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**Contributors**

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DEVELOPMENTS IN SCIENCE  
AND TECHNOLOGY

## IN ISRAEL IN 1997

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## POLITICAL

1) In January 1997, Zeev Binyamin Begin, Minister of Science & Technology resigned in protest over the Government's approval of the Hebron agreement with the Palestinian Authority. Following the general elections in May 1996, Prime Minister Binyamin Netanyahu - Israel's first directly elected Prime Minister - appointed Begin as Minister of Science & Technology.

On 9 July 1997, the Prime Minister appointed Michael Eitan M.K (Likud) as (a rotating) Minister of Science & Technology for one year, after which Silvan Shalom M.K (Likud) will take over.

2) In January 1997, Dr. Shuki Gleitman the Chief Scientist at the Ministry of Industry & Trade (MIT), resigned after four years of service. Until his resignations, he served for a few months as a Chief Scientist and also as Director General of the MIT.

On 14 January, Natan Sharansky the Minister of Industry & Trade, appointed Dr. Orna Berry as the new Chief Scientist of the MIT. Dr. Berry has a PhD from the University of South Carolina (USA) in computer sciences. In 1992 she founded Ornet, a start up information technology company, which was bought by Siemens of Germany in 1996 for \$30 million.

3) In January, the Knesset (Israeli Parliament) inaugurated a meeting of a Science & Technology Committee and endorsed the appointment of M.K Dalia Itzik (Labour Party) as Chairwoman.

The Committee has bemoaned the fact that as no Minister has been appointed since Begin's resignation in January, access to budget allocations from the treasury has weakened. The Ministry's budget has dropped from NIS 234 million in 1996 to NIS 219 million in 1997. The Ministry has allocated NIS 166 million for the development of scientific infrastructure, but the treasury approved NIS 91 million only.

4) In spite of opposition by some Arab representatives lead by Iran, Iraq and Syria with other Moslem, Arab and non-aligned Asian countries, the Israeli Minister of Agriculture and of the Environment participated in the Asian anti-desertification conference which was held in May 1997 in Beijing, China.

China together with India, Japan and other countries maintained that Israel had a right to attend the conference as an Asian state. The Beijing conference was held as a follow up to the 1992 world ecological summit in Brazil, which called for better management of land and it's uses.

Ben Gurion University of the Negev is to establish an anti-desertification facility at Sde Boker as a central link in the network of international research, implementing the U.N treaty against desertification.



## HI-TECH RELATED ACTIVITIES OF THE ISRAEL BRITAIN BUSINESS COUNCIL

5) The hi-tech working group of the Israel Britain Business Council is making progress. The group is working to create British-Israeli partnerships to overcome the tendency of Israeli companies to turn first to U.S companies. It's activity included:

a) The first Anglo-Israeli R&D cooperation seminar which was organised with the help of Robin Sleight, the DTI Hi-Tech Promoter for Israel, was held in London at the end of October 1996. Some 35 companies wished to participate but this was reduced to 16 selected companies. Some 50 serious UK companies met the Israelis in a series of one to one meetings. The mission involved discussions on direct industrial collaboration, research related collaboration as relevant to potential support by the EU framework Fourth Programme and research activity by smaller companies eligible for ECIP or MEDA funding.

b) A vertical DTI supported trade mission from the British telecommunications industry visited Israel in January 1997, coinciding with Israel's major telecommunications conference and exhibition. The mission members included large companies such as BT, GEC, Cable & Wireless and Marconi as well as small companies who were on their first visit.

c) In June, an Israeli Hi-tech Incubator mission visited Britain. The visit which was organised with the help of the DTI Hi-tech Export Promoter included 17 companies, covering 4 sub-sectors: telecoms, medical electronics, electro-optics and general electronic activities. The Israeli companies made 62 company to company specific contacts and well over 100 British companies sought to learn more about the Israeli incubator programme. This was the first Israeli Hi-tech Incubator Mission to Europe. It was a major success and it was jointly sponsored with the DTI and the Israeli Ministry of Industry and Trade which secured funding for a consultant to lead the matchmaking effort with the UK companies.

d) In May, the Healthcare Committee of the IBBC organised a successful pharmaceutical mission and national healthcare seminar to Israel. The pharmaceutical mission comprised of major UK manufacturers who had a series of talks with Israeli biotechnology and pharmaceutical manufacturers. The UK pharmaceutical companies have expressed the desire to repeat the mission next year. The one day healthcare seminar was fully supported by the Israeli Ministry of Health.

e) In July, a one day conference on the reclamation and rehabilitation of contaminated land was held at the DTI in London for two Israeli visitors from the Ministry of Environment and the Israel Military Industries Ltd. The conference was organised by the Environmental Services Group of British Aerospace, who are the successful bidders of tenders for plans to clean up two of the Military Industry's sites in Tel Aviv and Jerusalem and will bid for the civil engineering tenders.

# NO TECH RELATED ACTIVITIES OF THE ISRAELI BUSINESS COUNCIL

2) The Hi-Tech working group of the Israeli British Business Council is making progress. The group is working to create Israeli-British partnerships to overcome the tendency of Israeli companies to turn first to U.S. companies. It's activity included:

a) The first Anglo-Israeli R&D cooperation seminar which was organized with the help of Robin Wright, the UK Hi-Tech Promoter for Israel, was held in London at the end of October 1982. Some 35 companies wished to participate but his was reduced to 15 selected companies. Some 50 British R&D companies met the Israelis in a series of one to one meetings. The session involved discussions on joint industrial collaboration, research related collaboration as well as potential support by the EU Framework Fourth Programme and research activity by Israeli companies eligible for ECIP or STP funding.

b) A vertical R&D supported trade mission from the British telecommunications industry visited Israel in January 1983. It included with Israel's major telecommunications companies and institutions. The mission members included large companies such as BT, GEC, Cable & Wireless and Marconi as well as small companies and views on their future.

