ANNUAL REPORT

2004-2005

Samuel Neaman Institute

FOR ADVANCED STUDIES IN SCIENCE AND TECHNOLOGY

Technion - Israel Institute of Technology

A N N U A L R E P O R T

2004-2005

POLICY FOR PROGRESS

Samuel Neaman Institute
FOR ADVANCED STUDIES IN SCIENCE AND TECHNOLOGY

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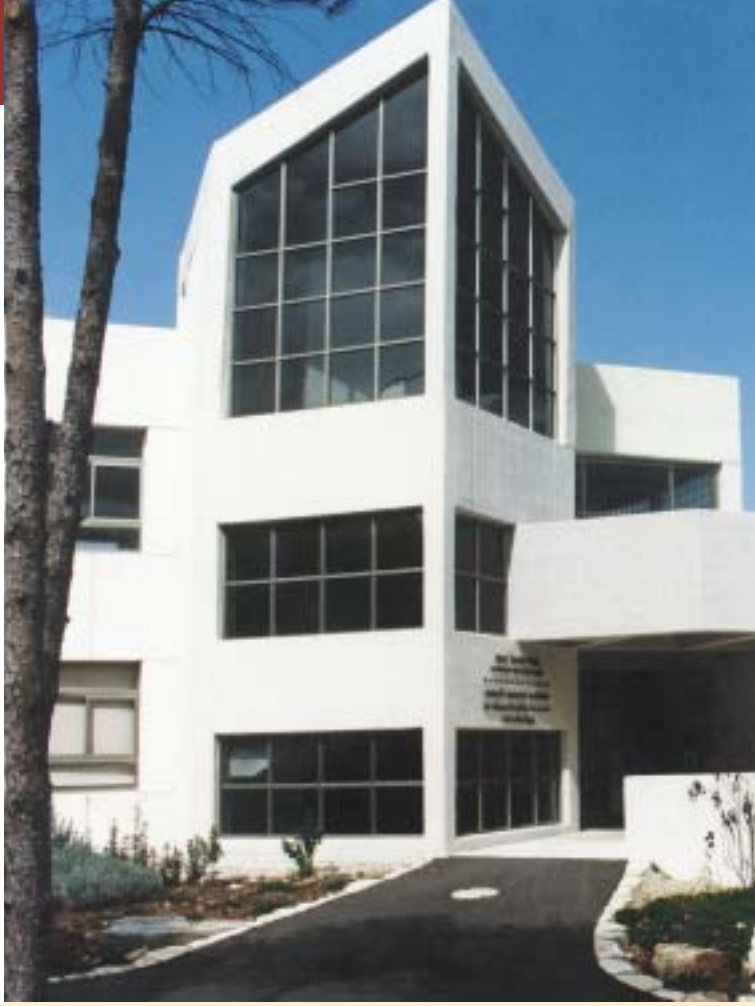
THE SAMUEL NEAMAN INSTITUTE



The S. Neaman Institute for Advanced Studies in Science and Technology is an independent, interdisciplinary public-policy research institute, established in 1978 and located at Technion-Israel Institute of Technology. The mission of the Institute is to research, identify and evaluate solutions for national problems in the areas of science and technology, education, economics, industry, and social development. Through its sponsored research, workshops and publications, the Institute serves as a bridge between academia and decision makers in government, public institutions and industry.

The scope of professional activity at the S. Neaman Institute is the interface between science, technology, economy and society. In Israel, as in many parts of the world, science and technology are major driving forces behind economic growth and prosperity, and are making a profound impact on almost all areas of society. As such, the Institute's multi-disciplinary research activity is more important than ever before.

To achieve its mission, the Institute undertakes sponso**red research, organizes workshops and implements continuing education activities on topics** of significance for the development of the State of Israel. It also maintains a publications program for the dissemination of research and workshop findings. Specific topics for research may be initiated by the Institute, researchers, government agencies, foundations, industry or other concerned institutions. As an independent not-for-profit research organization, the Institute does not advocate any specific policy or embrace any particular social philosophy. Each research program undertaken by the Institute is designed to be a significant scholarly study worthy of publication and public attention.

With its academic and national agenda, the Institute is ideally situated at Technion, Israel's leading scientific-technological university. The Institute draws on Technion faculty and staff, as well as scientists from other institutions in Israel, and specialists from abroad.

As befits a democratic society, choosing among policy alternatives is the prerogative and responsibility of the elected representatives of the citizenry. The Samuel Neaman Institute endeavors to empower the process of informed choice with the authority of academic research.

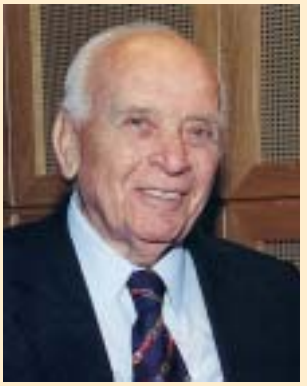
Origins

The initiative for establishing the Institute in Israel was undertaken by Mr. Samuel Neaman, who resolutely brought the idea to fruition with an agreement signed in 1975 between himself, the **American Society for Technion and Technion. It was ratified in 1978 by the Technion Senate. Mr. Neaman, a prominent U.S. businessman noted for his insightful managerial** concepts and innovative thinking, as well as for his success in bringing struggling enterprises to positions of fiscal and marketing strength, devoted his time to the activities of the Institute until he passed away in 2002.

Organization

The Director of the Samuel Neaman Institute, appointed jointly by the President of Technion and the Chairman of the Institute Board, is responsible for formulating and coordinating policies, recommending projects and appointing staff. The Director is Professor Nadav Liron. The Institute Board of Directors is chaired by Professor Zehev Tadmor. The Board is responsible for general supervision of the Institute, including overall policy, approval of research programs and overseeing financial affairs. An Advisory Council, made up of members of Technion's Senate and distinguished public representatives, consults on program development.

ABOUT SAM NEAMAN



Sam Neaman

"I was born in Rosh Pina in 1913, the eldest son of Esther and Pinchas Neaman. My mother was born in Rosh Pina and my father was a pioneer of the Second Aliyah. When I was three years old, my migrations began." Thus, Samuel (Sam) Neaman began telling the story of his life in the book "The Land of Israel from Inside and Out" (Ministry of Defense Press). This volume tells the fascinating story of Sam Neaman, following his life's path across Israel, to France, Syria, England, the United States, Canada, Mexico, and onward. Yet throughout all his life's journey, Sam never lost his identification with Israel, which led him, in the 1970's, to establish the Samuel Neaman Center at the Technion.

Sam died on the 13th of November 2002 at the age of 89, and up to his final days he was involved in the activities of the Institute, making invaluable contributions through his innovative ideas and vision. Sam was a well known businessman and philanthropist, who always placed the State of Israel as an ultimate value. His vision, generosity and love for his homeland, which characterized him so well, are what brought him to the realization that Israel needed a research institution that would both support and leverage the advanced technology so impressively developed in the country. Most importantly, this research institute would create a link between **researchers and policy makers, giving them the benefit of the wealth of knowledge available in** the country's academic institutions.

Sam is no longer with us, but his vision continues to guide all of us at the Neaman Institute. As he would have wished.

FROM THE CHAIRMAN

Professor Zehev Tadmor

Mr. Samuel (Sam) Neaman, the founder of this institution, created it in order to present alternatives to the national policy of the State of Israel. It seems to me that this report shows that this institution indeed fulfils its goal and, hopefully, stands up to the expectations and the vision of its founder.

Amongst the many and varied policy issues presented in this Annual Report, you will find the issue of Israeli higher education. I would like to dedicate my introduction to this subject because of the crucial importance of this system for the future of the State, its defense and economy, and according to our estimates, even to the actual existence of the State in the long run. The reason for this is that the universities are the institutions that provide nearly all the basic scientific and technological infrastructure in the State of Israel, and the universities, together with the colleges, provide the necessary human resources for maintaining Israel as a modern and prosperous country. Therefore, the higher education system constitutes the base of the pyramid on which Israel founds its economy and defense in all fields.

In this context it is important to remember that if the majority of today's successful technologies that are based on electronics, computers and communication (ECC) originated from the Defense Department together with the universities, then future technologies based primarily on chemistry, biology, nanotechnology, biotechnology, etc., will have to originate mainly from university research. The government has invested huge sums of money in defense related ECC technologies for decades. Thus, in order for future technologies to be fruitful, as ECC technologies were, the State must invest similar amounts in university research and in the development of these fields.

The S. Neaman Institute has long recognized that it is essential for the State of Israel to have a high quality higher education system where frontier scientific research is conducted, and has been focusing attention on this issue for years. The major expansion of the higher education system over the last decade, compounded by inherent developments in the system and governmental policies, make this issue not only important, but also urgent.

In light of these developments, and after meticulous preliminary preparations, the S. Neaman Institute and the Fulbright Foundation planned a conference addressing international comparisons of national policies of higher education. The conference was held in December 2004 and specialists on higher education from around the world were invited to participate. Prior to the conference, the S. Neaman Institute published the Prof. Joshua Jortner Report of the "Bashaar - Academic Community for Israeli Society" organization, which surveys the higher education system, warns of the dangers which face it, and suggests future guidelines. This report was presented to the President of Israel and to the heads of the Education Committee of the Knesset. Amongst the participants in the conference were presidents and rectors of the universities and the colleges, the heads of the Planning and Budgeting Committee of the Council for Higher Education, and representatives of the Budget Department of the Ministry of Finance. Many issues were raised in this conference that demand attention, and much was learned from the successes and failures of other countries.

One of the major conclusions of the meeting was that in order to achieve a higher education system that promises both scientific excellence, which as mentioned before is crucial for a modern national economy and for the existence of the State, and wide accessibility, which all of Israeli society is entitled to, it is necessary to establish a new social contract and masterplan through open discussion between universities and colleges. Only such an agreement, which is built from within the system, can on the one hand curb damaging governmental interference, and on the other hand encourage a government policy which suits the needs of the country. For this reason the S. Neaman Institute, together with the Fulbright Foundation and the "Bashaar" organization, founded for the first time a joint discussion forum of heads of universities and colleges. The reaction of the leaders of the system was positive and the forum began its work.

Through these actions, the S. Neaman Institute hopes not only to explore policy issues that concern the higher education system, but also to possibly influence the redesigning of the higher education system in Israel.

FROM THE DIRECTOR

Professor Nadav Liron

Over the past several years, the S. Neaman Institute has been steadily expanding its activities in response to the growing demand for its services. This trend is an indication of the recognition and status the Institute has earned as a trusted authority on policy research and formulation on the strength of its activities and research. Furthermore, because of its non-affiliated status, the Institute is able to gather the leading forces in this country – from government agencies, industry, academia and the private sector – under one roof, to examine alternatives for policy and research.

The STE program established at the Institute is widely acknowledged as a world leader in the study of the economics of industrial research and development. The Institute recently established a strategic collaboration with the Chief Scientist of the Ministry of Industry, Trade and Labor to promote industrial R&D connections between Israel and other countries in the world. To that end, the Institute has spearheaded an effort to build R&D ties between Israel and India, a country of major economic importance. Furthermore, the Institute recently signed an agreement with the Ministry of Science to evaluate the results of the ministry's support for research, with the intention of looking at long-term impact.

In the area of the environment as well, the Institute's research team is widely recognized for its expertise by municipal organizations, which frequently request our assistance in establishing policy in different areas. Moreover, the group once again put environmental issues at the top of the public agenda with its recently published Fourth Working Paper on National Priorities for Environmental Policy.

The Institute's international activities expanded this past year with the European Community as well, within the framework of the PRIME program of centers for excellence in policy research, which the Institute is a member of. In addition, the Institute collaborated in a consortium led by the University of Chicago, studying Terror.

The tenuous state of Israel's Higher Education System, with its critical implications for the future, and even the very existence of the state, has been the subject of intense study at the Institute. In December 2004, an international conference, hosted by the Institute and chaired by Professor Zehev Tadmor, addressed the question of how to ensure higher education opportunities for all while preserving excellence in academic research. Leading experts from Australia, the UK, Italy, the United States and other countries shared their experiences in addressing this challenge. All of the lectures from the conference can be found on the S. Neaman Institute website. The subject of Higher Education in Israel will be a central theme during the year to come.

We are pleased to report that during 2004, the Institute inaugurated its new website, which is already proving itself as a valuable resource for visitors worldwide. On the site, we have made available almost all of the research reports that have been produced at the Institute since it was established.

With this issue of our Annual Report, we decided to add a new feature, and highlight a specific area of activity at the Institute, to acknowledge its long-term contribution to Israeli society. This year, we chose to spotlight the work of the Institute towards the Environment. As you will read within this report, the S. Neaman Institute is playing a critical role in determining environmental policy by serving as a facilitating third-party that helps bridge the differences between often contentious parties with conflicting interests.

Thoughtful and equitable environmental policy can have a profound, positive impact on quality of life, particularly in such a small country. For this reason, the S. Neaman Institute is dedicated to promoting this important work.

RESEARCH PROJECTS AND ACTIVITIES OF THE S. NEAMAN INSTITUTE

THE S. NEAMAN INSTITUTE AND ITS ROLE IN DETERMINING ENVIRONMENTAL POLICY – A PERSPECTIVE

Prof. Yoram Avnimelech, Dr. Ofira Ayalon

Two major players are active in the area of environmental quality, and each one actively defines and determines environmental policy. The first group, of course, is comprised of the statutory bodies – the Knesset, the government and its representatives, in some instances the Ministry of the Environment. The second group is "the public". In defining these groups, we use collective terms; for example, in the case of water, the parties involved include the water authorities and the Ministries of Health, the Environment and Agriculture, all of which have different policies related to their particular limitations, interests and resources available. The different government agencies are unable, because of insufficient budgetary and human resources, to recruit enough qualified personnel to coordinate all of the disparate factors that must be taken into account to develop environmental policy. Thus, environmental policy is often uncoordinated between the different parties, inappropriate and unclear.

