluation" in immigration camps in many other countries, such as Sweden. A conclusion is

that today's vencap companies active in information technology play a much more active role than offering capital and investing. They may contribute vast networks for scanning markets and environment trends impacting upon the start-up firm, and they often enough partake in the establishment of the company through recruiting key personnel, etc. The result is that time from idea to market may be foreshortened, and substantially so, a key condition on those fast-moving IT markets. This is nothing unique for Israel; the tendency that vencaps get involved at an earlier stage is visible also in Sweden. Active investors may be seen as even more crucial to Israeli companies, though. Through their presence in both Israel and the US, the vencap investors may offer exactly the springboard that a portfolio company needs. Success breeds success. In Israel as in Sweden there has been the arrival of second and even third generation entrepreneurs who may invest again, and then with access not just to money but to experience and to market knowledge. Thus development may spread like ripples on a water surface.

30 Years Later – Israel revisited

Gull-May Holst

Saturday evening January 8, 2000. Rain falls over the Ben Gurion International Airport in Tel Aviv. Rain. Rain?

Passport control and security check. Two attractive young women in the traditional uniforms of the Israeli border officials ask the many times repeated questions. Among them:

– Have you been to Israel before?

I nod.

Thirty years ago.

Both look at me a bit surprised and smile, so I put words to their thoughts.

Yes, it is a long time ago … a very long time ago.

The one holding my passport makes a circulating gesture with her other hand, indicating "so what?" and in handing back the passport, both of them wish me a nice stay.

– These two were not even born in the late 1960s, I reflect. Maybe their parents were soldiers during the 1967 war. But most likely they were too young, too…

I shrug at the thought of my own life advancing and cannot help smiling at the young, eager faces. 1968 … my mind is racing through all the years that have passed job missions, people, events, places. I search my memory for pictures from Israel in 1968 and 1969. The last time I came was in the autumn of 1969. It was very, very hot and extremely dusty. We were scheduled to pass a day and a night in a camp close to Arad in the Negev, where a group of soldiers were busy building a permanent military camp. At that time Israel was a mobilized country, a nation suffering from the traumas of war and struggling with pragmatic socialism in a kibbutz version. Israel was still a very young nation, just twenty years old. UN agencies, soldiers, military trucks and official vehicles, security agents and constant checkpoints were part of the daily life. Only few people were not in uniform.

We were taken to Masada, Jericho, the Allenby passage, Jerusalem, the King David Hotel … Two elderly Arabs sitting in the sun outside the Dome of the Rock were talkative and happy to tell us about life in Jerusalem. They also wanted their picture taken. Mount Sion was out of bounds.

Memories rush by. The most intense one pops up now and again, that of the warm welcome we got everywhere, by everyone. But there were no smiles. Literally, people had nothing to smile at. Only memories of another terrible war, hard work and a rough life …

Today, Israel is a modern welfare state, a mature nation. It has turned 50 and has developed into the fifth largest exporter of telecommunications products in the world. I find it hard to match my experiences from way back with data about the present Israel – it must be a different country.

Our luggage arrives without delay and we pass through customs into the arrival hall. I find it difficult to forget the two border agents… they are so young…

Mr. Yehuda Hefer greets the TELDOK group. He will take us through high-tech Israel in five days and has set up an interesting and full program. On the way to the hotel at the sea front downtown Tel Aviv we get some detailed information about the present weather situation along with details about the coming days. It still rains.

Later that evening, we walk along the beach. The sky is covered and the wind is strong. Heavy waves cover the sand and roll back out. In our immediate environment there is nothing but the Mediterranean to the one side, the sand we walk on, and the Tel Aviv skyline to the other. Tall buildings, hotels, apartment houses, office buildings, a highway with a lot of traffic and building sites are part of the view from the hotel room. Building sites, those are we to see so frequently in the next few days…

Israel as a nation has turned 50 and during the last few years created its own Israeli version of Silicon Valley, the Silicon Wadi. Many examples of the companies and institutions making up the Silicon Wadi are reflected in this report. It strikes me that those thirty years seem to be a much longer period of time than what I had imagined when deciding to participate in the TELDOK study tour to Israel in January 2000. Silicon Wadi – in 1968, when this country still was fighting for its existence, the microprocessor didn´t yet exist …

The following morning is brilliant and the campus park of the Tel Aviv University is beautiful, dazzling with flowers and bright green grass. As we enter, the security guard greets us politely and looks quickly into our bags. We walk through landscaped gardens, tall trees and pass a few sculptures, modern ones. Some students are standing in a group, discussing, laughing, and sipping soft drinks from cans.