c) In June, an Israeli Hi-Tech Industries Mission visited Britain. The visit which was organized with the help of the UK Hi-Tech Promoter included 17 companies, covering 4 sub-sectors: electronic, medical electronics, electrical and general. The Israeli companies made 41 company to company specific contacts and will over 100 British companies. It was the first Israeli Hi-Tech Industries Mission to Europe. It was a very success and it was actively sponsored with the UK and the British industry of industry and trade who returned funding for a mission to visit and encourage activity with the UK companies.

d) In June, the Scientific Committee of the ITC organized a symposium on pharmaceuticals and medical electronics. The symposium was held at the ITC headquarters in London. The symposium was attended by 100 people from 15 countries. The UK government had organized the symposium to help a series of talks with Israeli scientists and engineers. The UK government had organized the symposium to help the UK to repeat the success of 1981. The symposium was fully supported by the Israeli Ministry of Health.

e) In July, a one day conference on the marketing of high-tech products was held at the ITC in London. The conference was organized by the ITC and the Ministry of Health. The conference was attended by 100 people from 15 countries. The UK government had organized the conference to help a series of talks with Israeli scientists and engineers. The UK government had organized the conference to help the UK to repeat the success of 1981. The conference was fully supported by the Israeli Ministry of Health.

6) Israel entrepreneurial skills have flourished thanks notably to the ex-Soviet high-tech talent that has poured in. The flow of immigrants has now levelled off at around 70,000 a year. But the larger waves of Soviet newcomers who arrived in the early 1990's are yet to reach their full economic potential.

From 1989 to the end of 1996, 780,000 immigrants including more than 11,000 scientists from the former CIS Republic, have immigrated to Israel. They have had to adjust to the economic reality in free market society. Close to 7,000 immigrant scientists have received three-year grants from the Ministry of Absorption to help them pursue their research at local universities and scientific institutions. According to a Ministry of Absorption survey, 29% of immigrant scientists who received Government funded university jobs in 1996 are now employed full time without state money.

### RECRUITMENT OF STAFF FOR HI-TECH INDUSTRY

7) The hi-tech industry, mainly the software industry, is suffering from a shortage of suitable staff with companies offering high salaries and tempting fringe benefits in order to attract new personnel. The shortage of high quality personnel is acute and has given rise to a "head hunting" phenomenon and the "stealing" of employees is not uncommon.

Over the past two years, the increasing demand for qualified manpower has led to a "blossoming" of computer colleges and hopefully the supply of computer trained staff will increase in two or three year's time, which should serve overall salary expenses downwards. However, high quality personnel (engineers and R&D staff) is likely to continue to be in considerable demand, expensive and rare. The computer colleges seem to be incapable of providing a solution to the problem.

In the year 2000, industry will need 29,000 engineers while Israeli universities can supply 22,000-23,000 only. American and British universities have sought to meet the need, either by marketing distance learning programmes or more recently, by licensing private establishments to run validated programmes.

A number of major Israeli hi-tech companies are considering investment in the UK software and hardware industry.

### VENTURE CAPITAL FUNDS

8) In March, the Government sold Yozma Venture Capital Ltd. to Ofer Bros. Investments Ltd. for \$15 million. That was the first sale of an entire Government company since the Government took power in May 1996.

Yozma was set up by the Government in 1992 with a capital of US\$100 million to serve as a catalyst for the venture capital industry in Israel. It has set up nine venture capital funds with local and foreign partners, as well as investing directly in some 11 start up companies. It has helped turn the Israeli venture capital market into a \$500 million industry with some 25 active venture capital funds, both private and public.

Israeli entrepreneurial skills have flourished thanks notably to the ex-Soviet high-tech talent that has poured in. The flow of immigrants has now levelled off at around 10,000 a year. But the larger waves of Soviet newcomers who arrived in the early 1990s are yet to reach their full economic potential.

From 1985 to the end of 1992, 780,000 immigrants, including more than 11,000 scientists from the former CIS Republics, have immigrated to Israel. They have had an impact on the economic reality in the market economy. Close to 7,000 immigrant scientists have received three-year grants from the Ministry of Absorption to help them pursue their research at local universities and scientific institutions. According to a Ministry of Absorption survey, 12% of immigrant scientists who received government-funded university jobs in 1992 are now employed full time without state money.

## RECRUITMENT OF TALENT IN TECH INDUSTRY

In the hi-tech industry, mainly the software industry, is suffering from a shortage of suitable staff with computer-related high education and training. In order to attract and recruit, the industry of high quality personnel is active and has given rise to a "brain hunting" phenomenon and the "stealing" of employees is not uncommon.

Over the past few years, the increasing demand for qualified personnel has led to a "hunting" of computer colleges and, hopefully, the supply of computer trained staff will increase in two or three years. At the same time, which should cause equally serious shortages, the high quality personnel (engineers and R&D staff) is likely to continue to be in considerable demand, expensive and scarce. The computer colleges seem to be incapable of providing a solution to the problem.

In the past 10-15 years, industry will need 20,000 engineers while Israeli universities can supply 15,000-20,000 only. Another 10,000-15,000 university graduates are needed to meet the need, either by working in distance learning programmes or more recently, by increasing private establishments to the vocational programmes.

A number of major Israeli hi-tech companies are considerably invested in the hi-tech and software industry.

## VENTURE CAPITAL FUNDS

In March, the Government and Yehuda Venture Capital Ltd. (YVC) set up a venture capital fund for \$15 million. This was the first sale of an equity investment company since the Government took power in May 1992.

Yehuda was set up by the Government in 1992 with a capital of \$100 million to serve as a catalyst for the venture capital industry in Israel. It has not yet received capital funds with local and foreign participation, as well as investing directly in about 11 start-up companies. It has helped form the Israeli Venture Capital Market into a \$100 million industry with some 25 active venture capital funds, both private and public.