The "public" is also comprised, on the one hand, of property owners, factories and other economic entities, but also includes the workers, the populations leaving adjacent to areas under development, and non-governmental organizations (community and environmental organizations) which represent the public in its demands from the government to determine environmental legislation and regulations. The demands of the environmental organizations are often based on emotional considerations, while those of the commercial entities are economically driven, creating a situation of conflict. In Israel, there is an additional problem related to the country's relatively small size, and the difficulty in recruiting sufficient resources to develop rational and balanced policy based, as much as possible, on professional considerations. The complex situation described here results in environmental policy that is inconsistent, without clearly defined goals, priorities or timetables. Often, the most critical topics are not addressed at all because of political sensitivities.

The environmental decision-making process can be improved by introducing a constructive third player into the system. This third player should include professionals in the relevant fields, from institutions that are not directly related to the interested parties, and from the academia. It would not be an exaggeration to say that, within the academia, there are objective, professional scientists who can make a significant contribution towards determining environmental policy, in the world in general, and in Israel in particular.

The S. Neaman Institute, as a public-policy research institute and "think tank" affiliated with the Technion-Israel Institute of Technology, has stepped in to serve as this third player. It established, in 1998, a division dedicated to environmental policy, thereby creating an independent, professional body that complements and bridges between the different sectorial approaches and entities in the field. Moreover, it added a professional, objective and scientific perspective that was severely lacking in the environmental decision-making process.

A series of documents published by the S. Neaman Institute, entitled "National Priorities in Environmental Policy", raises key environmental issues and places them on the public agenda. As such, the conclusions presented through the work of the Institute assist in the establishment of environmental policy that is rational and research-based.

Among the subjects that received national attention which were covered in the "National Priorities in Environmental Policy" series, is that of waste management. For over a decade, the S. Neaman Institute has been a leader in this field, and has influenced the government entities responsible for waste processing policy to adopt responsible and creative solutions. These include approaching waste as an economic resource that generates income and not only as a financial burden; adopting different solutions for waste treatment instead of a single system; demonstrating the failure of the market to price this resource, and examining the environmental costs and benefits of the different treatment options.

A similar environmental-social role can be found in agriculture. The changes that have taken place in the agriculture sector, among the public and the government, are expressed in policy papers we published. Today, the S. Neaman Institute is working, in cooperation with regional councils and other official organizations, to apply solutions for developing self-sustaining agriculture at a number of pilot sites. This approach, where agriculture is the last frontier for protecting open spaces in Israel's overcrowded landscape, also provides an opportunity for treatment of urban waste (including municipal wastes, effluents and sewage sludge), which is a resource for the agricultural sector. One of the applications that will be applied in the future, as a result of findings published by the S. Neaman Institute, is the establishment of a system for crops grown using treated effluents and sludge from urban waste and water treatment facilities, while determining the optimal level of treatment of these effluents. These activities will yield significant savings to the Israeli economy, as well as fortifying the agricultural sector.

In our cooperative work with government agencies, particularly with the Ministry of the Environment, which works closely with the Institute's environmental staff, other areas were brought to the public agenda as well. The market for environmental technologies was identified for its potential to leverage the Israeli economy, spur exports, employ thousands of workers in a variety of professions and, of course, improve quality of life and the environment in Israel.

Beyond the importance of these projects, which were carried out thanks to the work of the S. Neaman Institute, we continue to raise central environmental issues for professional and public discussion, a process which, in our estimation, is significantly improving the public's well-being and environmental quality.

ENVIRONMENTAL POLICY

Project Leaders: Prof. Yoram Avnimelech and Dr. Ofira Ayalon

Since 1998, the S. Neaman Institute has been engaged in a wide range of activities related to environmental quality in Israel. It has become a nationally-recognized center for environmental activity for a variety of academic and public bodies that are promoting environmental policy in Israel, in cooperation with the Ministry of the Environment and other relevant government entities. Since its environmental activities began, the S. Neaman Institute has published over 15 reports, sponsored over 10 conferences and conducts an ongoing lecture series on environmental topics that is open to the public. The environmental activities of the Neaman Institute are widely recognized and acclaimed; they have a clear rationale and direction beyond the specific projects that are carried out.

The areas in which these activities are focused are:

- National Priorities in Environmental Policy
- The Global Environmental Market and Business Opportunities in Israel
- Agriculture and the Environment
  Energy and Environment
- Policy Towards Reducing Transportation-Related Air-Pollution in Dan Region
- Introducing Packaging Laws in Israel – Potential and Possible Applications
- Evaluating Operation of a Waste-separation Program in Haifa.
- Operating the “Green Campus” Project at the Technion

NATIONAL PRIORITIES IN ENVIRONMENTAL POLICY

Project Leaders: Prof. Yoram Avnimelech, Dr. Ofira Ayalon

Since 1999, the S. Neaman Institute has published a series of Position Papers entitled "National Environmental Priorities of Israel". The latest in this series, published in 2004, was divided into three parts, each addressing a different aspect of environmental quality and environmental policy in Israel.

Part I **– Environmental Education in Israel**
Already in the first Position Paper on National Environmental Priorities, published in 1999, the importance of environmental education for promoting the cause of environmental protection was emphasized. Because this area is indeed so significant, we are pleased to report that there has been a tremendous groundswell of environmental education activities in recent years, and that many organizations, both governmental and non-governmental have started (or continued) to develop environmental education materials and plans. Still, environmental education does not occupy a central place in the Ministry of Education's core program, and is not addressed in the Ministry's published educational plans; the Ministry has consistently under-budgeted teaching hours, educational materials and teacher training in this important area.

This report recommends issuing a call for making environmental education mandatory for every pupil. Only through environmental education will the public become aware of the long-term importance of protecting the country and its environment. Environmental education, emphasizing knowledge, initiative, innovation and technological curiosity, is an important investment in the country's human resources, which, as in many other parts of the world, should be promoted in Israel as well.
This report was prepared and edited by Dr. Tali Tal of the Department of Education in the Technion.

Part II **– The Energy and Transportation Sectors in Israel**
Prof. Dan Zaslavski prepared a broad overview ofn the present energy market in Israel and suggested means and policy required to achieve a sustainable energy market.
Consumption of energy by motor vehicles places a heavy load on the environment. For many years, it was believed that there could be no progress without ever-increasing levels of energy consumption and a total dependence on private vehicles. This attitude has long since been abandoned in most parts of the world, and in Israel as well. In the meantime, the consumption of fossil fuels is exacerbating the greenhouse effect and global climate changes. Burning of fossil fuel to create energy, and to power motor vehicles, causes air pollution, public health problems and higher mortality levels. Moreover, the increasing numbers of new cars and roads constructed are ultimately causing traffic overload, traffic jams and accidents. Uncontrolled operation of gas stations and gasoline pipelines contaminates soil, groundwater sources and causes air pollution that can be disastrous.

We cannot, with any of the subjects addressed in this report, continue with a "business as usual" attitude. Other options must be explored and

changes made to divert the course, which is incurring such heave damage to the environment. In this report, several approaches towards establishing a sustainable energy sector in Israel are outlined, as well as means to reduce pollution from motor vehicles and fuel.

Part III **– Characteristics of Environmental Administration in Israel**

In this report, two projects are presented in the area of environmental management and administration. Also presented is a progress report on a project examining the interrelationship between agriculture and the environment.

Environmental policy, at its core, must address the inherent conflict between development and protection. Both of these forces are critical, and sound environmental policy is such that it mediates reasonable solutions between them.

Unlike policies which depend upon legislation and enforcement, a new approach to environmental policy is gaining momentum which emphasizes mediation between the different approaches and between the different concerned parties where interests are in conflict. As such, there is an increase in the use of mediation between parties demanding commercial development, and those demanding protection of the environment, where each has different interests, opinions and perceptions of the situation. This approach is emphasized in this report, prepared by Dr. Debra Shmueli and Dr. Michal Ben Gal from the University of Haifa. We believe that mediation will be utilized more and more in the future and are hopeful that we will increase the awareness in this country that acceptable solutions can be reached without involving the legal and enforcement systems.

An additional subject addressed in this report is the recognition that the country's regional councils must be involved and committed to environmental issues. The regional councils are responsible for some 83% of the country's non-urban, open land, therefore they have a special role to play. They are responsible for environmental protection on behalf of the residents who live under their jurisdiction, as well as the rest of the citizens of the country who need, and are entitled to, the essential experience of visiting open, green spaces, which embody the values of nature, agriculture and our national heritage.

In the third part of this report, we present the main findings of a project which was carried out in order to quantify the environmental-social benefits and efficiency of agriculture, with the purpose of integrating the external values of agriculture into the Israeli farmer's income in different regions of the country (for more on this subject, see the section on "Agriculture and the Environment" below).

This report can be downloaded (in Hebrew) from the S. Neaman Institute website: www.neaman.org.il

THE GLOBAL ENVIRONMENTAL MARKET AND BUSINESS OPPORTUNITIES FOR ISRAEL

A Preliminary Model for Estimating Costs and Benefits for the Israeli Economy from Investments in Environmental Technologies

Project Leader: Dr. Ofira Ayalon, **Participants:** Mr. Yitzhak Goren, Pareto Engineers Ltd.

This Project was carried out in cooperation with the Ministry of Environment

The S. Neaman Institute has been promoting the field of environmental technologies since the beginning of 2003, together with the Ministry of the Environment. As a part of this effort, a team was established comprising representatives from the government, academia, technology, the Israeli Export Institute, and others. In July 2003, the first report on this subject was presented, which included a survey of the size of the world's market and the advantages and obstacles Israel faces to penetrate it. It also examined possible means to promote this area. One of the conclusions reached was that a cost/benefit analysis should be conducted to determine the implications for Israel in supporting this field.

During 2004, a preliminary economic analysis was conducted to estimate the costs and benefits to the Israeli economy as a result of investment in developing environmental technologies. The conclusions that arose pointed to a need for government investment in the field, which will enable Israeli exports to capture 2-3% of the world market. Without this support, Israel's market share will remain at 1% only, with the difference between the two options representing some $3 Billion in lost revenues, a reduction in environmental quality in Israel, commercial opportunities lost, and more. Moreover, according to this analysis, investing in environmental technologies would create some 10,000 jobs by 2010. Furthermore, the report projects that within about six years of government involvement in the field, the benefits will exceed the costs, further strengthening the rationale for government support to companies with environmental technologies.

Government support can constitute administrative measures, financial assistance or monetary equivalents, or indirect, administrative, measures (i.e. increasing public awareness of environmental technology, diligently enforcing compliance with environmental regulations which will spur industry to adopt these technologies, requiring that Israeli companies be included in applications for government and public tenders, increasing dissemination of information on international project opportunities, and of course, for the government to take concrete actions in this field). The government can also provide financial support to companies beyond the incubator stage, invest in funds dedicated to assisting in the establishment of beta sites, finance professional consulting and mentoring in business development and marketing, integrate environmental technologies into the MAGNET program, finance international marketing efforts, and more.

This report can be downloaded (in Hebrew) from the S. Neaman Institute website: www.neaman.org.il

AGRICULTURE AND THE ENVIRONMENT

Project Leader: Prof. Yoram Avnimelech

Project Team: Dr. Haim Zaban, Ms. Liron Amdor - Zenobar Consultants Ltd., Dr. Ofira Ayalon

One of the S. Neaman Institute's principal activities involves evaluating and quantifying the interrelationships between agriculture, the environment and Israeli society. We are convinced that maintaining a dynamic and environmentally sound agricultural sector is critical for the existence of the State of Israel, and represents a central element for environmental quality, our landscape and our heritage. We have been active towards changing public perceptions about agriculture, emphasizing its recognition as a critical part of our society and not just a commercial sector with narrow interests. It seems that a change in attitudes is also taking place among the farmers, acknowledging the need to address environmental and social issues in their approach to agriculture.

In a project carried out together with Zenobar Consultants, we evaluated the positive external values of agriculture to society and to the environment, and reached the conclusion that the external value per hectare of Israeli agricultural land averages $730. In order to help preserve agriculture and its contribution to society, economic and administrative tools must be found which will enable farmers to receive the extra compensation which they are entitled to when considering the external services they provide to society.

The third stage of this project will commence in early 2005, funded jointly with Mifal HaPayis' Sapir Fund. We are working together with a select group of regional councils and other government agencies to apply solutions for environmentally sound agriculture, which will, hopefully, serve as models for adoption by other regional councils.

Together with the Jezreel Valley and Megiddo Regional Councils, a project is underway dedicated to environmental improvement, while involving and integrating the tourism businesses in the region. Projects will be undertaken to improve roadside landscaping, while emphasizing agricultural elements (examples of typical crops, showcasing seasonal flowers and opportunities for "pick-your-own" flowers, etc.), and improving the infrastructure for rural tourism.

In parallel, environmentally sound and economically viable solutions for using urban waste are being planned. An appropriate agricultural system for regions which use treated wastewater is being developed which will determine the optimal level of treatment. Furthermore, regional projects will be developed for appropriate use of compost from municipal waste and sludge from wastewater treatment plants. These activities will ultimately yield significant savings for the Israeli economy, at least part of which could be reinvested in supporting agriculture.

Similar activities are planned in cooperation with the Emek Hefer and Drom Sharon Regional Councils. In addition to the importance of these projects in their own right, they also are examples of the success of the S. Neaman Institute in raising environmental topics to the center of public and professional agendas, with the goal of improving our national environment.

This project is a work in progress.

A report on this project can be downloaded (in Hebrew) from the S. Neaman Institute website: www.neaman.org.il

ENERGY AND THE ENVIRONMENT - A SURVEY OF AIR CONDITIONING IN ISRAEL

Potential Savings and Policy for Reducing Energy Demands

Project Leader: Dr. Ofira Ayalon, **Survey Conductor:** Dr. Moshe (Dan) Hirsh
Steering Committee: Professor Gershon Grossman, Prof. Avraham Shitzer, Dr. Haled Gomid, Mr. Yitzhak Goren, Professor Yoram Avnimelech, Mr. Yaron Arnon

This project was carried out in cooperation with the Ministry of the Environment

Over the years, energy consumption in Israel has increased significantly due to the increase in population and rising standards of quality of life. Moreover, during this time the amount of energy consumption related to air conditioning and heating has also increased relative to energy consumption in general. In light of this trend, the Ministry of the Environment requested that the S. Neaman Institute characterize climate control use in Israel from the perspective of energy consumption and efficiency, and to examine the potential of savings to the national economy and to the individual consumer as a result of replacing old technologies with newer, more efficient ones. In parallel, they requested that the Institute propose other options or policies that would moderate the growth in energy consumption.