Yehuda tells us that now we have to go back to school, as he ushers us

into a classroom for several morning lectures. A totally unexpected learning experience takes its beginning. A learning experience that during the next few days takes us through parts of the academic Israel, a number of venture capitalists, many, many start-up companies in high tech sectors like communications and Internet applications. We cover the country in our minibus from Tel Aviv to the Golan Heights to Tefen close to Haifa and all the way back. Once we are back in our classroom again, four days later, Dr. Yossi Vardi, one of the founding fathers of the Israeli high tech industry, reminds us:

You are in the Middle East!

It is easy to forget.

Israel is a nation of many paradoxes. It is a very modern nation in most external aspects – highly educated well dressed people, well dressed but informal, elegant buildings, highways and modern motor cars, excellent infrastructure, a society that functions well in all aspects. At the same time the Jewish people of Israel along with their Palestinian neighbors represent some of the oldest cultures still living. So a very old people, the Jewish, has built one of the most modern nations in the world. A nation based on high tech; high tech developed in order to defend the nation from its immediate Middle Eastern neighbors for a start. The negative results of that I experienced in the late 1960-ies. The positive effects are seen nowadays.

Today, all that knowledge of advanced technology has been used to create wealth for all Israeli citizens. Israel is a well fare state that is well ahead of most others of the industrialized countries. There are more medical doctors per capita in Israel than anywhere else and medical care is probably among the best in the world. Israel is also one of the IT-nations of this world. Israelis spend more minutes per capita talking on their mobile telephones than citizens of any other nation do and there are more mobile telephones in this country than there are fixed ones. E-shopping is growing popular among the young generations and in some families the kids have their own e-accounts for shopping via the Internet.

Another paradox – the nestors of this high tech society are the ones seeing the opportunities offered by the Internet and mobile communications. Respected persons like dr. Yossi Vardi, Yigal Erlich, and Uzia Galil all talked about the formidable possibilities they see in the networked and mobile global society. I marveled at their ways of giving overviews in describing focused applications. The paradox? The old generations see the

opportunities, the young generations see the immediate problems and find the solutions. One example of this cross generation interaction is Yossi Vardi himself. He has a consultant of 13 who is a whiz kid of hard disc technology. Uzia Galil and his daughter Ruth Alon, she is the president and CEO of NetVision, is another. Maybe such constant interaction between the old and the young is one of the many factors behind this strong and successful society? To a person with a Swedish experience this is fantastic. Whoever heard of a lady of 84 in Sweden starting her own Internet company? Where in Sweden will we find people of 70+ being active in developing Internet applications? Nowhere in Israel is 50+ generations seen as problems, to the contrary. People are a rare commodity and their contributions are wanted by the society as long as they care to give them. The older generations seem to regard it as their natural obligation to support the younger ones by their knowledge, experience, networks and capital for their ventures.

During the thirty years that passed between my visits to the country, the Israelis have turned it from being a rather typical Middle Eastern nation growing oranges, into a modern and creative society, very similar to the state of California. Intense intellectual human activity is going on everywhere. Business parks are growing like mushrooms after summer rain, even in the arid outskirts of Elat in the very south of the country, and in the Negev desert. Construction sites are part of the landscape. The military camps are still there but not so visible, not so dominant. The modern suburbs of Tel Aviv, Haifa, and Jerusalem are growing in an well-organized way, by the day.

Entrepreneurship, energy, creativity, brainpower, and fine meshed global networks are some of the qualifiers of modern Israel. The Israelis learn some of it in the army – if there is a problem solve it! If you have to turn on just one toe, do it! If you want to become very rich, start a good company! One impression from 30 years ago is still the same, however – the warm welcome, now accompanied by equally warm smiles.

Decisiveness and focus!

Sven-Åke Ström

Nobody can visit Israel without being impressed by the decisiveness with which Israelis go about most any task, big or small. There is a definite faculty for concentrating on the task at hand, resulting in a high degree of efficiency and in speedy results.

Another factor for success that several of our hosts underlined is the importance of creating a well functioning team, something that is more important than particular specialized competencies. In a culture where people love to meet and discuss just about everything, personal chemistry is essential when one is taking on a job task. Feeling comfortable is key and that requires a team of "the right people". For many working in fast growing IT companies, especially youths, the difference between work and leisure is vanishing. It is nothing particular for Israel that work thus creates an entire life-style, where the problem is to strike a balance, avoiding being burnt out.