Yozma has provided 40% of capital in the venture fund in return for a 40% limited partnership. At the same time Yozma granted to the holders of the 60% balance of the fund, the right to buy Yozma's holding in the fund after five years, at cost plus nominal return. In this way, the Government shared the risks of an investment in the fund by private investors to the extent of 40%, while leaving them with the entire profits created by the fund. In the event that the venture fund was successful, the investors were able to exercise the purchase option. This concept has fuelled the venture capital industry in Israel. Following Yozma's success, many private venture funds were created without assistance or active encouragement of the Government. Having completed its primary objective, the Government privatised Yozma.

9) About 40% of the capital for venture investments, which has fuelled the establishment of new start up companies, has originated outside Israel. Geographic distribution shows that 56% of foreign funds comes from the US, 33% from Europe and 11% from Asia. The majority of foreign investors is private, followed by investment companies. It is expected that a greater portion of funds for venture investments will in future come from outside Israel, mainly from institutional investors that have not as yet been active in Israel.

#### START-UPS

10) In 1996, a total of 240 start ups were set up in Israel compared to 291 in 1994. One of the main reasons for the drop in the number of start ups is a shortage of technological manpower which leads to a rise in salaries and reduces the ability of the start-ups to compete with well established companies in human resources.

The 240 start-ups that began their activity in 1996 were active in a number of areas, including: communications (21%) and medical apparatus (35%).

#### OFFICE OF THE CHIEF SCIENTIST (OCS) MINISTRY OF INDUSTRY & TRADE (MIT)

11) The budget of the Office of the Chief Scientist (OCS) of the MIT totalled \$348 million in 1996 compared to \$346 million in 1995. In 1996 the OCS approved 1116 projects for funding compared to 1220 in 1995.

The percentage breakdown of grants by sectors was:-

	<u>1996</u>	<u>1995</u>
Electronics	26.00	37.00
Communications, including broadcasting and data transfer	31.00	28.00
Software	12.00	16.00

Yoram has provided 40% of capital in the venture fund in return for a 40% limited partnership. At the same time Yoram granted to the holders of the 60% balance of the fund, the right to buy Yoram's holding in the fund after five years, at cost plus nominal return in this way, the Government shared the risks of an investment in the fund by private investors to the extent of 40%, while leaving them with the entire profit created by the fund. In the event that the venture fund was successful, the investors were able to exercise the purchase option. This concept has fueled the venture capital industry in Israel. Following Yoram's success, many private venture funds were created without assistance or active encouragement of the Government. Having completed its primary objective, the Government privatised Yoram.

2) About 40% of the capital for venture investments, which has fueled the establishment of new start-up companies, has originated outside Israel. Geographic distribution shows that 25% of foreign funds come from the US, 15% from Europe and 10% from Asia. The majority of foreign investors in private funds followed by investment companies. It is expected that a greater portion of funds for venture investments will in future come from outside Israel, mainly from institutional investors that have not as yet been active in Israel.

## STARTUPS

10. In 1992, a total of 140 start-ups were set up in Israel compared to 101 in 1991. One of the main reasons for the drop in the number of start-ups is a shortage of technological manpower which leads to a rise in salaries and reduces the ability of the start-ups to compete with established companies in human resources.

The 140 start-ups that began their activity in 1992 were active in a number of areas, including: communications, civil and medical apparatus, 1992.

## OFFICE OF THE CHIEF SCIENTIST (OCS) MINISTRY OF INDUSTRY & TRADE (MIT)

11. The budget of the Office of the Chief Scientist (OCS) at the MIT located 1992 differed in 1992 compared to 1991 in 1992. In 1992 the OCS approved 110 projects for funding compared to 110 in 1991.

The percentage breakdown of grants by sector was:

	1992	1991
Electronic	25.00	27.00
Communications, including broadcasting and cable transfer	11.00	20.00
Biotechnology	11.00	10.00

	<u>1996</u>	<u>1995</u>
Chemicals, including pharmaceuticals and biotechnology	14.00	7.00
Medical	13.00	6.00
Other	4.00	6.00
	=====	=====
	100.00	100.00

12) Magnet, the generic R&D programme of the Chief Scientist of the MIT has set up a consortium to develop new technologies for the development of products to triple the sales value of crude metallic magnesium. The target of the consortium is to reach a situation in which Israel will supply about 12% of the world's production of magnesium alloy based products.

Magnet encourages and funds multi-year research projects by consortiums comprised of industry, research institutes and academia. To date, Magnet has committed a multi-year budget of some \$200 million. Eleven consortia are presently engaged in a broad range of projects. Technologies targeted by the consortia include ground stations for satellite communications, plant biotechnology, algae farming, hybrid seeds and medical lasers. The financial incentives are larger than those offered for other R&D projects funded by the Chief Scientist. Participating companies can receive up to 66% of their budget and are not obligated to pay royalties. The academic partner receives full funding: 80% as a grant and the remainder from the industrial companies involved.

## INTERNATIONAL INDUSTRIAL R&D COOPERATION

### Israel / USA

13) Israel and the USA have four major endowment foundations including:

BIRD Israel - US Binational Industrial R&D Foundation, established in 1977 with an endowment of \$60 million and was increased by \$50 million in 1984 to \$110 million. Since the first project was initiated in 1979, BIRD has supported 490 joint projects involving a US company and an Israeli company as a team. In 1996, 39 US Hi-Tech companies entered projects with Israeli companies.

A breakdown of companies by sectors which have benefited from BIRD is almost identical to that in 1995 and is as follows:

	<u>1996</u>
Software	28%
Electronics	16%
Communications	22%

	1995	1996
Chemicals, including pharmaceuticals and biotechnology	14.00	7.00
Medical	13.00	6.00
Other	4.00	6.00
	100.00	100.00

(12) Magnet, the genetic R&D program of the Chief Scientist of the MIT has set up a consortium to develop new technologies for the development of products to fight the water value of crude materials. The target of the consortium is to reach a situation in which Israel will supply about 15% of the world's production of magnesium alloy based products.