According to a survey carried out as part of this project, it was found that the technological potential for addressing consumption peaks needed to be examined. This would entail examining the technological potential for addressing the peaks of consumption in summer mornings, taking into account the costs and benefits to the national economy and the individual consumer that result from increasing efficiency of air conditioners. Through energy-saving technological improvements, the growth in energy consumption, particularly during peak periods of air conditioners use, can be moderated. It was found, however, that government support for replacing/increasing efficiency of home air conditions is hardly attractive, while in the commercial/industrial sectors, projects should be promoted awarding grants of $200-400 for every kilowatt saved.

The work in this project revealed once again the need for indirect government assistance to encourage application of energy-saving technologies and systems through measures such as constantly raising the value of energy efficiency compliance, promotion of environmentally sound building practices and application of energy efficiency standards, and general training through distribution of informational materials and through the media, which will direct the public to carry out simple measures to conserve energy (i.e. cleaning filters, ventilation instead of air conditioning, etc.). Furthermore, it was recommended to prepare guidebooks and computer programs that are easy to use, that will help in optimal planning of climate control systems in existing buildings and those in the planning stages. In this way, the general public will be able to enjoy energy-efficient air conditioning suited to the type of building, household use and climatic environment.

This project is a work in progress.

A report on this project can be downloaded (in Hebrew) from the S. Neaman Institute website: www.neaman.org.il

POLICY TOWARDS REDUCING TRANSPORTATION-RELATED AIR-POLLUTION IN DAN REGION

Project Leader: Dr. Ofira Ayalon, **Project Team:** Mr. Yitzhak Goren, Mr. Shai Jarby - S. Neaman Inst., Dr. Noam Gressel and Mr. Ofer Ben Dov-Assif Strategies Ltd., Pareto Engineers Ltd., Dr. Yaakov Garb, Floersheimer Institute for Policy Studies

This project is being carried out on behalf of the Dan Region Association of Towns for Environment and Waste Water.

Three main factors influence air quality in the Dan region – the most densely populated metropolis in Israel: motor-vehicle transportation, electricity production and other industries. Moreover air pollution is also found in the area from sources that are not within the Association's jurisdiction. This project aims to establish policy and goals for reducing transportation-related air pollution in the Dan Region that can be initiated, applied and enforced by the municipal authorities under the umbrella of the Association of Towns.

Preparation of the policy paper is based on characterizing the existing situation, defining the implications of continuing with "business as usual", identifying all those activities carried out today in the municipal and governmental systems that have an effect on air quality, identifying technological developments and other transportation concepts that are ready for use, that could be integrated and affect air quality. The policy paper is composed of two layers: The first and main layer proposes policy and the steps each entity in the Association can and should take to enact it. The second layer indicates those activities which government entities should carry out as support and/or as central efforts towards improving air quality in Dan Region.

The policy that will be recommended will be integrative and will include among its main elements the professional-technological perspective, the legal perspective, creation of cooperative operational frameworks to meet the goals between the local councils and the entities responsible for air pollution, the explanatory and public perspective for carrying out the plan and the enforcement perspective.

This project is a work in progress.

INTRODUCING A PACKAGING LAW IN ISRAEL

POTENTIAL AND POSSIBILITIES FOR APPLICATION

Project Leader: Dr. Ofira Ayalon, **Project Team:** Professor Mordechai Shechter - Natural Resources and Environmental Research Center, Haifa University; Kivun Consultants Ltd.

This project is carried out on behalf of ELA – Collection for the Environment

Packaging represents, according to rough estimates, about 10-15% of the weight of municipal solid waste, and about one third of its volume. In economic terms, some $100-150 Million each year are spent over this fraction, without even taking into account the external effects of producing the packaging, collection, transport and waste treatment.

At the end of the 1990's, the Ministry of the Environment considered introducing a packaging law in Israel, although it was eventually decided not to do so and that the management of packaging would be carried out in the context of overall solid waste management. However, in the intervening years, the law for bottle deposits was introduced in Israel (which created a logistical system for management of packaging) and in the western world we are facing many new additions and expansions of the packaging laws. In light of these developments, the S. Neaman Institute proposed to evaluate once again the subject, with the intention of evaluating the tools and systems that are most efficient to reduce the quantity and volume of packaging at the source.

The research involves collection of technical, economic and administrative data, mainly from Europe, which is a leader in this field, examination of alternatives for applying packaging law under Israeli economic conditions, and recommends a preferred option. According to the initial findings of the research, it was found that carrying out the packaging law is desirable and that introducing the law will promote the establishment of recycling industries in Israel, something which was not possible in the framework of the existing legislation (law of deposit for beverage bottles), due to economic infeasibility in establishing recycling industries and a logistical system of transport services of only one type of packaging (bottles). Moreover, successful implementation of the packaging law will lead to a significant reduction in waste disposal areas for municipal waste and savings to the national economy.

This project is a work in progress.

EVALUATION OF A PLAN FOR MUNICIPAL SOLID WASTE SEPARATION IN HAIFA

Project Leaders: Prof. Yoram Avnimelech, Dr. Ofira Ayalon

Israel is contending with ever increasing amounts of waste. Every year there is an increase of about 2.5% in the amount of municipal solid waste. Moreover, the options for disposing this waste are decreasing, and planners are encountering ever greater difficulties in identifying new sites for waste disposal, where the effects on the environment and the public will be minimal. Technologic and administrative alternatives for waste disposal have yet to be widely developed and only a small portion of waste is recycled or re-used in some meaningful way. As a result, by 2007-2008 Israel can expect, according to projections by the Ministry of the Environment, to reach a situation where the waste disposal sites can no longer accommodate the accumulated amounts of waste.

This situation raises the need to examine new alternatives that include changes in the system for treating waste and commercial initiatives in the field. Metropolitan Haifa, perhaps more than any other area in Israel, must make a decision regarding solutions for the waste disposal problems in the future. This need emerged from the fact that the waste disposal sites in the north of the country will be closing in the near future. Furthermore, disposal of degradable organic waste is forbidden in Europe and in the future, Israel will also have to adopt a similar measure. The alternative is disposal of "dry", organic free, waste only, after a process of separation and sorting.

According to the composition of waste in Israel, it seems that the option whereby clean organic waste is transferred for composting, and dry waste is left for waste disposal or recycling is the option that economically and environmentally ensures a positive change in the waste processing system. The option for separating waste at the source is suitable for any type of solution that may be developed in the future. It should be noted that separation at the source implies separation at the citizens' home. Furthermore, organic waste from markets, grocery stores, public institutions such as hotels, restaurants, geriatric residences, etc. would also be applicable. From a preliminary calculation, it seems that this option is not more expensive than the present waste management. At this point, the Haifa Municipality is examining, together with the S. Neaman Institute, the economic and administrative re-organization that will be required to carry out the waste separation project in one of the neighborhoods in the city, which will encompass some 50,000 residents.

This project is a work in progress

THE GREEN CAMPUS AT THE TECHNION

Project Leaders: Dr. Ofira Ayalon and Prof. Yoram Avnimelech

The Green Campus project at the Technion, led by the S. Neaman Institute, is intended to instill values of environmental quality and protection. The project began in May 2000 with the goal of not only talking about the environment, but also of doing something about it. The Technion, as a leading research center serves as a role model for academic institutions in Israel and the rest of the world. The Technion is a veteran and central technological institution in Israel, responsible for educating engineers and scientists, operating at the forefront of research and development to advance, among others- environmental issues. The management staff of the project includes representatives from the student association, who take a full part in its activities and initiatives; the Green Campus council, which was appointed by the President of the Technion, is comprised of representatives from the academic faculties and key individuals in the management of the Technion, managers in the administrative and maintenance branch, the Technion spokesperson, and more.

The Green Campus project's activities are in the areas of education and consciousness-raising, saving of resources (water, energy, recycling, etc.). At the initiative of the Green Campus, and supported by donations, an Ecological Garden was developed and it is now open to the public. This garden is intended to educate and raise awareness of the importance of environmental protection among the generations of the future. A tour of the garden strengthens the awareness of the public of the importance of a natural environment, of the resources within it, and the importance of protecting them. The Ecological Garden is a place for recreation and relaxation for Technion students and faculty, workers, and for the general public. A virtual tour of the Ecological Garden can be taken through the project's website (see below).

Moreover, the Green Campus project also sponsors lectures that are open to the public and free of charge, which present different aspects of environmental protection, presentation of new research projects in the field, and development and ideas from the Technion, to introduce into the public consciousness the subject of the environment and its protection.

Additional information on this project can be found at: **http://techunix.technion.ac.il/~greenweb**

THE SCIENCE, TECHNOLOGY AND THE ECONOMY (STE) PROGRAM

Head of Program: Prof. Manuel Trajtenberg; **Academic Coordinators**: Prof. Dan Peled, Prof. Saul Lach

STE is a core program aimed at developing national policy alternatives for key issues lying at the interface between Science, Technology and the Economy. Prof. Manuel Trajtenberg chairs and coordinates its activities, aided by Prof. Dan Peled and Prof. Saul Lach. There are about 15 researchers participating regularly in the program, mostly economists from various universities and research organizations, in addition to a range of other participants. The program has been characterized since its inception by several outstanding features: First, it cuts across university boundaries trying to bring under one roof the best researchers in the field; second, it attempts not only to promote top academic research in STE-related areas, but also to harness the academic expertise so created for current policy issues; lastly, it aims to educate a cadre of young, policy-oriented research scholars for Israel. Hopefully this modus operandi will help place the S. Neaman Institute and the Technion at the center of national policy making. The activities of this program started in late October 2000, thus we are now in the midst of the program's sixth year.

I. New Research Projects

The academic committee of the STE Program selected this year five new projects and one continuation project[1], which bring in an excellent group of researchers from various universities and disciplines, and cover a range of topics of interest to the Program. This year we undertook to support fewer *new* projects, in view of the fact that last year (i.e. in 2003-04) we supported an unusually large number of projects, quite a few of those are still ongoing, and the researchers conducting them participate in the meetings this year as well. Following is the list of new projects:

1. ***"The role venture capital plays in the life sciences sector in Israel"*** Morris Teubal and Yuval Markus, Department of Economics, Hebrew University
2. ***"Why do Foreign Firms Register Their Patents in Israel? An Empirical and Theoretical Study"*** Benjamin Bental, Department of Economics, Michal Gal, Law School, Haifa University
3. ***"Start-up funding inefficiencies due to VC's limited horizon."*** Eugene Kandel, Harry Yukleah, Business School, Hebrew University
4. ***"Incentives, Constraints and Objectives in Technology Licensing Offices and the Effectiveness of Technology Transfer Activities"*** Mark Schankerman, LSE, UK, and Saul Lach, Department of Economics, Hebrew University
5. ***"The Longitudinal Panel of Israeli Manufacturing Firms: 1955-1999. Report for 2004, Plan for 2005"*** Haim Regev, CBS
6. ***"Growth Profiles in the Israeli Enterprise Software Sector"*** (continuation project) Jonathan Menuchin and Niron Hashai, Business School, Hebrew University

[1] *Continuation projects refer to those that were carried out the previous year and for which the researchers submitted interesting and valuable follow up research plans.*

Several of the projects supported by the STE program in past years came to completion in the course of this academic year. The results were presented during the periodic meetings of the group, and published in the STE Working Papers series (see below).

II. Scholarships

Since its inception we understood at the STE Program that one of the limiting factors facing policy-oriented research in this field is the scarcity of economists and researchers in related disciplines that specialize in Science and Technology. It was thus decided to support graduate students in order to encourage them to write dissertations in this area. Since 2000-2001 we have supported 20 students writing MA and Ph.D. dissertations at various universities, and this year we awarded scholarships to the following seven graduate students (notice the variety of institutions: each student belongs to a different one):

1. Edo Eshet, Law School, Tel Aviv University, ***"Service Innovations"***
2. Danny Breznit**z**, Ph.D. candidate, MIT ***"A Misunderstood "Miracle" – The State and the Growth of the IT Industry in Ireland"***
3. Ity Shurtz, Eitan Berglas School of Economics, Tel Aviv University ***"Estimation of Network Effects and Learning in the Diffusion of New Technology"***
4. Shiri Breznitz, Cambridge University, UK ***"The Role of the University in Regional Economic Development – The University as a social agent."***
5. Amit Epstein, Technion ***"Location Choice of High-Tech Firms in Intra-Metropolitan Area"***
6. Nir Brueller, Business School, Tel Aviv University, ***"Creation and Capture of Value in Technology-Grafting Acquisitions"***
7. Ofer Tur-Sinai, Law School, Hebrew University ***"Patent Law and Sequential Innovations"***

III. Working Papers

One of the intended goals of the STE Program is to influence the national agenda and policy making in Science and Technology. Thus, dissemination of the research outputs resulting from the projects supported is key to the success of the Program. One of the main vehicles to that end is the Working Papers Series, comprising the end results of STE projects, as well as other papers of related interest, written by researchers connected to the Program. These are the working papers published lately (several more are currently in the making):

- Cohen-Goldner, Sarit and Zvi Eckstein, "Immigrants in the Hi-Tech Sector: Comparison to Natives and the Effect of Training", STE-WP-22-2004, October 2004.
- Ber, Hedva and Yishay Yafeh, "Can Venture Capital Funds Pick Winners? Evidence from Pre-IPO Survival Rates and Post-IPO Performance", STE-WP-23-2004, October 2004.
- Menuchin, Jonathan, and Nir Hashsi, "Firm Growth Profiles (FGPs): Towards an Action-Based View of Firm Development." STE-WP-24-2004 January 2005.
- Avimelech, Gil and Morris Teubal, "Evolutionary Innovation and High Tech Policy: What can we learn from Israel's Targeting of Venture Capital?". STE-WP-25, March 2005.