"Corporate Israel" is characterized by its lack of very large companies; the few existing make up a very short list. One of our hosts gave us an informal hint: it might be because the Israeli executive wants to be in total control of all events in his company. His interest and involvement in details small and large is tangible, something which makes for limitations to what may be comprised. Such a leadership style may be applicable to organizations with a couple of hundred employees but not to really large companies, and neither would it be desirable.

No one from Sweden visiting Israel will avoid being impressed by the informal top management style, both when it comes to behavior and to dress. We feel that American executives are informal: jackets off, shirtsleeves up. The Israelis are one step ahead: tie, two-piece-suit, even just jackets are rare; unbuttoned short-sleeve shirt and possibly pullover – that's what's common. Prestigious titles don't equate with success, they don't even count, only actual performance does. This basically sound attitude is diffusing from the executive suite right down through the entire hierarchy.

The American influence is strong. Superficially, one would feel that the American style has been copied outright, but deeper down, the cultural differences between the two countries are more profound than what meets the eye. When it comes to business deals, differences are tangible.

One of our hosts was concerned with the current Israeli hysterics surrounding new firm creation. In his view, there was simply too much capital available. The number of start-up companies is overwhelming and all economic focus is short-term. One risk here is that such features as company loyalty gets eroded, losing all value. Employees jump from one job to another as incentives follow an upward spiral and this competition for competency creates stop-go situations rather than smoothly flowing activities. In the army, from where many competent programmers have been recruited, there is the rule that no one is allowed to leave within five years of advanced education and training completed. Thus there is the guaranteed pay-off on the investment in training, before the student may get recruited to industry.

The fast development of the start-ups has been further accelerated by the fact that quick payback is expected by shareholders. "Shareholder value" is the primary driving force for most investors today and thus long term development may risk being offset partially or entirely, according to one of our interlocutors.

Obviously, it's an impossible task to capture the soul of a country and attempt to describe its people after just a one-week visit. Some points, however, to sum up my impressions. First the dedication to achieving the goals established, and, in addition, the focusing mentioned. Without a doubt, military training has had an important impact also in the civilian sector; every woman and man has her two and his three years of compulsory military service. This training is of great importance to their future careers. It is somewhat of a riddle that the economy and the industry have developed in such a positive way despite the political tensions troubling the country. One important reason is certainly a general understanding of the fact that substantial trade with other countries is a key prerequisite for achieving stable relations with the rest of the world.

To Israel on Israel, from Yours truly,

Bengt-Arne Vedin

What have I really seen and understood of Israel? I've spent a grand total of two weeks in the country, and while I've visited a comparatively large part of it geographically, how much have I seen of its society? That is, of its society in its entirety, not just some forty companies involved in high tech, a number of professors that seem as American or French as they seem Swedish, Jerusalem – I need say no more – and then, of course, Eylat with its beach and its skyline scattered with hotels …

The activity in the companies we met with can only be described as feverish. The excitement is tangible and it's only part of it that can be spelled IPO, another part is the fun that comes out of trying to create something new, the creativity of inventing combined with the deep contentment of seeing ideas translated into reality.

If Israel compares itself with the US, there is one exception: this country, like our own, has much more of cellular telephone presence. And it is not hard to believe that the Israelis spend more time on mobile phones than anybody else does. This may well have something to do with the informal attitudes, an informality that beats even Californian levels on that account. Being late seems to make no offense, asking for assistance on something odd is met with an 'of course', silly questions or questions for what would be confidential information are met with openness or an explanation why no answer can be given, but there is no attempt to dodge or evade. If you appreciate the openness and informality, you have to accept pushy and rude attitudes and behavior too, since they are part and parcel of the same mentality.

Having an engineering background myself, and having studied and worked with both Swedish and American start-up companies, I can only envy all that enthusiasm – and become infected by it. Technology, development, ideas: it's all great fun! It would seem that the important phenomenon of "increasing marginal returns", of positive spirals, would apply to mentality too. Not that mentality can be created out of thin air.

Being an ardent preacher of the importance of venture capital availability for several decades, I found that belief resoundingly vindicated by the Israeli development. But with a particular point. I have, as many others, spoken of "a whole venture capital system" involving stock options, taxa-

tion, etc. Here, in Israel, that system is international in the sense that the system involves the United States too. And that, in its turn, may be one very visible proof of the truth in the economists' claim that the global economy means convergence between different economic structures. The conclusion might seem obvious, that there will have to be "harmonization". But may we suggest another consequence also? The search for optimal solutions and combinations may perhaps be a driving force for better and more intimate contacts between countries and regions? What cannot easily be harmonized are cultures, certainly not through governmental actions or decisions in parliament.