Magnet encourages and funds multi-year research projects by consortiums composed of industry, research institutes and academia. To date, Magnet has committed a multi-year budget of about 2500 million. Eleven consortiums are presently engaged in a broad range of projects. Technologies covered by the consortium include ground stations for satellite communications, plant biotechnology, signal processing, hybrid analog and digital systems, The financial incentives are larger than those offered for other R&D projects funded by the Chief Scientist. Participating companies can receive up to 50% of their budget and the not obligated to pay royalties. The academic part of research is funded 100% as a grant and the remainder from the industrial companies involved.

## INTERNATIONAL INDUSTRIAL R&D COOPERATION

### Israel/USA

The Israeli and the USA have four major industrial foundations:

BLND Israel - US Binational Industrial R&D Foundation, established in 1977 with an endowment of \$50 million and was increased by \$50 million in 1985 to \$100 million. Since the first project was initiated in 1979, BLND has supported 450 joint projects involving a US company and an Israeli company on a total of \$100 million. High-tech companies and projects with Israeli companies.

A breakdown of companies by sector which have benefited from BLND is almost identical to that in 1985 and is as follows:

1985	
20%	Defense
15%	Electronics
15%	Communications

## 1996

Medical, including biotechnology 12%

Semiconductors 8%

Other 14%

In the financial year ending 30 September, 1996 BIRD realised an income of \$16.2 million, \$8.5 million of which was interest income on the \$110 million endowment contributed in equal parts by the two Governments and \$7.7 million from repayments by successful grantee companies. Cumulative endowment income over the 18-year history of the Foundation amounts to \$115.0 million, and cumulative repayment income totalled \$41.8 million.

Projects approved in 1996 include:

### i) Medical

3M Unitek Corporation, California and  
Cadent Ltd. Israel

### ii) Communications

Sandisk Corporation, California and  
Sandisk Israel Ltd.

Tandem Computers Inc., California and  
Missing Link Ltd., Israel

### iii) Electronic Systems & Instrumentation

Racal Instruments Inc., California and  
Tabor Electronics Ltd., Israel

Timex Corporation, USA and  
Timex Development Ltd., Israel

### iv) Software

America Online Inc., USA and  
Ubique Ltd., Israel

Magic Software Enterprises Inc. and  
Magic Software Enterprises Ltd., Israel

Sapiens USA Inc. and  
Sapiens Technologies Ltd., Israel

Comstream Corporation, a US leader in digital communication solutions for voice, data images, audio and video and Orckit

1972

1971

Medical, including  
biotechnology

1970

Semiconductors

1969

Other

In the financial year ending 30 September, 1992 BIRD realised an income of \$16.2 million, \$5.5 million of which was interest income on the \$110 million endowment contributed in equal parts by the two Governments and \$1.7 million from repayments by successful grantees companies. Cumulative endowment income over the 18-year history of the Foundation amounts to \$115.0 million, and cumulative repayments income totalled \$41.9 million.

Projects approved in 1992 include:

1) Medical

3M Health Corporation, California and  
Cancer Inc., Israel

2) Semiconductors

Sandisk Corporation, California and  
Sandisk Israel Ltd.

Tandem Computers Inc., California and  
Mixing Inc., Israel

3) Electronic Systems & Instrumentation

Radiant Instruments Inc., California and  
Yorox Electronics Ltd., Israel

4) Other

5) Software

Amulet Software Inc., USA and  
Lispac Ltd., Israel

6) Software Development

7) Software Development

8) Software Development

9) Software Development

Communications Ltd., an Israeli hi-tech company specialising in broadband transmission solutions for the local loop over the existing copper telephone infrastructure were honoured with the 1996 BIRD joint venture of the year.

BIRD funding is provided in the form of a grant which does not entitle it to equity or intellectual rights. If the project is a commercial success, the Foundation receives repayment, a pre-tax expense to the grantee - up to a maximum of 150 percent of the grant. Companies not realising commercial benefits from the project are not under an obligation to repay BIRD.

### ISRAEL-US SCIENCE & TECHNOLOGY COMMISSION (USISTC)

The USISTC was set up in June 1994 at the initiative of President Clinton and the late Prime Minister Yitzhak Rabin. A significant amount of the Commission funds have been committed to support joint ventures between US and Israel companies to develop and commercialise medium to high risk technologies in a number of areas. The awards were based on a competitive selection process utilising the resources of the National Institute for Standards and Technology (NIST) in the US and the Office of the Chief Scientist (OCS) in Israel. In addition, reviewers from the private sector scored the projects on their business plans and commercial prospects.

Awards to the joint ventures are made on a cost sharing basis with the private sector, paying at least one half of the cost over a four year period. Government contributions are made on a quarterly reimbursement basis, upon successful completion of tasks mutually agreed upon by the joint venture and the Governments. Projects range in size from \$6-13 million with the Government's share being divided equally between the two Governments. Joint venture support is subject to a recoupment of 2% on the sale of products developed with Commission support, up to the amount to the award.

In March 1997 the USISTC approved a \$5.3 million project to develop a new solar power generation system from a combination of technological innovations developed by partners of the project which includes McDonnell Douglas and the Weitzman Institute of Science. The system is capable of generating hundreds of kilowatts to tens of megawatts of power with the operational flexibility to guarantee electricity even during inclement weather. In three years the US-Israel partners hope to develop the system which will be modular in construction, enabling the user to adapt it to match a changing power demand from solar to gas to a combination of the two.

The USISTC has supported a number of workshops including four on good chemical practice and good managing practice in Israel, organised by the US Food & Drug Administration in conjunction with US private sector drug and device trade association.

Communications Ltd., an Israeli hi-tech company specializing in broadband transmission solutions for the local loop over the existing copper telephone infrastructure were honored with the 1998 BIRD Joint Venture of the Year.