- Frenkel, Amnon, Daniel Shefer, Michal Miller, "Public vs. Private Technological Incubators Programs: Privatizing the Technological Incubators in Israel." STE-WP-26, March 2005.

An additional research project, not under the auspices of STE but in its field of study, was entitled: "A Typology of New Business Formations Based on Psychological Contract Theory", by Zipi Shperling and Michael Lubatkin.

IV. Monthly Meetings

The STE Program continued holding the traditional monthly meetings in which members of the group present and discuss ongoing projects. One of the significant advantages of this forum is that it allows feedback at earlier stages of the projects in a constructive, sympathetic academic environment, thus truly influencing and helping the researchers reach their stated goals. Such an environment is seldom encountered in traditional academic forums. Each meeting lasts over three hours, and typically includes three presentations, and discussions of additional topics of interest to the group.

In the course of the fall semester of this academic year (2004-05) three meetings were held, comprising presentations of ongoing research projects (including those by scholarship recipients), as well as academic talks. Mark Schankerman (from LSE, UK) visited with us during early January, 2005, and presented a seminar at the January 6, 2005 meeting of the group. We plan to hold four meetings during the spring semester, as well as the bi-annual conference.

V. Outreach Activities

In July 2004 Prof. Manuel Trajtenberg participated in a panel discussion held at the National Bureau of Economic Research (NBER) annual Summer Institute, on ***The Future of US Scientific and Technological Leadership*** (the other panelists were Michael Porter of the Harvard Business School, and Martin Blume, Editor-in-Chief of The American Physical Society). In August 2004 Prof. Trajtenberg made a presentation at the Forum of Project Directors of the Office of the Chief Scientist, Ministry of Industry, Trade and Labor on "New Directions for R&D Policy in Israel."

ISRAELI SCIENCE AND TECHNOLOGY INDICATORS (ISTI)

Investigators: Prof. Dan Peled, Dr. Daphne Getz, Marian Shumaf

The goal of this project, which is operating under the auspices of the S. Neaman Institute, is to create databases and indicators of scientific, technological and R&D activities taking place in Israel over time, which will serve for comparative purposes on an international scale. This benchmarking activity will enable a quantitative assessment of Israel's R&D activities, scientific capabilities and infrastructure, and how they are funded. The databases are developed in close cooperation with the Central Bureau of Statistics and in accordance with the guidelines officially adopted by the EU. Databases by other international organizations such as the OECD's Department of Science and Technology, the EU's Department of Statistics and the US Patent Department, are also used.

The first stage in the project calls for collection and processing of data in three key areas related to science and technology:

- Private and Public Investment in R&D
  Data in this category relate to R&D expenses on a national level and R&D activities in the commercial sector. The indicators for this category are:
  1. National spending on R&D as a percentage of the Gross Domestic Expenditure (GERD)
  2. The percentage of national R&D funding financed by each sector (i.e. government, industry and higher education).
  3. The percentage of R&D funds used by each sector.
  4. The distribution of the R&D funds in the commercial sector according to areas, etc.

- Human Capital in Science and Technology
  In this category, data are characterized that relate to R&D in the commercial sector (rate of R&D employees in commercial sector and in the country, and those divided by categories), the academic sector (teaching and research faculty in universities according to rank), and among university graduates (BSc, MSc and PhD recipients) in the areas of science and technology. Furthermore, data is collected related to the proportion of women among university graduates and their relative position among R&D workers in the commercial sector.

- Scientific and Technology Production
  1. **Patents**. In order to measure technological accomplishment, data on the number of applications for patents in Israel and overseas was analyzed. For example, the number of patents per citizen, the number of patents per Shekel spent on R&D, the annual rate of increase in applications for patents, etc.
  2. **Scientific Publications**. Another measure of scientific output considers such factors as: number of scientific publications per citizen and according to scientific area. To establish the quality of research, data were analyzed based on the citation index.

The indicators are published in a report that is updated every year and expanded according to the development of different scientific areas. The second level of the project will attempt to use these indicators and data to perform policy analyses related to R&D and creation of the scientific technological infrastructure, and their impact on the national economy. Examples of such policy analyses include: examining the demographic trends in human resources working in R&D and in the different industrial sectors, the migration of human resources, funding of research in public institutions, and direct government support of R&D activities in the commercial sector.

This project is a work in progress.

THE ZVI GRILICHES RESEARCH DATA CENTER

The Zvi Griliches Research Data Center was established by Haim Regev, former Associate Director of the Central Bureau of Statistics (CBS), and Prof. Saul Lach of the Department of Economics at Hebrew University, to incorporate data from the Office of the Chief Scientist (OCS) of the Ministry of Industry, Trade and Labor, with data from the CBS. The data center, which was established and operates at the S. Neaman Institute, comprises data on R&D projects which were supported by the OCS, and on companies which carried out projects since the mid 1980s. The establishment and development of this data center are a part of the ongoing activities of the STE group, operating under the auspices of the S. Neaman Institute. The data center can be accessed by researchers through the internet and at a special research room at the CBS.

The main goal of the data center is to promote R&D, encourage innovation, and advance areas related to human resources, business productivity, etc.

The main activities of the Zvi Griliches Center are:

- Establishment of comprehensive data sets, which enable research at the level of commercial entity. The data infrastructure is located at the CBS, and comprises data collected over the years and from managerial files received from different government ministries.
- Assisting research based on data included in the Center, including confidential data in research rooms at the CBS. Use of this data is made possible through a special arrangement between the CBS and the S. Neaman Institute. The data center is an integral part of the S. Neaman Institute website, under the responsibility of Orly Nathan-Shats, Information Specialist at the Institute.

Activities in 2004

Haim Regev continued his outstanding work incorporating new data into the Center, aided by Simcha Bar Eliezer and Soli Peleg of the CBS. As of late he has developed a unique data set tracing detailed information on industrial firms in Israel back to the 1930's. We expect to soon have the data on new plant varieties being developed by Dan Rymon and Baruch Bar-Tel.

EVALUATION OF THE MAGNETON PROGRAM

Project Leader: Dr. Daphne Getz, **Research Assistant:** Mariana Ardetz

The Magneton Program was established by the Chief Scientist of the Ministry of Industry, Trade and Labor to encourage cooperation between academia and industry. The program is based on matching one research group in academia and one in industry, as opposed to the Magnet consortia program where a number of industries and academic groups are partners in the consortium research program. The Magneton Program's objective is to increase the accessibility of Israeli industry to the achievements of economic-industrial oriented scientific research.

The S. Neaman Institute conducts research evaluating the Magneton Program in order to analyze its effectiveness as a tool for encouraging technology transfer from academia to industry, and for commercialization of the technology and its application to products and services. The research also evaluates the impact of the Program on promoting innovation of companies and their growth. The results of this research provide important feed-back to investors (Government, Industry), participants (Academia, Industry, Government), and executives to support policy-making decisions.

In order to study the subject and formulate a questionnaire a preliminary survey was conducted. Ten researchers from the Technion who participated in the Magneton Program were interviewed, as well as the heads of those projects from the companies. During the preliminary survey we conducted interviews using a questionnaire that included 60 questions, most of which were open ended. As a result of the pilot, more focused questionnaires were formulated which were aimed mainly at examining the products of the projects and their outcomes, as well as the impact of the projects and the continuation of the activities in the industries and in academia. Therefore it was decided to focus only on projects that have already ended. The questionnaire attempts to locate factors of success or lack of success in the projects and to learn about the direct and indirect impact of the projects on the participants from the industry and from academia.

Through today 50 Magneton projects have ended: 16 at the Technion, 14 at Ben-Gurion University, eight at Tel Aviv University, six at Hebrew University, three at Bar-Ilan University, two at the Weizmann Institute and one in the Oceanographic & Limnological Research Institute. Nearly all of the participants from the Technion and Ben-Gurion University were interviewed.

This project is a work in progress.

BALANCING INNOVATION, QUALITY AND EFFICIENCY IN R&D ORGANIZATIONS

Project Leader: Professor Miriam Erez; **Project Team:** Dr. Eitan Naveh, Ella Miron

The S. Neaman Institute has been promoting the fields of science, technology and economy since the beginning of 2003. In 2003/4 the main focus was on Industrial Organization (IO) aspects of Innovation / High Tech.

Our study focuses on managing innovation while maintaining quality and efficiency in R&D organizations. We suggest that successful management of new product development is crucial for the competitiveness of Israeli high-tech, which has gained worldwide recognition for its technological advancement. However, the uniqueness of a technology may lose its attractiveness if it does not meet quality requirements, and time and budget constraints. The purpose of our research was to study the factors that facilitate or inhibit the balance between innovation, quality and efficiency. The study is conducted in one of the R&D organizations in the defense industry in three organizational units – two R&D units and one manufacturing plant. This design will enable us to investigate the R&D process that takes place in the manufacturing plant, from the beginning to the end.

During 2003, we tested the balance of innovation, quality, and efficiency at the employee level. This part of the research received the Third prize of the Mitchner Award for Quality Sciences and Quality Management at the Technion. In addition, the research was presented at the Annual Meeting of the Academy of Management in Seattle, August, 2003 in a symposium organized by M. Erez., and C. Lee titled: Innovation in Organizations - Individual, Team, Organizational, and National Factors. The symposium won The Most Innovative Session Award. Finally, a paper written on the first part of this study was published in a special issue on Innovation of the Journal of Organizational Behavior, 2004.

During 2004, we collected and analyzed additional data at the organizational unit level. We examined whether the leadership and team characteristics that lead to product innovation in the R&D phase differ from those producing process innovation in the manufacturing phase. A paper entitled: "Same leadership and team characteristics, yet different effects on innovation in R&D versus manufacturing", was accepted to the Annual Meeting of the Academy of Management, Honolulu, August, 2005. The paper will be presented in a symposium organized by M. Erez., and C. Lee entitled: Team innovation: Effects of leadership, team composition, structure, and processes.

This project is a work in progress.

UNIVERSITY PATENT COMMERCIALIZATION:

Managing the Opportunity Discovery and Evaluation Process to Enhance Expected Value.

Project Leaders: Professor Uzi de Haan, Prof. Miriam Erez, Prof. Avi Fiegenbaum, Tali Sivan, Ella Miron

The S. Neaman Institute supported program **Entrepreneurship Laboratory** was finalized with the design of an action-learning course in Entrepreneurship called E-lab, in which business plans for Technion patents were developed by teams composed of MBA students together with the patent inventor(s) and coached by venture capital managers.
After a successful pilot during spring 2003 by Dr. Zipi Shperling, the course was given during spring 2004 and fall semester 2004 by Professor Uzi de Haan and Tali Sivan, a doctoral student, as teaching assistant, with great success.

The E lab course presented the opportunity to develop a research model to manage the process of identifying and evaluating entrepreneurial opportunities, in order to enhance the value of the original idea.

The research proposes a new theoretical framework to enhance the economic value of universities' patents in the commercialization stage. We introduce a management procedure to be carried out within the university before it is presented to external interested parties. This process is aimed at creating competitive knowledge, which feeds into the discovery–evaluation process and as a result, enhances the economic value of the initial opportunity presented by the inventor. The model assumes a spiral process. Namely, the discovery–evaluation process is an iterative cycle, ending in an exploitation of an opportunity, which most likely will be different from the initial one, with a higher expected economic value. The model proposes two sources for creating competitive knowledge. One is by using an entrepreneurial management team (EMT) consisting of MBA students who work together with the patent inventor. Their joint prior knowledge is greater than the prior knowledge of a single inventor. The second involves external knowledge resources, including the course instructors, venture capitalists and technology-business experts, who served as consultants and provided feedback to the entrepreneurial management team.
The research model was empirically examined on six teams during the third time the course was offered. Initial findings supported the proposed theory and model. The results demonstrated that this process leads to the creation of competitive knowledge that stimulates the re-conceptualization of the initial opportunity discovered by the inventor, and the evaluation process resulting with an opportunity more attractive to investors.
In addition, papers written on the first phase of this study were accepted for presentation in two global Entrepreneurship conferences: Babson Kauffman Entrepreneurial Research Conference (Boston, June 2005), and ICER Entrepreneurial Conference (February 2005
The model will be further developed and validated with as research objectives:

a) To focus on the discovery and evaluation phase of the entrepreneurial opportunity

b) To explore the competitive knowledge effect on the opportunity expected value.

c) To explore the effect of the team cooperation with the inventor on competitive knowledge.

d) To explore the effect of a team's network on competitive knowledge.

e) To explore the effect of team diversity on competitive knowledge.

f) To explore our model in the university commercialization setting, by applying it to future E-lab courses.

This project is a work in progress.

NATIONAL SECURITY RESEARCH FORUM

Chairman: General (Res.) Uzi Dayan; **Forum Members:** Prof. Moshe Arens, Dan Meridor, Professor and General (Res.) Amos Horev, Prof. Zehev Tadmor, Prof. Nadav Liron, Prof. Manuel Trajtenberg, Prof. Dan Peled, Prof. Nehemia Friedland; **Coordinator:** General (Res.) Moshe Elad

The National Security Research Forum was established as an independent body under the auspices of the S. Neaman Institute. The purpose of the Forum is to create a research infrastructure addressing areas of national security, utilizing and integrating the existing potential at research institutes in the country, with the intention of basing a body of knowledge on in depth and systematic research.

To that end, two working groups have been established, focusing on "Economy and National Security" and "Society and National Security".

ECONOMICS OF NATIONAL SECURITY PROGRAM (ENS)

Chairman: Prof. Dan Peled; Advisory; **Committee:** Prof. Manuel Trajtenberg, Prof. Daniel Tsiddon

This program was officially launched in November 2003 as a core program of the Research Forum on National Security at the S. Neaman Institute, headed by Major General (Ret.) Uzi Dayan. The Program chair is Prof. Dan Peled from the Department of Economics at the University of Haifa, and the Program Advisory Committee also includes Profs. Manuel Trajtenberg and Daniel Tsiddon from the Berglas School of Economics at Tel Aviv University. This is an inter-mural program which seeks to initiate, encourage, and facilitate high quality academic research on the much neglected interconnections between economics and defense. The close ties between economic strength and development on one hand, and defense capabilities and security on the other, while being well recognized, have not been studied closely in quantitative ways by the academic community. There is a grave concern that important decisions with critical implications are undertaken by policy makers without proper background research or attempts to quantify their impacts. Moreover, there is a shortage of skilled researchers whose interests and expertise encompass the links between economics and security in Israel.