Recent TELDOK publications (in English and Swedish) on early IT use

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Weje Sandén (weje.sanden@va.se)

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Maja-Brita Mossberg (maja-brita.mossberg@alfa.telenordia.se)

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Via TELDOK 34E

New Media in Sweden. The Swedish New Media and Internet Industry Survey

Åke Sandberg (Ake.Sandberg@niwl.se)

The report is based on a questionnaire answered by the management of more than 300 Swedish CD-ROM and Internet producers. Results provide information about the situation in new media companies, and their future prospects. The survey presents an optimistic view.

TELDOK Report 116

The TELDOK Yearbook 1997. Telecommunications and Information Technology in Sweden as seen from a User's Perspective

Ed by Gull-May Holst (gull-may.holst@telia.com)

The TELDOK Yearbook 1997 – more than four hundred pages filled with graphs and tables, factoids and fact sheets, introductions and backgrounds – sets out to "define Sweden's place in an even more complex telecommunications and information technology world, in the information society, and to put (Sweden) firmly on the international IST map", and in particular to present the data and insights "from a user's perspective".

TELDOK Report 111E

IT – Visions at work

Inger Stjernqvist (inger.stjernqvist@asterisk.a.se)

The report documents some twenty selected projects, showcasing how IT can be put to productive use. The most interesting aspect of technological development, rather than technology in itself, probably is how the use of IT develops.

The 5 most recent reports in Swedish

TELDOK Report 134

Privatliv & Internet – som olja och vatten? (Private life and the Internet – like oil and water?)

Anders R Olsson (anders.r.olsson@swipnet.se)

Deals with problems related to privacy protection in today's "IT society", delineates the risks, and discusses possible ways to protect one's privacy with legal, technological, and practical means.

TELDOK Report 133

Interaktiv underhållning inför framtiden (Interactive entertainment for the future)

Erik Fjellman (ericfjellman@yahoo.com) & Jan Sjögren (jansjogren@yahoo.com)

The report describes and explains how computer games and computer gaming work, and looks at how interactive entertainment/edutainment is likely to impact us in the near future. Genres and types of games, usage and users, technology and business are dealt with, as well as the ongoing debate on violent computer games and their effects.

TELDOK Report 132

Den digitala fabriken – Verkstadsföretaget som IT-företag (The digital factory)

Christina Johannesson & Peter Kempinksky (info@fba.se)

Based on extensive interviews with four engineering and machinery manufacturers and their partner companies, the case studies of this report show ample proof of innovative and insightful IT use, serving to fuel growth and collaboration.

TELDOK-Info 18

Innovation & Internet (Innovation and the Internet)

Bengt-Arne Vedin (vedin@stockholm.mail.telia.com)

How can we construe. deconstruct, and discuss the plethora of services and "products" – innovations – related to the Internet? A host of examples include new actors; new mechanisms for negotiation and pricing; and marketing even before there is anything to deliver.

Via TELDOK 38

Allas våra museisamlingar (Our common museum collections)

Sofie Rittfeldt (sofierittfeldt@yahoo.com)

Art museum treasures belong to us all; but existing museums are too confined to exhibit or even link to all of them. The report shows, based on a number of examples and comments, how IT can be of assistance.

IT, Innovation - Israel

A new IT company is started every thirtysix hours in Israel; the proud country is surpassed only by Silicon Valley in terms of the formation of new businesses. During a decade Israel has managed to assimilate one million new immigrants while maintaining close contacts with US capital and research. The growing labor pool is well-educated, not least due to the needs of the Israeli armed forces.

TELDOK Report 135E **IT, Innovation – Israel** documents a study tour to Israel in January 2000. Its pages come alive with bustling young IT companies as well as venture capitalists and (state or private) incubators and industrial parks.

TELDOK Report 123E: **The Net as a marketplace** documents the practical experience gained by a dozen leading Swedish companies. The report shows how e-commerce changes distribution and affects competitiveness.

How are new successful ideas – innovations – created on the web, for the web, through the web? And how are businesses formed for innovations on the Internet?

TELDOK's unique Swedish-language web site **www.teldok.org/innova** addresses these issues and links to a great number of web-related innovations. A print companion, TELDOK-Info 18: **Innovation & Internet**, summarizes (also in Swedish only) the early findings.

The Swedish edition of **The TELDOK Yearbook 2000** was released in late 1999, five hundred pages of facts (in text, tables, and graphs) documenting states and trends in the turbulent IT and telecom ("infocom") markets. The English-language version will debut on the web in early summer this year (2000).

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