BIRD funding is provided in the form of a grant which does not entitle it to equity or intellectual rights. If the project is a commercial success, the foundation receives repayment, a pre-tax expense to the grantee - up to a maximum of 150 percent of the grant. Companies not realizing commercial benefits from the project are not under an obligation to repay BIRD.

## ISRAEL-US SCIENCE & TECHNOLOGY COOPERATION (USISTC)

The USISTC was set up in June 1994 at the initiative of President Clinton and the late Prime Minister Yitzhak Rabin. A significant amount of the Commission funds have been committed to support joint ventures between US and Israeli companies to develop and commercialize solutions to high risk technologies in a number of areas. The awards were based on a competitive selection process utilizing the resources of the National Institute for Standards and Technology (NIST) in the US and the Office of the Chief Scientist (OCS) in Israel. In addition, reviewers from the private sector scored the projects on their business plans and commercial prospects.

Awards to the joint ventures are made on a cost sharing basis with the private sector, paying at least one half of the cost over a four year period. Government officials are made on a quarterly reimbursement basis upon successful completion of tasks mutually agreed upon by the joint venture and the Government. Projects range in size from \$500,000 to \$10 million with the Government's share being divided equally between the two Governments. Joint venture support is subject to a re-evaluation of 50% on the sale of products developed with Government support, up to the amount of the award.

In March 1997 the USISTC approved a \$1.1 billion project to develop a new solar power generation system from a combination of technological innovations developed by partners of the project which included Motorola, Boeing and the Western Institute of Science. The system is capable of generating hundreds of kilowatts to tens of megawatts of power with the operational flexibility to generate electricity even during inclement weather. In five years the US-Israel partnership hopes to develop the system which will be modular in construction, enabling the user to adapt it to match a changing power demand from solar to gas to a combination of the two.

The USISTC has supported a number of ventures including four in good chemical synthesis and good managing practices in Israel, organized by the US Food & Drug Administration in conjunction with US private sector drug and device manufacturers.

14) CANADA-ISRAEL INDUSTRIAL RESEARCH & DEVELOPMENT FOUNDATION (CIIRDF)

The CIIRDF was established in 1994 when the Governments of Canada and Israel agreed each to contribute Canadian Dollar 1 million per year for a three year period to support binational industrial R&D initiative by contributing 50% of the R&D costs, repayable should there be commercial revenues arising from the project.

CIIRDF, which has headquarters in Ottawa and a field office in Israel, has a partnership agreement with IRAP (the Industrial Research Assistance Program of the National Research Council of Canada) which has an extensive technology network. Through IRAP, CIIRDF has access to Canadian technology companies on a day to day basis.

The second three year period of CIIRDF began in February 1997, when the Canadian Foreign Trade Minister, Art Eggleton and the Minister of Trade & Industry, Natan Sharansky signed in Jerusalem an agreement to provide an additional \$3 million each in funding for CIIRDF. The projects approved for funding are mainly in the biotechnology and information technology fields.

A free trade agreement between Canada and Israel came into affect on 1 January 1997.

15) SINGAPORE-ISRAEL INDUSTRIAL R&D FUND (SII-RD)

An agreement to set up SII-RD fund was signed on 10 December 1996. The National Science & Technology Board (NSTB) of Singapore and the Office of the Chief Scientist at the MIT will cooperate in implementing the agreement.

Singapore and Israel have agreed each to contribute to SII-RD US\$1 million per year over a period of three years - a total of \$6 billion. Approved joint projects are eligible for cash grants of up to 50% of the R&D cost. Grants are repayable should there be commercial revenues from the projects. So far, two joint venture projects have been approved:

a) Scitex Corporation (Israel) and Transtech Electronics (Singapore) will jointly develop components for printers and fax machines.

b) Eliaschim Ltd. (Israel) and Tech IBP Singapore will jointly develop security products for the internet.

SII-RD has awarded a total of \$1.5 million for these two projects which are the first to receive the fund's support.

16) ISRAEL / GERMANY

Although there is no industrial R&D fund similar to BIRD, CIIRDF and SII-RD, there are elaborate scientific relations between Israel and Germany. Cooperation is mainly in basic science and not in industrial R&D. Bundesministerium fur Bildung Wissenschaft Forschung und Technologie (Bnb+f), (the Federal Ministry of Education, Science, Research & Technology), is the main supporter of these activities.

The CIRDF was established in 1974 when the Government of Canada and Israel agreed each to contribute Canadian Dollar 1 million per year for a three year period to support bilateral industrial R&D initiative by contributing 50% of the R&D costs, repayable should there be commercial revenues arising from the project.

CIRDF, which has headquarters in Ottawa and a field office in Israel, has a partnership agreement with IRAP (the Industrial Research Assistance Program of the National Research Council of Canada) which has an extensive technology network. Through IRAP, CIRDF has access to Canadian technology companies on a day to day basis.

The second three year period of CIRDF began in February 1977, when the Canadian Foreign Trade Minister, Art Egerton and the Minister of Trade & Industry, Brian Mulroney signed in Jerusalem an agreement to provide an additional \$3 million each in funding for CIRDF. The project approved for funding are mainly in the biotechnology and information technology fields.

A free trade agreement between Canada and Israel came into effect on 1 January 1977.

## 12) SINGAPORE-LEBANON INDUSTRIAL RESEARCH FUND (SLIRF)

An agreement to set up SLIRF was signed on 29 December 1974. The National Science & Technology Board (NSTB) of Singapore and the Office of the Chief Scientist in the MIT will cooperate in implementing the agreement.