The ENS Program is trying to bridge these gaps in several ways. First, it assembled a cadre of top economists and researchers from related disciplines from several universities and research institutes in Israel. This group meets regularly to discuss various issues, research questions and methodologies, and attend presentations by outside experts and decision makers from the defense and government sectors. Second, "Calls for Proposals" were circulated among Israeli universities, research institutes, and defense industries in order to offer research support on a broad range of defense-economics topics identified by the Program's advisory committee. Third, a "Call for Scholarships" was circulated among all economics, management and other relevant graduate programs in Israel, to encourage young researchers to focus their career development in directions conducive to defense-economics research.

Finally, attempts are underway to establish close links with decision makers at government agencies responsible for defense and security, IDF units, and other defense organizations. Such links are deemed vital to the Program's mission, since they will insure that the Program focuses on issues and problems perceived to be of national importance. Such links will also help to maximize the impact of the Program's supported research results, and will establish ENS at the S. Neaman Institute as a major resource in Israel for defense-economics issues, research methodologies, and data.

A first annual full-day ENS Conference, bringing together researchers and decision makers in defense-economics is being planned for the beginning of the 2005-6 academic year.

A. Researchers Meetings 2004-5

The ENS researchers group is still growing, with currently over 50 participants from institutions including: Tel Aviv University, Hebrew University of Jerusalem, Bar-Ilan University, University of Haifa, the Technion, Bank of Israel, and the National Security

Council; former defense industries leaders are also actively participating in the research meetings and other activities.

During 2004, seven research meetings were held, with an average of 25 participants present in each meeting. Members of the group presented their on-going research, and outside invited speakers presented their views on pertinent issues pertaining to the links between economics and national security. Outside speakers included: Brigadier General Ariel Heiman, (Chief Reserves Officer, IDF); Mr. Ofer Shelah, (defense journalist); Maj. General (Ret.) Prof. Isaac Ben-Israel, (former head of MAFAAT); and Nir Gilead, (former General Accountant, MOF). Summaries of these meetings and presentations are distributed to ENS participants. These meeting are conducted every 4-6 weeks, and provide opportunities for lively debates and formation of collaborations among participants.

B. Research Grants

The ENS Advisory Committee, aided at times by outside referees, has selected five out of 11 grant applications in 2004, and five out of nine applications in 2005. The new projects recommended for funding this year include:

1. Zalman Shiffer, (formerly, Research Department Bank of Israel, and Council of National Security), and Amiram Oren: ***"Economic Implications of Land and Spatial Resources Used by the Defense System".***
2. Oren Setter, (Tel Aviv University, Faculty of Management), ***"Investment in Advanced Defense Technologies under Uncertainty"***.
3. Eric Gould, (Hebrew University of Jerusalem, Department of Economics) and Guy Stecklov (Hebrew University of Jerusalem, Department of Sociology and Anthropology), ***"The Effects of Terror on Crime: Empirical Evidence from Israel"***.
4. Bradley Raffle and Naomi Feldman, (Ben Gurion University, Department of Economics), ***"International Support for Terrorism: A Cross-Country Analysis"***.
5. Yakir Plessner, (Hebrew University of Jerusalem, Rehovot, Department of Economics), ***"Estimating the 2nd Intifada Costs to Israeil Economy"***.

C. Scholarships

The ENS Advisory Committee selected three out of six scholarship applications in 2004, and recommends funding six additional scholarships out of 10 submitted applications in 2005. Scholarship grants this year are awarded to:

1. Deganit Paikowsky, (Tel Aviv University, Security Studies): **Space Technologies, Force Formation and Combat Doctrines in the US and Israeli Militaries**.
2. Aviad Tur-Sinai, (Tel Aviv University, Economics): **Price Competition and Equilibrium Characteristics under Terror: A Microeconomic Analysis**.
3. Alex Levkov, (Hebrew University of Jerusalem, Economics): **Wonded Souls: Estimating the Effect of Terrorism on Israeli School Children**.
4. Koby Kagan, (Tel Aviv University, Faculty of Management): **The use of Terror in Asymmetric Arms Races**.

5. Amit Toker, (Ben Gurion University, School of Management): **Ranking Officers and Physicians Salary Schedules in the IDF - a New Proposal**.
6. Haggay Etkes, (Hebrew University of Jerusalem, Economics): **The Security Fence Impact on the Palestinian and Israeli Labor Markets**.

D. Research Reports

Completed research project reports for work supported by the S. Neaman Institute through ENS currently include:

1. Yoad Shefy and Asher Tishler, (Tel Aviv University, Faculty of Management), ***"The Effects of the World Defense Industry and US Military Aid to Israel on the Israeli Defense Industry: A Differential Products Approach"***, (July 2004).
2. Oren Setter and Asher Tishler, (Tel Aviv University, Faculty of Management), ***"Budget Allocation for Integrative Technologies: Theory and Application to the US Military"***, (October 2004).

An ENS Working Papers Series will be added to the ENS –S. Neaman Institute home page, (http://www.neaman.org.il, click on "Social and Health Policy"), where research reports by the ENS participants can be viewed and downloaded, (currently under construction).

E. Outreach Activities

- Members of the SNI National Security Research Forum Steering Committee met with representatives of several defense organizations and IDF units in order to create and promote links between these organizations and the Program's participants.
- Prof. Peled and Prof. Tsiddon were among the civilian participants in 9/2003 in "The Israel Defense Forces and the National Economy of Israel", a 2-day workshop organized by the Israel Democracy Institute with the IDF Chief of Staff and most the General Staff major generals. Prof. Peled subsequently participated in a smaller group that drafted a proposal to reform the defense budgeting procedure which was presented to a committee formed by the Chief of Staff, General Moshe Ya'alon, on that subject.
- Prof. Peled and several other ENS members also participate in on-going discussions on security resource allocations at the Council of National Security, (MALAL).
- Prof. Tsiddon was a member of the team assembled by the Chief Reserve Service Officer, Brigadier General Ariel Heiman, to propose a reform of the reserve service in Israel, which was subsequently adopted by the Government.
- Prof. Tsiddon also participated in the team working with the Ministry of Justice to draft the Evacuation-Compensation Law, ("Pinui-Pitzui"), recently adopted by the Knesset.
- The ENS Program participated in a University of Chicago (UC) proposal to establish a Department of Homeland Security (DHS) funded Center for Terrorism Research. The UC proposal did not win the DHS grant.
- Profs. Trajtenberg and Tsiddon presented some of their research works in various defense-economics and general economics research workshops in the US during the past year.

SOCIETY AND NATIONAL SECURITY

Chairman: Prof. Nehemia Friedland

This program was initiated at the beginning of 2004 and ended in March 2005. The aim was to create a forum for the research of national security that will be an independent research group sponsored by the Samuel Neaman Institute.

The objective of the forum was to establish a research infrastructure on national security with the aid of, and potential incorporation of, Israeli research institutes; the aim of which would be to base the knowledge in this field on thorough and methodical research. The forum was intended to deal with subjects such as: what is the sociological infrastructure of national security? What are the psychological and social "resources" needed for maintaining a suitable level of national security? What is the definition or definitions of "social strength" and what is its characterization with regard to the variables and the processes that manifest the level of social strength.

Three research scholarships were approved by the program and given to four researchers who investigated the subject of social strength. These researchers were: Prof. Asher Arian of the Haifa University, Prof. Avi Kirshenbaum of the Technion, Dr. Karin Amit and Ms. Nicole Fleischer of the Carmel Institute. The four researchers presented the main research results at a round table on March 9th 2005 in the Samuel Neaman Institute. Attending this session were the researchers themselves, the members of the advisory committee of the program and a number of experts from other academic institutes who participated in the closing discussion.

PRIME

Investigators: Dr. Daphne Getz, Prof. Morris Teubal, Prof. Dan Peled, Dr. Dan Breznitz, Dr. Amnon Frenkel, Hani Mansour, Marian Shumaf, Orly Nathan-Shats.

Within the EU sixth framework program, the S. Neaman Institute has joined along with 42 other institutions from 16 different countries in a network of excellence called PRIME. The network officially started its activities in January 2004. During 2003 major efforts were invested in preparing the proposal for the EU. The proposal was accepted and highly rated by the examining committee.

PRIME stands for Policies for Research and Innovation in the Move towards the European Research Area. These policies are facing major transformations. The first relates to the changing dynamics of knowledge production, with the new search regime of the new leading (NBIC) sciences, and with the research intensification of many industries and services. The second is linked to the changing relationship between science and society, with the burgeoning controversies and public debates over priorities and research practices (such as GM field trials). The third concerns the growing importance of both regional and European public authorities. This means that one can no longer simply equate public intervention with national policy, and that we must fundamentally reassess our accumulated knowledge on R&I policies.

The project has certain key characteristics. It is truly international and interdisciplinary, bringing together over 200 researchers (half with established international reputations) and 150 PhD students from four main disciplines, over 40 institutions and 16 countries. A Joint Program of Activities that balances three research actions was constructed. These activities are dedicated to producing world-class research and three structural actions aimed at achieving lasting effects in terms of structuring the field at the European level, those structural actions focusing on database and indicators issues, training, and interactions with the full range of stakeholders.

Among the ongoing and ad-hoc research programs conducted at the S. Neaman Institute, several programs are relevant to PRIME:

(1) STE – The Science, Technology and Economy Program.
(2) ISTI – Israeli Science and Technology Indicators Project.
(3) The Future University Project.
(4) Magnet R&D Consortia Management: managing several industry specific government supported infra-structural R&D consortia of industrial interests and academic research institutions in Israel.

The Neaman institute is active in two PRIME projects: 'ENIP' and 'Venture Fund'.

PRIME- ENIP

Investigators: Dr. Daphne Getz, Hani Mansour, Orly Nathan-Shats, Marian Shumaf

The S. Neaman Institute is taking part in ENIP - European Network of Indicators Producers - which is one of the projects of PRIME. The aim of the ENIP project is to create a network of science and technology indicators producers, based on the experience of recognized institutions, labs or groups, and to develop the capacity for the interpretation of existing indicators and for the research and development of new ones. The ENIP project is producing through its action a comparison analysis between a significant number of European countries, to identify European partners where action is needed and areas of further action. This will contribute for a more thorough knowledge of available data and new indicators of development necessary to strengthen the comparability of data across Europe and the interaction between the relevant players. This is essential to build a long term European Network of Indicators Producers.

During 2004, the researchers from the S. Neaman Institute participated in several meetings of the ENIP group, the result of which is a national report that each country has written. The report first presents the national structure of R&D in the country surveyed; a list of the national S&T-related databases as well as their availability; a description of the national structure of S&T indicators of production, and a brief description of the main Data/Indicators producers.

PRIME- VENTURE FUND:

The Role of Venture Capital in Promoting High Tech and Science-based Growth: A New Rationale for European Policy-Making?

This is a three-year research project that intends to examine the role of venture capital in the process of sustaining innovation and growth in Europe. Beyond financial economics that rely on asymmetric information and related issues of adverse selection and moral hazards, our project highlights the other functions inherent in the "intermediation" role performed by VC. In order to do so, we adopt an evolutionary perspective that emphasizes interactive learning between economic agents (i.e. firms, financial intermediaries, other institutions of innovation systems equipped with different competencies) and allow consideration of venture capital as an essential component of the innovation system. From this perspective, we intend to develop a comparison of industry-studies (life science and ICTs) across different European countries (including Israel) with different institutional environments (regulation, characteristics of other agents of the innovation system).

The major purpose is to depict, analyze and discuss the intermediation mechanisms provided by venture capital in this various set of differentiated environments. This is thought of as a necessary condition to determine the performance of the venture capital industry in its ability to sustain innovation and growth, and to discuss the implications for appropriate policy design in the European context

This project is a work in progress.

NATIONAL INNOVATION STRATEGIES:

SOME INTERNATIONAL COMPARISONS AND COLLABORATIONS

Steering Committee: Prof. Nadav Liron; Dr. Eli Opper; Dr. Orna Berry; Prof. Manuel Trajtenberg; Prof. Morris Teubal; Prof. Shlomo Maital; **Steering Committee, India – Israel project:** Dr Shuki Gleitman (Chairman); Prof. Nadav Liron; Yair Amitai; Azi Hemar; Haya Miller; Dr Amnon Frenkel;
Project Coordinator: Naftali Moser

The international environment in which the Israeli high tech industry operates has changed and become even more competitive over the last few years. Powerful new forces have emerged, such as India in software and China in hardware. Many countries all over the world are determined to build up their high tech industries and capture a share of the global market. R&D has become global: companies now perform R&D at multiple locations; outsourcing has become very prevalent. New industries are emerging, and it is necessary for academia, industry and government to cooperate more closely than in the past. At the same time, government budgets for R&D support in many countries, including Israel, are under pressure.

To maintain its competitive advantage and leadership, Israel must address these challenges and develop new policies and initiatives. The extensive expertise built up over the years under the STE Program of the S. Neaman Institute represents a unique resource for this purpose.

In 2004, the S. Neaman Institute initiated a project to address these issues, in order to support Israel's efforts to maintain national competitive advantage and leadership, and formed a partnership with the Office of the Chief Scientist (OCS), Ministry of Industry, Trade and Labor, for this purpose.

This project brings together representatives from Israel and from foreign countries in a series of bilateral workshops, exchanges, research projects and other activities, to facilitate mutual learning of national innovation systems and policies, and to help build the infrastructure for bilateral partnerships.

It was decided to start the project with activities between Israel and India; and between Israel and Australia. India was chosen because of that strategic country's growing prominence in the IT world, and to assist in the development of productive bilateral cooperation with Israel. Australia was selected in order to expand the strong foundations for cooperation which have been built up over the last decade with this OECD country.