Singapore and Israel have agreed each to contribute to SLIRF \$1 million per year over a period of three years - a total of \$3 million. Approved R&D projects are eligible for cash grants of up to 50% of the R&D cost. Grants are repayable should there be commercial revenues from the projects. In the first two years projects have been approved.

a) Science Communication (Israel) and Technology Education (Singapore) will jointly develop programs for graduate and law machines.

b) Electronics Ltd. (Israel) and Tech 702 (Singapore) will jointly develop scientific programs for the sciences.

SLIRF has awarded a total of \$1.2 million for three projects which are the first to receive the fund's support.

## 13) RESEARCH AGREEMENT

Although there is no industrial R&D fund similar to CIRDF and SLIRF, there are bilateral scientific relations between Israel and Germany. Cooperation is mainly in basic research and not in industrial and technological R&D. The Federal Ministry of Education, Science, Research & Technology, is the main supporter of these relations.

The German Israel foundation for Scientific R&D (GIF) which is a DM 300 million fund with equal contributions from the two Governments, finances some ninety joint research projects a year.

#### 17) EU / ISRAEL

In March, a delegation of four members of the European Parliament Research & Energy Committee visited Israel. The visit is in the context of the EU-Israel agreement on scientific and technical cooperation which came into force in September 1996 and which since then has been instrumental in promoting a large number of cooperative ventures in various scientific sectors.

The itinerary of the EU Parliamentarians included a meeting with members of the Science & Technology Committee of the Knesset, as well as visits to the Jerusalem Software Incubator, the Weitzman Institute of Science and other science institutes.

In July, the EU has announced that it will spend \$1 million in joint financing of four environment projects in Israel in the framework of the LIFE II programme. The projects are:

- a) Restoration and conservation of fauna and flora in the re-flooded Hula Wetland Habitat.
- b) Centralised treatment of organic waste in the Galilee
- c) Restoration of the rivers in Israel's coastal plain
- d) A municipal solid waste management demonstration project at Kiryat Tivon, near Haifa with observers from Israel, the Palestinian Authority and Jordan.

In addition, the city of Ashdod will participate in a regional LIFE project called ENVIMED II as part of an environmental survey with Larnaca and Limassol (Cyprus), Tripoli (Lebanon) and Sousa (Tunis).

#### 18) TRIDE TRILATERAL INDUSTRIAL R&D

Based on the successful BIRD model, the Governments of the US, Israel and Jordan decided to establish a pilot trilateral initiative to stimulate, promote and support industrial research and development. Each TRIDE (Trilateral Industrial Development) project constitutes a joint venture between private companies from all three countries, with the three Governments funding up to 50% of the direct project costs. BIRD is implementing the TRIDE pilot initiative on behalf of the three Governments.

A total of \$1 million will be contributed equally by each of the three Governments. TRIDE will support 50% of the development and pre-marketing expenses for a new product and the balance will come from the participating companies.

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The itinerary of the EU Parliamentarians included a meeting with  
members of the Science & Technology Committee of the Knesset, as  
well as visits to the Jerusalem Science Institute, the Weizmann  
Institute of Science and other science institutes.

In July, the EU has announced that it will spend 21 million in  
joint financing of four environment projects in Israel in the  
framework of the EU II programme. The projects are:

a) Restoration and conservation of fauna and flora in the  
re-forested Hula Wetland National Park.

b) Controlled treatment of organic waste in the Galilee.

c) Restoration of the rivers in Israel's coastal plain.

d) A municipal solid waste management demonstration project at  
Kiryat Tivon, near Haifa with cooperation from Israel, the  
Polish and German Governments.

In addition, the City of Ashdod will participate in a technical LIFE  
project called SWATH II as part of an environmental survey with  
Israel and financed by the European Commission and German Government.

## THE JERUSALEM CENTRAL BANK

Based on the successful KING model, the Government of the EU  
Israel and Jordan decided to establish a joint (trilateral)  
initiative to stimulate, promote and support industrial research  
and development. KING (Jerusalem Industrial Development)  
Project constitutes a joint venture between various companies from  
all three countries, with the three Governments funding up to 50%  
of the direct project costs. KING is headquartered in the KING office  
initiative on behalf of the three Governments.

A total of 25 million will be contributed equally by each of the  
three Governments. KING will support 10% of the development and  
pre-commercial expenses for a new product and the balance will come  
from the participating companies.

## 19) ISRAELI HI-TECH INDUSTRY

The most significant development in industrial production and exports has been the shift towards hi-tech industries which are human capital intensive and are notable for their high level of investment in R&D. The number of new hi-tech startups, mainly those in the areas of electronics and communications, has grown significantly over the past few years as has the number of projects reaching fruition.

The growth in the economy is mainly from the hi-tech industry and R&D investment. During recent years, many Israeli hi-tech companies have raised capital on Wall Street (USA) and in the last couple of years, seven Israeli companies have raised capital in the UK on AIM. As at the end of October 1996, over 80 Israeli companies with a market value of \$12 billion were traded abroad.

One sector in which Israel excels is software. It's success is attributed to the industry's greatest asset - the quality of its manpower. Production does not consume costly raw materials of which Israel has precious few, and does not require massive fixed investments.

In 1984 software exports amounted to just \$5 million. In 1996 exports totalled \$400 million, compared to \$300 million in 1995. Domestic sales are growing at the rate of 10% per annum. Sales (exports and local) have topped \$1 billion in 1996 and expected to increase to \$1.2 billion in 1997. The software industry has some 300 companies employing a total of some 9000 computer and software professionals. Israel has become a world centre for software design and development of new products and design of tailor made packages.

Multi-national companies have established R&D centres in Israel. These include Microsoft, who set up its first research centre outside of the US in Haifa. IBM has also a software R&D facility in Israel, employing 300 scientists and engineers at its design facility in Haifa. Oracle, Computer Associates and Novell have set up offices in Israel to exploit Israel's ability to conceive new products and design tailor made packages. Madge Networks UK has acquired the Israeli company Lannet Data Communications.