ISRAEL - INDIA PROJECT

The first stage of this project focuses on Israel and India. The year 2004 was used to develop a project plan and team. A partnership was formed between the S. Neaman Institute and the Office of the Chief Scientist. Relations were established with our Indian partners, the Department of Science & Technology, the Technology Information, Forecasting & Assessment Council (TIFAC), and the Indian Embassy in Israel, during a visit to Israel and the S. Neaman Institute by the Secretary to the Government of India; Department of Science & Technology; and a visit to India by Prof Nadav Liron. We identified and met interested parties from academia, industry and NGOs in the two countries; and prepared a plan for the two workshops to be held in 2005, one in Israel (in May) and one in India.

ISRAEL - AUSTRALIA PROJECT

During 2004 a project plan was prepared and a

partnership formed with the Chief Scientist, who visited Australia in September. Relations were established with several Australian partners during a series of visits to Israel and to the S. Neaman Institute which included the Treasurer and Minister of Innovation of the State of Victoria; the Chairman of the Australia – Israel Chamber of Commerce and several delegations of Australian government officials and business people. Interested parties were identified from academia and industry in the two countries; and a workshop is planned to be held in 2005.

This project is a work in progress.

THE SCHOOL + PROJECT

Project Leaders: Prof. Miriam Erez; Ilana Hayer. M.Sc.

"School+" is an R&D project within the Information Society Technologies program, approved by the European Commission Research Directorate General, under the Fifth Framework Program. The project started operating in September 2001.

The main aim of the "School+" project is to design, develop, demonstrate and evaluate a comprehensive teaching and learning environment by integrating a progressive educational perspective with information technologies, to help schools (teachers, students, parents…) acquire and develop knowledge and skills required both by future and present citizens of the information society.

The "School+" project ventures to re-engineer the school environment, to tackle the issue of computerized information technology in schools from its "roots", and to integrate, adapt, enhance and fine-tune the technology to meet the changing needs of schools and citizens seeking education in the information society, and not vice versa.

In order to achieve the objectives described, while taking into account the European dimension, the "School+" project's consortium includes 10 partners from five different countries: Spain, Greece, Israel, the Czech Republic and Finland. It includes partners from academia and industry, as well as five schools, one from each country. The schools are full partners in the project. The participating Israeli school is the "Alliance" Junior High in Haifa. The project is based on expertise and experience brought by the partners, and tries to handle the various needs of Eastern as well as Western Europe.

During 2003, a first version of the "Microcosmos" computerized platform was developed. A first pilot was conducted in the five participating schools, and the "Microcosmos" was tested in classes of the secondary age level. The main chosen topic was water, and each school chose questions which were of interest to them, and researched them. An evaluation report was written, and the platform and pedagogical methods were improved. A second version of "Microcosmos" has been completed, and preparations for the second pilot have started.

The team at the S. Neaman Institute has also been engaged in the design and development of an innovative computerized module of questionnaires with multi-language characteristics that is to be used during the evaluation of the second pilot. During 2004, the second pilot was conducted using the second version of the "Microcosmos" in 20 schools. In each country, three more schools beside the partner school were included. The three new schools in Israel are: Irony Aleph, Irony Hey, and Kfar-Galim. The second pilot evaluation report has been published and necessary improvements have been implemented. Additionally, a socio-economic study was conducted. During the project, all of the partners have been engaged in various dissemination activities of the project's results, via the project's website.
More details appear in the project's website:
http://www.school-plus.org

NEAMAN INSTITUTE ACTIVITIES IN MAGNET CONSORTIA

The S. Neaman Institute has been active in the MAGNET program for over 10 years. MAGNET is a unique, nationwide program responsible for encouraging the development of innovative, generic, pre-competitive technologies and R&D, and promoting the collaboration between industrial companies and scientists from Israeli research institutes. It was launched in 1992 by the Office of the Chief Scientist of the Ministry of Industry, Trade and Labor; MAGNET currently includes 15 active consortia and supports three additional channels for the development of technology rich industry, using the reservoir of knowledge in the Israeli academic institutions.

The S. Neaman Institute was instrumental in developing the program together with the Chief Scientist, and acted as a bridge between academia and industry to foster joint R&D and technology transfer between the two sectors. Currently, the S. Neaman Institute fulfills two functions related to the MAGNET program. First, the Institute represents researchers from the Technion in a number of MAGNET consortia. In addition, the Institute has established and operates one of the largest information centers in the country on behalf of many of the consortia.

MAGNET Consortia Information Centers

Information Center Manager: Dr. Daphne Getz

The MAGNET Consortia Information Center was established to fulfill the information needs of the consortia working in the framework of the MAGNET program. It is based on a dedicated system, designed according to requirements of the S. Neaman Institute team in cooperation with the consortia. During 2004 the system was upgraded and a new interface, features and modules have been developed in order to supply supporting tools for organizational management.

Currently, eight information centers for MAGNET Consortia are active within the framework of the S. Neaman Institute.

Information Center Goals:

- Knowledge collaboration among consortium members.
- Managing relevant internal information.
- Information supply from international databases.
- Modules supporting organizational management.

Internal Information Site

The internal information of each consortium includes reports of researchers and project managers. An internet site is designated to store and retrieve all the documents produced in the consortium, as well as to enable technical administration of its activities. The knowledge management system has a web interface which enables user-friendly access to information, while ensuring the necessary protection of data.

External Technical and Scientific Information Supply

The site is designed to keep consortium members updated with information published about their subjects of interest. This information is retrieved from technical and scientific databases as well as free internet sites. It includes standards, patents, proceedings, articles and relevant daily news.

Organizational Management Supporting Modules
The new information system enables the consortia to manage their activities through several tools such as a calendar for schedule management of work groups, mailing lists for distribution of messages and alerts, secured forums for unstructured communication and discussions among consortia members.

Information Retrieval
Users may access information by three methods:
- Using the search engine of the knowledge management system.
- Surfing via libraries and categories.
- Notification by personal profile defined by each user.

Consortia Open Internet Sites
The open web site of each consortium is designated to publicize its activities worldwide. It includes links to consortia companies and the MAGNET web site.

Human Resources
At present, five information specialists supply information and maintain the Information Center: E. Barzani; O. Berl; E. Gilad; O. Malberger; O. Nathan-Shats; Computing infrastructure: G.Tamir.

MAGNET Consortia

Nano-Functional Materials (NFM) Consortium
The NFM Consortium was established to develop technologies that will enable the fabrication, characterization, stabilization and application of nanometric particles, enabling the Israeli chemical industry to develop new products. The Consortium's goals are to improve existing products and develop new markets and applications for them, develop new products and create a generic "toolbox" for fabrication and dispersion of nanoparticles.

The Consortium must confront technological barriers related to the fabrication of nanoparticles and their dispersion in matrix. The working groups and the core technologies (sonochemistry, sol-gel, polymers, surfactants and emulsions, mechanical energy and self-assembly) assist in managing these barriers.

Industry Members of the NFM Consortium:
Ahava Dead Sea Laboratories,
B.G. Polymers, Carmel Olefins, Cerel Ceramic Technologies, Cima NanoTech, ICL-IP (DSBG), Kafrit, Makhteshim, Nano Size, Nilit, Scitex Vision, Sol-Gel Technologies and Solubest.

Academic Members of the NFM Consortium:
The Technion Foundation (Technion), Yissum (Hebrew University), Bar-Ilan University.

The S. Neaman Institute established and maintained an Information Center for the NFM Consortium.

Streaming Rich Media Messaging (STRIMM)

STRIMM was established in 2000 with the aim of researching and developing generic technologies for efficient delivery of rich media (audio and video) messages over the Internet and next generation wireless networks.
STRIMM plans to continue its R&D towards removing barriers in messaging of rich media. The Consortium plans on solving issues of rich media messaging for MMS; enabling optimal service in Cables, GPRS, EDGA and UMTS networks; combining and synchronizing multiple media types in the same message, etc.

Industry Members of the STRIMM Consortium:
Comverse, Emblaze Systems, Cellcom, Optibase, VCON, Scopus, Mobixell Networks, InfoWrap.

Academic Members of the STRIMM Consortium:
The S. Neaman Institute (Technion), Ramot (Tel Aviv University), B.G. Negev (Ben Gurion University).

The S. Neaman Institute established and maintained an Information Center for the STRIMM Consortium.

Wafer Fab Cluster Management (WFCM) Consortium

The WFCM goals are to develop architectures, algorithms and communication infrastructures for process control that will facilitate the integration of process and control equipment (wafer FAB clusters) with an automated management control system. The vision is to implement production processes in future FABs for the manufacture of semiconductors autonomously and automatically, thereby optimizing the chip production process and maximizing equipment usage and production yield.

The Consortium was active for five years, from September 1999 through August 2004. Seven industrial members and four academic institutes founded the consortium in the framework of the Magnet Program of the Chief Scientist Office at the Ministry of Industry, Trade and Labor. During the years the Consortium was active, some changes took place in the member line up. Also, for the first time, an out of Israel based company joined in the consortium (Applied Materials U.S.)

The Consortium's activities were concentrated in five principal directions: Process control; Adaptation and implementation of communication protocols, Information transfer and standards, Development and integration of image processing algorithms in production process and Industrial engineering – scheduling workflow and developing tools for production management; and Data fusion between the various metrology tools and the process control equipment.

The S. Neaman Institute coordinated the activity of the research groups from the Technion, represented them in the Consortium and founded and operated the computerized information center for the use of the Consortium members.

The participating researchers were: a research group from the Technion's Faculty of Industrial Engineering and Management, two research groups from the Faculty of Computer Sciences, and three research groups from the Faculty of Chemical Engineering. The collaboration between the academic researchers and the industry professionals was, according to both sides, mutually beneficial.

Industry Members of the WFCM Consortium: K.L.A. Tencor, Nova, Optum, Applied Materials (Israel), Applied Materials (USA), Tower Semiconductors, Optum (sub contractor) and Intel (observer).

Academic Members of the WFCM Consortium: The S. Neaman Institute (Technion), Ramot (Tel Aviv University).

The S. Neaman Institute established and maintained an Information Center for the WFCM Consortium.

Information Super-Highway in Space Consortium (ISIS)

The ISIS Consortium was established in 1999 to provide Israeli communications satellite industries a technological advantage in anticipation of the "revolution" which will probably change the role of satellite systems in telecommunications and international services. The Consortium comprises five leading satellite communication companies and three academic institutes, cooperating in the development of generic technologies that will be integrated into low cost satellite ground terminals and the appropriate networking systems for the future, space-based broadband public networks.

The Consortium terminated its activity in May 2005, at the conclusion of its fifth and final year. A demonstration of all the technologies developed by the industry and academy was presented to the Chief Scientist, his staff and MAGNET representatives.

Industry Members of ISIS: Gilat Satellite Networks; Orbit; Microkim; Scopus and Shiron.

Academic Members of ISIS: S. Neaman Institute (Technion); Ramot (Tel Aviv University); B.G. Negev (Ben Gurion University).

The S. Neaman Institute established and maintained an Information Center for the ISIS Consortium.

Pharmalogica

The Pharmalogica consortium was established to develop a set of novel generic tools for predicting the pharmacokinetics profile (i.e., bioavailability, clearance, volume of distribution, stability and toxicity) of biological active molecules prior to their submission to costly clinical trials. These tools will assist in determining whether an active molecule has particular features that render it more attractive for future development.

Starting from the site of administration, a drug molecule encounters a series of biological barriers to be traversed on its way to its site of operation. Alternatively, the drug molecule or its metabolites might produce toxic effects. The barriers include among others: its stability in the digestion system, its ability to be absorbed from the intestinal to the blood, its stability in the liver and in the blood and the ability to locate selectively the site of operation. Trying to predict the body's response to a medicine and accordingly to plan in advance medicines that will overcome these barriers, Pharmalogica members are developing models in a number of directions: Bioavailability; Metabolism; BBB permeability (the project ended on February 2005); and Toxicity (ended at the middle of 2004).

Industry Members of Pharmalogica: Agis Industries, D-Pharm, Harlan Biotech Israel, HPBM, Pharmos, ProteOptics, TEVA Pharmaceutical Industries.

Academic Members of Pharmalogica: Yissum (Hebrew University), B.G.Negev (Ben Gurion University).

The S. Neaman Institute established and maintains an Information Center for the Pharmalogica Consortium.

The Israeli Consortium for the Development of Micro Optical Electro Mechanical Systems (MOEMS)

The goal of the MOEMS Consortium is to study and develop new technologies as a basis for developing new micro electro mechanical systems and manufacturing methods, which will position the members as leaders in the MOEMS products market. The Consortium is active in creating, directing and supporting the academic research infrastructure with industrial vision, to support long-range new ideas and technologies.

Specific areas of interest for the Consortium include: Developing and implementing cost-effective generic technologies; Establishing infrastructure, labs and manufacturing process facilities that strengthen Israeli industry's technology; Identifying future market trends and customer needs; Defining technologies and breakthroughs in advanced stages, by which new products will be developed; Analyzing critical technological gaps; Fostering development of generic solutions, tools and infrastructure; Establishing long-term cooperation between Israeli industry and academic institutions to pioneer cutting-edge technological achievements; Achieving successful and short time-to-market products; Positioning Israeli companies as an international force that leads new solutions for the MOEMS technology.

Industry Members of MOEMS: Elbit, Elop, Flixel, Opgal, Rafael, SCD, Shellcase, Teraop.

Academic Members of MOEMS: B.G. Negev (Ben Gurion University), Technion Foundation (Technion), Ramot (Tel Aviv University).

The S. Neaman Institute established and maintains an Information Center for the MOEMS Consortium.

Large Scale Rural Telephony (LSRT) Consortium

The LSRT Consortium deals with the development of technological infrastructure that will make possible the setting of large scale communication networks in rural areas. The consortium was established with the aim of creating an advantage for Israeli industry in the creation of an LSRT market and in spreading millions of lines across vast areas in the world using Israeli technology.

Industry members of LSRT: Telrad Networks, Gilat Satellite Networks, Alvarion, and TTI Telecom.

Academic members of LSRT: The Technion, Ramot (Tel Aviv University), B.G. Negev (Ben Gurion University), Yeda (Weizmann Institute), IIM (Institute of Industrial Mathematics).

REMON - Israel 4G Consortium

The REMON - Israel 4G mobile consortium's mission is to open new opportunities for the Israeli telecom industries in the future 4G mobile market and to achieve a leading role in critical technologies based on OFDMA, an innovative air-interface. REMON, started its activity in June 2004

REMON is organized in three clusters, each led by a prominent expert:

- PHY and MIMO Cluster
- Smart MAC & Protocols Cluster
- RAN Optimization Cluster

Additionally, a System Committee is assigned to the tasks of analyzing users' requirements, identifying technology gaps and new promising technologies, and defining system architecture and technical support in coordination of the R&D efforts.

Industry Members of REMON: Alvarion, Cellcom, Celletra, ComSys, Rafael, Runcom and Schema.

Academic Members of REMON: Technion, Tel-Aviv University, Ben-Gurion University, Bar-Ilan University

The Israeli Consortium for Short Range, High Data Rate Wireless Communication (ISRC)

Vision: "Everybody and Everything are Connected"

The ISRC Consortium aims to utilize the current time window for worldwide short range communication systems development and position the Israeli communication industry among the leaders in this new field. Moreover, the short range communication market facilitates coexistence of many communication systems in a broad variety of applications (such as through-the-wall imaging and detection systems). Consortium activities focus on the primary and secondary communication levels – PHY/MAC as well as network issues. These layers need to comply with requirements of systems adapted to dynamic communication conditions (channels with variable characteristics, mobility, adding and removing users, coping with interference, etc.) limited by the following restrictions:

- Short range – up to 50 meters
- High rate – 30MBps and up
- Low power – transmission in a human environment

Industry Members of ISRC: CEVA, Clariton, Elbit, Metalink, MicroKim, Pulsicom, Tadiran Spectralink, Telematics Wireless, Wavion

Academic Members of ISRC: Tel-Aviv University, Technion

MAGNESIUM TECHNOLOGIES USERS ASSOCIATION

Chairman: Prof. Eli Abramov, Manager, Israel Reich

During 2004, the Magnesium Technologies Users Association continued its activity at the S. Neaman Institution at the Technion, while expanding its ranks to 21 members from industry and Academia. The purposes of the association are the introduction of new magnesium technologies and the creation of breakthroughs in the use of magnesium. In the automotive industries today, magnesium has become a familiar and user-friendly component; in the fields of aviation, space and communication, interest in the use of magnesium is also growing.

In the magnesium industry, great progress was achieved from the use of the important research which was conducted over the past two years by the association. The research deals with two subjects which have so far prevented technological breakthroughs due to the lack of readily available information:

1. The characterization of mechanical traits and corrosion of magnesium alloys, aluminum and their combinations.
2. A comparison data base of magnesium alloys and aluminum alloys in various technological processes.

The above mentioned information is available for the potential user. In addition, the collection of information related to the development of magnesium alloys, technological innovation etc, in Israel and around the world, continues under the auspices of the data center of the S. Neaman Institute.

The association conducted six conferences throughout the year at its members' sites and at the S. Neaman Institute, and six new members joined the association.

Industry Members of the Magnesium Users Association: The Israeli Magnesium Corporation, Sahal Alubin, Ortal, Electrotram, Englender, Cabiran, Palbam, AM&S, Rafael, Magrech, Rotem Industries, Israel Aeronautics Industry, The Aeronautic Industries and its affiliates, Interflight, Elop, Zabartech, Dead Sea Magnesium.

Academic Members of the Magnesium Users Association: The Technion, The Metal Institute at the Technion, Ben Gurion University of the Negev, M.R.I, The Academic College for Engineering NACE in Beer Sheva.

The S. Neaman Institute manages the information center of the Magnesium Users Association.

DEVELOPING AN INDUSTRIAL AND BIOTECHNOLOGY CLUSTER IN HAIFA/N. ISRAEL

Project Leaders: Prof. Daniel Shefer, Dr. Abraham Rotem

The S. Neaman Institute is leading an initiative aimed to establish a 'Cluster for Biotechnologies Industries' in the north part of Israel and to issue a call to companies and academic researchers interested joining this initiative. The rationale for this initiative is the fact that biotechnology has become the fastest growing industrial sector worldwide, as well as in Israel, and is reshaping science, especially in the fields of medicine, food and agriculture. The decision to lead this initiative was taken after a survey conducted by S. Neaman Institute found that biotechnology industries usually develop as 'clusters' in the vicinity of academic institutes and successful biotechnology researchers.

In order to promote the initiative to establish the 'Northern Cluster for Biotechnologies' the S. Neaman Institute called for a meeting of all leading scientists in this area from the Technion, as well as representatives from the biotechnological companies located in the north part of Israel. The aim of that meeting, which took place in October 2004, was:

1. To assemble all the academic researchers as well as biotechnology industry forces and enable them to create close professional relations.
2. To decide what the best organizational structure should be in-order to promote the goal of establishing a Northern Cluster for Biotechnologies.

This project is a work in progress.

INVESTMENTS IN HIGHER EDUCATION AND SCIENTIFIC RESEARCH IN ISRAEL: AN INTERNATIONAL COMPARATIVE PERSPECTIVE

Project Leaders: Amnon Frenkel and Eran Leck

A broad consensus exists in the economic growth literature in regard to the positive and significant association that exists between public investments in education and economic growth. Universities and academic research institutions play an important role in contributing to the economic growth of countries, mainly through the diffusion of scientific knowledge, new methods and technologies. Many studies conducted in the past two decades have shown that public investments in higher education yield significant benefits, both direct and indirect, to national economies. Direct benefits include the enhancement of GDP, employment and labor productivity. Indirect benefits include such elements as investments in physical capital and the adoption of technological innovations.

This research investigates the relationship between investments in higher education and scientific research, on the one hand, and the economic performance of developed countries on the other hand. Special interest will be given to an examination of Israel's relative position among the 30 OECD member countries. The study's longitudinal economic and higher education inputs will be collected from various comparative cross-country databases (e.g., WDI, OECD Statistics Portal, UNSECO, etc.). On the basis of these comparative data sources, a unified database will be built, which will enable the calibration of an economic growth model. The examination of Israel's relative status will be carried out by the cluster and factor-analysis methods. These two techniques were identified in past studies as powerful statistical tools for comparative, cross-country analysis.

This project is a work in progress.

UNIVERSITIES OF THE FUTURE, AND RESEARCH AND SCIENCE IN ISRAEL

Project Leader: Prof. Zehev Tadmor

The S. Neaman Institute is leading a movement for critical examination of the university of the future and higher education in Israel. In this context, in December 2004, the Institute sponsored an international scientific conference entitled "The Transition to a Mass Higher Education System – International Comparisons", in cooperation with the United States-Israel Educational Fund, which manages the Fulbright Program for student and faculty exchanges, and the ISEF Fund. The purpose of the Conference was to learn from the experiences of other countries in the world (United States, Australia, Italy, the U.K., Germany and Sweden.) how to create a national policy that enables broad access to higher education, without endangering the level of excellence in research which has already been attained.

Lectures were presented by internationally leading researchers in the field of education, and senior figures from the Israeli higher education system. Participating the conference were heads of colleges and universities, senior representatives from the Council for Higher Education and the Planning and Budget Committee, and the Budget Branch of the Treasury. The conference lectures were recorded and can be heard through the S. Neaman Institute website; they will be published by the end of 2005.

WOMEN IN COMPUTER INDUSTRY PROFESSIONS

Project Leader: Dr. Orit Hazzan

This project encompasses research on female high-school pupils studying computer science and undergraduate female students at the Department of Electrical Engineering of the Technion.

Female high-school pupils studying of computer science: The Israeli high-school curriculum in computer science is one of the leading curricula in the world. Data indicate that the percentages of female high-school pupils who study computer science at the level of 5 points (the higher level) of the matriculation exam remain relatively low (about 25%). This fact led us to examine the study of computer science by female high-school pupils. The research results were presented in a paper entitled "Factors influencing the shrinking pipeline in high schools: A sector-based analysis of the Israeli high school system" presented and published in the *Proceedings of SIGCSE 2005 - The 36th Technical Symposium on Computer Science Education*, St. Louis, Missouri, USA, pp. 406-410.

Undergraduate female students studying at the Department of Electrical Engineering of the Technion: The percentage of women studying at the Department of Electrical Engineering of the Technion is about 15%. In order to attract more women to study at the Department, over the last four years the Department has been organizing an annual one-day exposure conference for female high school pupils. In the last two years, supported by the S. Neaman Institute, research was conducted in order to examine the influence of this day on the attitude of the female pupils towards their studies at the Technion in general and towards studies at the Department of Electrical Engineering of the Technion in particular. In both years, a considerable increase in students' interest in the Department was observed. Specifically, this interest increased during the 2004 conference from 15% in the morning to 66% by the end of the day; during the 2005 conference, interest increased from 26% to 82%.

A full report about this research, entitled "Electricity in the palms of her hands - The perception of Electrical Engineering by outstanding female high school pupils" will be published in *IEEE Transactions on Education*.

AN INNOVATIVE, PLURALISTIC, MULTI-VALUED APPROACH TO LEARNING MATHEMATICS AS A BASIS OF SCIENCE AND ENGINEERING

Project Leaders: Dr. Igor Verner, Prof. Avi Berman

In this project we developed, examined and evaluated processes of mathematical learning in the applied realistic context with regard to different learning styles. The progress in the first year of the project was in two directions, as described below.

1. Mathematical aspects of educating architects

We developed, delivered, and evaluated a course "Mathematical Aspects of Architectural Design" for second year architecture students. The course is given in the "studio" environment. The study examined the features of mathematical learning in the architecture design project and its effect on applying mathematical methods and tools in the design process. Results of the follow-up indicated that the students applied a variety of complex geometrical forms in the projects given as the course assignments. Students' attitudes towards mathematics changed so that they found interest and challenge in integrating complex geometrical forms in the design solutions. Related publications:

- I. Verner, and S. Maor "Mathematical Aspects of Educating Architecture Designers: A College Study", International Journal of Mathematical Education in Science and Technology (accepted).
- I. Verner, and S. Maor (2004): Design Problems in an Architecture College Mathematics Course. The International Commission on Mathematical Instruction Study 14 Conference: Applications and Modelling in Mathematics Education, Dortmund, Germany, 297-302.
- Sarah Maor submitted her thesis to the Technion Graduate School for final examination.

2. Applications motivated calculus course at the Technion

We conducted three experiments that examined different ways for integrating applications in the Calculus 2M course. In the first experiment, 75 calculus students participated in the optional supplementary classes that focused on applying the calculus concepts to realistic problems. The second experiment made a comparison of calculus studies in two groups. The groups received the same lectures (4 hours per week), but their 2 hours/week recitations were organized in different ways. The control group (n=33) had conventional recitation sessions (without applications). The experimental group (n=33) had 1 hour of conventional and 1 hour of applied problem solving sessions. In the third experiment we conducted two supplementary workshops which were attended by more than 50 students from the calculus class. In the workshops the calculus concepts were recreated from the practical need and through the analysis of applied problems. After the workshops, the concepts were formally taught in the lectures. Results of the first two experiments indicated the significant advantage of the students studied calculus with applications in the course achievements, their understanding of the lectures was better and easier. Related publications:

- S. Aroshas, I. Verner, A. Berman (2005) Calculus for Engineers: An Applications Motivated Approach, Mediterranean Conf. on Mathematics Education, 591-597, Palermo.
- Shuki Arochas gave a talk at the National Science Education Seminar, Nir Ezion, 20.09.04.

MATHEMATICAL ACHIEVEMENT FOR ALL

Project Leader: Prof. Ron Aharoni

The Israeli Organization for Mathematical Achievement for All (IFMA), and the Department of Scientific Education at the Technion were supported during 2004 by the S. Neaman Institute. IFMA has translated mathematics books from Singapore, a country which leads the world in mathematics education, and is using these books in 116 schools around the country. The principles of the books are:

1. Starting from the concrete
2. Stress on the meaning of the operations, before reaching their calculation.
3. Attention to fine points of meaning.
4. Precise verbal formulations.

Beyond the principles of the books, the principles of IFMA are:

a. Work with the entire class
b. The children are seated facing the teacher. The teacher is the leader of the discussion in class.
c. Lessons are composed mostly of joint experimentation and discussion, as opposed to the filling of workbooks that prevailed in Israeli schools during the last 20 years.

The success of the IFMA program is impressive by all criteria – the satisfaction of principals, teachers, parents and students, and by tests conducted both internally and by external bodies.

Recently, IFMA started working in kindergartens, again with books used in Singapore.

The support of the S. Neaman Institute was used for teacher training and for supervision in schools. Part of the latter is done by IFMA members without pay, but because of the current large scale of the operation, a significant part of it is done by paid instructors.

The IFMA activities are accompanied by a follow-up research, conducted by Dr. Shira Cohen-Regev. Some IFMA members publish papers describing the spirit of the organization and the results in schools. These articles are aimed at teachers working with IFMA, as well as for other teachers.

FROM "ISRAEL 2020" TO "ISRAEL 2050"

The Challenge of Planning the State of Israel towards its Second Jubilee

Project Leader: Prof. Arch. Adam Mazor; **Professional Coordinator:** Lisa Tangy, M.Sc

Following the success of the "Israel 2020" project, which profoundly affected current national planning practices, and the accumulation of knowledge and planning tools during this project, the S. Neaman Institute now proposes to initiate a continuation of this huge research effort, expanded to include coordination with the Palestinian Authority and Israel's neighbors and extended to the 100th anniversary of the State of Israel in the year 2050.