The Information Technology (IT) market in Israel is growing as quickly and in many instances, faster than comparable IT markets in Western Europe. IT spending totalled over \$2 billion in 1996 and is expected to grow in the next three years at an annual rate of 14.9%. By the year 2000, total IT spending is expected to exceed \$3.5 billion. 44% of IT spending in Israel goes to hardware, i.e. servers, PC's, workstations, printers and other peripherals. 20% goes to purchasing packaged software consisting of system software, application tools and solutions. IT services and data communication equipment account for 25% and 12% respectively.

Israelis are known for their acceptance and early adoption of new computer technologies. This is seen most notably in the home sector where PC penetration rates are estimated at about 40% of Israeli households, making Israel one of the world leaders in home PC ownership. Some 200,000 PC's will be sold in Israel in 1997. Intel's recently introduced Pentium was developed in Israel at Intel's research centre in Haifa, whose staff has exhibited

The most significant development in industrial production and exports has been the shift towards hi-tech industries which are human capital intensive and are notable for their high level of investment in R&D. The number of new hi-tech startups, mainly those in the areas of electronics and communications, has grown significantly over the past few years as has the number of projects reaching fruition.

The growth in the economy is mainly from the hi-tech industry and R&D investment. During recent years many Israeli hi-tech companies have raised capital on Wall Street (NASDAQ) and in the last couple of years, seven Israeli companies have raised capital in the UK on AIM. As at the end of October 1996, over 60 Israeli companies with a market value of £15 billion were traded abroad.

One sector in which Israeli excels is software. It's success is attributed to the industry's greatest asset - the quality of its manpower. Production costs are extremely low relative to which Israel has production low, and does not require massive fixed investments.

In 1996 software exports amounted to over \$2 billion. In 1995 exports totalled \$800 million, compared to \$700 million in 1994. Domestic sales are growing at the rate of 10% per annum. Sales abroad and total have topped \$1 billion in 1995 and expected to increase to \$2.5 billion in 1997. The software industry has some 300 companies employing a total of some 10,000 computer and software professionals. Israel has become a world center for software design and development of new products and design of carrier and packages.

High national companies have established R&D centers in Israel. These include Microsoft, who set up its first research center outside of the US in Haifa. IBM has also a software R&D facility in Israel, employing 100 researchers and engineers at the Tel-Aviv facility in Haifa. Oracle, Computer Associates and Novell have set up offices in Israel to exploit Israel's ability to develop new products and design tailor made packages. Oracle Networks UK has acquired the Israeli company, Oracle Data Communications.

The Information Technology (IT) market in Israel is growing at rapidly and in many instances faster than elsewhere. IT spending in Western Europe. IT spending reached over \$1 billion in 1995 and is expected to grow in the next three years at an annual rate of 12.5%. By the year 2000, total IT spending is expected to exceed \$1.5 billion. 44% of IT spending in Israel goes to hardware, 30% to software, 10% to services and 16% to other peripherals. 50% goes to purchasing packaged software, 30% to development of custom software, 10% to purchasing hardware and 10% to other peripherals. IT equipment and data communication equipment account for 15% and 10% respectively.

Israelis are known for their enthusiasm and early adoption of new computer technologies. This is seen notably in the home sector where 50 penetration rates are achieved at a rate of 10% per annum. Israel is one of the world leaders in home PC ownership. Some 60,000 PCs will be sold in Israel in 1997. Intel's recently introduced Pentium was developed in Israel as Israel's research center in Haifa, which itself has established

exceptional development capabilities and original thinking.

In January, it was announced that Israeli research has produced technology that will provide Intel's Pentium processor with significant advance. The new technology will enable PC's to improve performance in terms of speed, ability to deal with complex graphic programmes, as well as audio and visual materials.

Intel's presence in Israel is 22 years old. It began with a R&D facilities in Haifa and a plant in Jerusalem and is now building a \$1.6 billion micro-chip plant in Kiryat Gat.

Although the native language is Hebrew, the Internet primarily an English based network, has gained popularity in Israel. Israel is now considered to be the "Land of the Internet". There are more start-up companies in the field in absolute, not per capita figures than anywhere else outside Silicon Valley. According to a survey conducted by the World Economic Forum in Davos, Israel is number five in the list of ten most connected countries. Coming after Finland, Iceland, Norway and Australia and way ahead of Canada and the US. Israel has 52,000 Internet users per million people. Four Israeli companies are ranked among the 25 most important Internet companies in the world. 15% of Internet technologies are "Israeli born".

In June, a delegation of senior executives from six Japanese computer companies - NEC, Toshiba, Fujitsu, Hitachi, Matsushita and OKI - visited Israel for meetings with research institutes and technology incubators. They also met the Prime Minister and the Minister of Industry & Trade. That was the most senior delegation of the Japanese computer industry ever to visit Israel. The Executive Director of the Japanese Electronics Industry Development Association, was the leader of the delegation.

In April, Israel signed the new global treaty that has as its final goal the removal of all import tariffs on IT products and equipment, regardless of the product's country of origin. The treaty, which will be integrated into a larger World Trade Organisation Agreement to promote the liberalisation of the communications market, calls for tariff reduction and eventual elimination in stages until the end of the decade with some extensions until 2005. Although Israel has Free Trade Area Agreements with the EU, Canada and USA, it is expected that new markets where at present, for political reasons, cannot trade freely, such as Malaysia and Indonesia (with whom Israel has no diplomatic relations) may open up, if non-tariff barriers are not instituted.

Companies who recently set up or are planning to set up R&D centres in Israel include:-

a) In June 1997, Hewlett Packard announced plans to upgrade its Haifa based Science Centre into a research and development laboratory as part of its improved status. HP's Israel Science Centre, established three years ago, has been renamed HP Labs Israel, with a larger research staff. HP Labs Israel joins the mother company's other major research centres in California, the UK and Japan which together employ 1400 researchers and support staff. HP Labs Israel will concentrate on developing digital photography, image compression and multi-media performance analysis tools.



b) In April 1997, Cisco Systems of USA - a leader in Internet networking solutions - opened an R&D centre in Netanya near Tel Aviv, to develop the next generation of Internet technology. The ten engineers hired to start-up Cisco's local R&D centre will be responsible for developing a high speed gigabit switch and routing technologies which form the backbone of the Internet and have a potential market of \$5 million.

c) In January 1997, Sun Microsystems opened the Java Software Development Centre in Herzlia near Tel Aviv. The centre will develop software products for security systems and PC's.

d) In May 1997, Rockwell Semiconductor Systems, a subsidiary of Rockwell International Corporation of USA opened a \$15 million R&D centre in Herzlia near Tel Aviv, to design software based modems which are more flexible and less expensive than the currently used hard modems. Rockwell already has a centre in Carmiel near Haifa, which is engaged in developing satellite modems.

e) In October 1996, Sandisk Corporation - the world's largest of flash data storage products - established a design centre in Israel. The centre is partially funded by a grant from the US-Israel Binational Industrial R&D Foundation (BIRD-F).

f) In January 1997, Analog Devices Inc., a Massachusetts-based developer of integrated circuits opened a R&D centre in Herzlia. During the first year of operation, \$3-4 million will be invested in the centre which will employ 20 engineers.

g) In June 1997, Samsung Electronics Co., the Korean consumer and industrial electronics company, announced that it will open an R&D centre in Israel within a year to focus on developing telecommunications technologies, semiconductors and software.

## 20) HEALTHCARE SECTOR

An area of technology which is attracting world-wide attention is that of the healthcare sector (equipment, systems, diagnostics, pharmaceuticals and biotechnology). Medical products unlike software programmes, require Government regulatory examinations before being marketed. As Israel's hospitals are approved for clinical trials by the FDA, multi-national companies are conducting clinical trials in Israel, taking advantage of the high reputation that local hospitals enjoy in the international medical community. The quality of the medical staff and researchers enhanced with the flow of the immigrants. The sheer smallness of the country allows for easy interaction between researchers in different disciplines. Six leading hospitals are located within 90 minutes driving time from Tel Aviv.

Merck, Bayer, Hoffman La Roche are among the many companies conducting clinical trials in Israel. Some of the major pharmaceutical/medical companies including Johnson & Johnson, Baxter and Pfizer have opened offices in Israel with R&D facilities.

b) In April 1987, Elcom Systems of USA - a leader in Internet networking solutions - opened an R&D center in Herzliya near Tel Aviv, to develop the next generation of Internet technology. The center engineers aimed to start-up Elcom's local R&D center will be responsible for developing a high speed gigabit switch and routing technologies which form the backbone of the Internet and have a potential market of \$2 billion.

c) In January 1987, Sun Microsystems opened the Java Software Development Center in Herzliya near Tel Aviv. The center will develop software products for security systems and PC's.

d) In May 1988, Rockwell International Systems, a subsidiary of Rockwell International Corporation of USA opened a \$12 million R&D center in Herzliya near Tel Aviv, to design software based modems which are more flexible and less expensive than the currently used hard modems. Rockwell already has a center in Carmiel near Haifa, which is engaged in developing satellite modems.

e) In October 1988, Sandisk Corporation - the world's largest of flash data storage products - established a design center in Herzliya. The center is partially funded by a grant from the US-Israel Binational Industrial R&D Foundation (BIRD-7).

f) In January 1987, Analog Devices Inc., a Massachusetts-based developer of integrated circuits opened a R&D center in Herzliya. During the 1st year of operation, \$3.4 million will be invested in the center which will employ 30 engineers.

g) In June 1987, Kongsberg Electronics Co., the Korean consumer and industrial electronics company, announced that it will open an R&D center in Herzliya within a year to focus on developing telecommunications technologies, microcomputers and software.

## 2.1. HEALTHCARE SECTOR

In area of technology which is attracting world-wide attention is that of the healthcare sector (pharmaceutical, systems, diagnostic, pharmaceutical and biotechnology). Medical products unlike software products, require government regulatory examinations before being marketed. As Israel's reputation has improved in clinical trials by the FDA, United National companies are conducting clinical trials in Israel. Having advantage of the high standards that local hospitals enjoy in the international medical community, the quality of the medical staff and research have enhanced with the flow of the technology. The short distances of the agency allows for easy interaction between researchers in different disciplines. Six leading hospitals are located within 30 minutes driving time from Tel Aviv.

Many major, foreign pharmaceutical companies are among the many companies conducting clinical trials in Israel. Some of the major pharmaceutical medical companies including Johnson & Johnson, Pfizer and others have opened offices in Israel with R&D facilities.

Angiosonics Corp. of USA has researched and developed at a Tel Aviv hospital, a unique system that virtually explodes plaque into harmless particles in the arteries. This development has been cited in the professional press as a "breakthrough" in the treatment of heart disease. Other medical developments include a treatment for the removal of kidney stones with a non-invasive system which crushes the stones that may be removed naturally by the human body.

## GENERAL

21) In January, Natan Sharansky, the Minister of Industry & Trade accompanied by a business delegation, paid an official visit to Russia. A memorandum of understanding was signed between the two countries for cooperation in technology. The setting up of a joint R&D fund was discussed.

22) In January 1997, the Israel Space Agency (ISA) signed an agreement with the European Space Agency (ESA) for the first time. The agreement allows Israel to receive European satellite transmissions which will contribute to the accuracy of weather forecasting, sea and coastal research and the location of mines.

23) In March, a Hi-tech delegation from the State of Massachusetts led by Governor William Weld visited Israel. Participants included senior executives of leading Massachusetts-based firms as Raytherm, Advent and Biogen. The delegation participated in a seminar at which the heads of two hi-tech Israeli firms with branches in Massachusetts - Enigma Information Systems and E.S.C. - described their experiences.

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