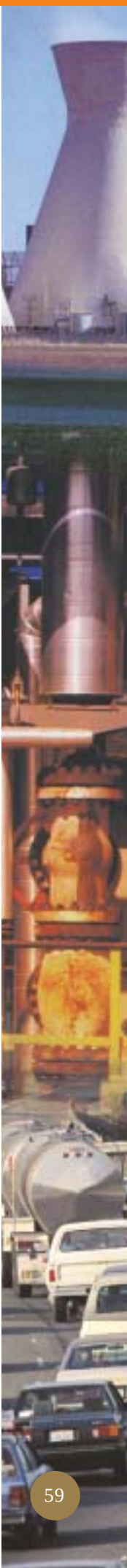
Three major moves are now in progress:

1. **"Israel 2020" and "Palestine 2015" – *Coordinating the Palestinian and Israeli long-term plans***

   The overall aim of this project is to create a basis for long-term planning cooperation between Israeli and Palestinian teams, using existing long term planning by both Israelis and Palestinians as its point of departure. The Israeli plan is "Israel 2020"- Master Plan for Israel in the 21st Century, and the Palestinian plan is "Palestine 2015", which was carried out by the Palestinian Ministry of Planning and Cooperation (MOPIC) between 1994-1998. As part of the preliminary phase of the project dedicated to the optimal coordination of the Israeli and Palestinian long-term plans, an inaugurating workshop was conducted (February, 2000) with the overall goal of bringing together Israeli and Palestinian planners in order to initiate professional dialogue. The main output of the workshop was a jointly agreed-upon set of preliminary understandings on Israeli-Palestinian cooperation in long-term planning. These understandings were summarized and defined in a list of 11 integrated planning issues compiled into a written report. The Royal Government of the Netherlands sponsored the preliminary phase. During the last year the project was presented to the Akademie der Kuenste, to Berlin Municipality and to the German Foreign Affairs Office in Berlin. They were all very much impressed with the project and the Akademie der Kuenste expressed its willingness to host the activity of the Israeli and the Palestinian long range planning teams along with international experts. The Akademie der Kunste considers the project as one of its leading activities in the year 2005. At this stage, the German Foreign Affairs Office expressed willingness in principal to setting up financial resources for the continuation of the project.

2. **Master Plan for Cross-Border Cooperation between Israel and its Neighbors**

   Following the conflict resolution approach, and as part of its peace-building efforts, The Israeli Ministry of Regional Cooperation asked the S. Neaman Institute, in the framework of "Israel 2050", to prepare an inclusive cross border master plan for Israel and its neighbors. The work began in August 2002. Here Israel's national goals will be coordinated with those of its neighbors, formulating principles for the planning stage and a policy appropriate to the target years, in order to locate the means for fulfilling an overall future regional picture. Stage 1, funded by the Ministry for Regional



Cooperation, has been completed. The outputs of the first stage include: a Database of 480 proposed projects for cooperation between Israel and its neighbors; a Detailed review of cross border case studies; a Comparative analysis of Israel and its neighbors; and Development of economic criteria for analyzing the cooperation projects. The former Interior Minister, Mr. Avraham Poraz, suggested that the continuation of the project would be led by the Ministry of Interior along with other governmental offices. Recently, the heads of the project discussed this matter with the head of the planning department at the Ministry of Interior, in order to renew the project.

3. Equal Opportunities for All in Israel

The overall aim of this project is to close existing gaps among Jewish and Arab communities in Israel and improve the quality of life for all. The significance of this step became self-evident in the wake of the violent Arab demonstrations in October 2000 that ended with a dozen Arab Israelis dead. In the context of long-range planning, 2030 is the target year for reaching mutual goals and objectives. Accordingly, a strategic comprehensive plan will be formulated. The initial phase includes agreement on terminology and definitions of issues. The project, which is contracted by the Economic Cooperation Foundation (ECF) and the Arab Center for Alternative Planning (ACAP) and funded by the Kahanov and Goldman funds, is jointly directed by Prof. Adam Mazor, head of the "Israel 2050" project and Dr. Hanna Swaid, head of ACAP, with the participation of Jewish and Arab professionals who are experts in variety of relevant fields. "Israel 2020" findings and database serve as a platform for the plan that began in June 2002. During the last year the first stage of the work has been completed and its outputs include: Statistics and Digital Mapped Database of Israel planning and spatial inventory; International bibliographical survey of minority-majority relationships; Position papers of Arab and Jewish Philosophers who represent a wide range of equality attitudes and aspects.

This project is a work in progress.

A NATIONAL PLAN FOR THE CHEMICAL INDUSTRY IN ISRAEL

Project Leaders: Prof. Zehev Tadmor, Dr. Gil'ad Fortuna.

This project was carried out in cooperation with the Chief Scientist of the Ministry of Industry, Trade and Labor, the Ministry of Finance, the Ministry of the Environment, the Ministry of Education and the Manufacturer's Association of Israel.

The goal of this project is to examine in detail and in depth the obstacles to development of the chemical industry in Israel, how to leverage opportunities for growth and expansion, and designing and adopting a national plan to preserve and develop the chemical industry so that it will be best suited to the particular characteristics of this country. In addition to a Steering Committee, sub-committees were established in the following areas: Chemistry Education, New Technological Directions, "Green" Infrastructure and Industry, and National Policy.

The status of this project is as follows:

- The project is entering its final stages where each committee is writing a draft of its conclusions. All of these drafts will be integrated by the National Policy Committee into a final document.
- Each committee was designated its own site (to create a "virtual office") which was used by its members to collaborate on papers, correspond, etc.
- The committees met a number of times, and each one met twice with the Steering Committee.
- The committee members were able to receive assistance from scientists at the S. Neaman Institute in finding materials for their research.

This project is a work in progress.

ESTABLISHMENT OF A PUBLIC FORUM ON THE SUBJECT OF THE ENERGY SECTOR IN ISRAEL

Project Leaders: Mr. Amnon Einav, Dr. Ofira Ayalon

The Master Plan for the Energy Sector was recently published on behalf of the Ministry of National Infrastructure. The Master Plan provides a basis for public discussion and for preparing operational plans which will be derived from it. The S. Neaman Institute decided to establish an Energy Forum which would comprise discussion groups on the subject of the Master Plan for the Energy Sector in Israel and its practical implications.

At the first stage, two groups will be established which will address the following subjects:

I. Alternative Technologies for Producing Energy
   - To investigate the economic/environmental/social needs for introducing alternative technologies to the energy sector in Israel (including reducing the Israeli economy's exposure to projected changes in the world energy supplies, reducing security exposure, improving environmental quality, etc.).
   - In accordance with the previous item, to determine realistic goals for introducing energy alternatives.
   - To map the existing technological options and identify those applications which are most economical.
   - To create commercial opportunities and markets for private entrepreneurs.
   - To estimate the long-term costs and benefits to the Israeli economy of introducing alternative energy technologies in Israel.

II. Savings through Optimizing the Energy Sector
   - To identify means to increase energy consumption efficiency.
   - To evaluate the costs and benefits of conducting a government plan for energy savings.
   - To establish realistic milestones for carrying out an energy saving project.
   - To evaluate economic incentives for applying energy-efficient measures.
   - To outline operational recommendations and a timetable for carrying out the above projects.

The Energy Forum at the S. Neaman Institute will serve as a hub for discussions which will be held among government officials and representatives from industry, the energy sector, the transportation sector, the gasoline companies, consumer groups and others who are willing to join. In the context of this forum, it will be possible to establish positions that are acceptable to the majority of the public as well as the decision-makers in the different government ministries.

This project is a work in progress.

PUBLIC HEALTH

Project Leader: Prof. Gad Rennert, M.D., Ph.D.

The S. Neaman Institute served as a home for the following cancer control projects and studies conducted by the CHS National Cancer Control Center:

1. The Molecular and Environmental Epidemiology of Colorectal Cancer (MECC) Study

The MECC study is conducted in collaboration with the University of Michigan, Ann Arbor and is funded by the US NIH/NCI. Recruitment to the first phase of this study ended in 2004, with 2100 cases and 2100 age-sex-matched controls recruited. Recruitment of participants for phase II is ongoing and 1000 more cases and controls have been added. After a five year funding period of phase I, which included risk factor data and biological sample collection, the study received further five year funding through the competitive renewal mechanism of the NCI to add a component of clinical follow up after the study participants and to study a large variety of genetic events in the etiology of colorectal cancer in Israel. A number of papers related to this study have thus far been published or have been accepted for publication and have been presented in conferences.

2. The Molecular and Environmental Epidemiology of Breast Cancer Study

This study of the causes and risk factors for breast cancer in Israel is being conducted with funding from various sources including the Israeli Ministry of Health and recently the Israel Cancer Association. More than 1500 women with breast cancer and a similar number of age-matched women without breast cancer have thus far been recruited to the study. Major emphasis is being put on understanding the importance of molecular events controlling the metabolism of sex hormones, such as the cyp19 regulating aromatase metabolism. Information about health habits (diet, smoking, alcohol) as well as reproductive parameters, occupational and environmental exposures, and family history is collected for each study participant. Blood samples are separated into DNA, sera and lymphocytes. Breast cancer molecular etiology was also studied in a historical cohort of women diagnosed with breast cancer in Israel in the years 1987-1988 in collaboration with University of Toronto, Canada and was funded by the US NIH/NCI.

3. The Molecular and Environmental Epidemiology of Lung Cancer Study

This study is currently being launched. It is aimed at understanding the low lung cancer risk in Israel and will evaluate a variety of genetic events which could lead to a relative protection from lung cancer in Jewish populations. Partial funding for this study is provided by Clalit Health Services and by a grant by the Bi-national US-Israel Science Foundation in collaboration with the M.D. Anderson Cancer Center in Houston, Texas. This study also includes a major collaboration with the Weizmann Institute.

4. The Evaluation of the National Israeli Breast Cancer Screening Program

The National Israeli Breast Cancer Screening Program is run by the CHS National Cancer Control

Center under appointment of the Ministry of Health and funding of the Israel Cancer Association. The program oversees all activity related to breast cancer diagnosis and treatment in Israel and is responsible for policy setting, implementation and quality control of the activity of all mammography units in Israel and of the pathological and surgical activity related to breast cancer. The National Center for Health Services Research has funded the evaluation of this program including the evaluation of satisfaction of women from the screening process.

5. The Evaluation of the National Israeli Colorectal Cancer Screening Program

The National Israeli Colorectal Cancer Screening Program has recently been launched. It is run by the CHS National Cancer Control Center under appointment of the Ministry of Health. All detection activity in Israel, by fecal occult blood tests, endoscopic or radiological diagnostic means, will be recorded to ensure high quality coverage of the target population. The program will evaluate the gastroenterological, radiological, surgical, pathological and oncological components of the detection and treatment process of colorectal tumors.

6. The Evaluation of the Health Effects of the Chernobyl Accident

More than 200,000 individuals have immigrated to Israel since 1989 from areas in the former Soviet Union thought to have been affected by ionizing radiation from the Chernobyl accident. We have conducted studies in children, adolescents and liquidators (clean-up teams) currently residing in Israel. More than 1000 liquidators have already been evaluated and the Cancer Control Center has recently been appointed by the Ministry of Health to be responsible for the national follow-up after the clean-up teams as required by the Liquidators Law. These studies have been funded by a variety of agencies, among them the US Agency for International Development (USAID) and the US Office of Naval Research of the US Navy (ONR).

This project is a work in progress.

THE SAMUEL AND CECILIA NEAMAN PROGRAM FOR DOCTORAL AND POST-DOCTORAL FELLOWS

In honor of the memory of Samuel and Cecilia Neaman, and in the spirit which led to the creation of the S. Neaman Institute, the Samuel and Cecilia Neaman Program for Doctoral and Post-doctoral Fellows was established. The new program, which was inaugurated at the 2004 Board of Governor's Ceremony, will provide support each year for outstanding students doing their doctoral and post-doctoral research at the Technion, who show potential to become leaders in their fields.

Fellowships over the last two academic years were awarded to:

Doctoral Fellows

2003-2004: Amir Rosenthal, Mayan Duvsheni, Gabriel Zaiden, Eyal Ackerman, Avner Fleisher, Alon Polski, Or Yizhar

2004-2005: Daniel Melamed, Avner Fleisher, Nirit Egoz, Sharon Shoham, Michal Aharon

Post-doctoral Fellows

2004-2005: Dr. Michael Tzareski, Dr. Milan Sidelka, Dr. Amir Sapir, Dr. Samach Samaan

LECTURE SERIES IN HONOR OF SAMUEL NEAMAN

In 2004, an annual lecture series was established in commemoration of Samuel Neaman, featuring national leaders distinguished for their depth of knowledge and vision regarding the challenges faced by the State of Israel.

The first lecture was delivered by former MK Dan Meridor on the subject of "Zionism – An Interim Accounting at a Critical Junction". The second lecture, by Israel Prize Laureate Professor Avi Ravitzki, was entitled "The Jewish People in our Times: Between Determinism and Independence".

CONFERENCES, SEMINARS AND LECTURES SPONSORED BY THE S. NEAMAN INSTITUTE

The Next Big Thing is Really Small: New Business Opportunities in Converging Technologies
January 15, 2004.

Sustainable Agriculture
January 31, 2004

Reducing Transportation-related Air Pollution
in cooperation with the Ministry of the Environment and the Transportation Institute
February 5, 2004

NFM Consortium Seminar
February 11, 2004

Seminar for School Principles in the Haifa area on Environmental Education
in cooperation with the Ministry of the Environment
March 28, 2004

Hazardous Materials and Wastes
in cooperation with Hadassah-Israel
May 11, 2004

Conflicts in the Energy Sector
in cooperation with the Department of Natural Resource Management, University of Haifa
May 31, 2004

Business Opportunities in the Area of Environmental Quality
in cooperation with the Ministry of the Environment and the Israel Export Institute.
June 8, 2004

NFM Consortium Seminar
July 13, 2004

Seminar on Biomedicine
Organized by the Biotechnology Cluster group for biotechnology researchers and industrialists in Northern Israel
October 26, 2004

Strategic R&D: Choice, Risk, Valuation
November 17, 2004

MOEMS Consortium Seminar
November 30, 2004

The Transition to Mass Higher Education System – International Comparisons
Organized jointly with the US-Israel Education Fund and the Fulbright Program
December 5-6, 2004

International Conference on Learning & Assessment in Science, Engineering and Management Education
December 8-9, 2004

REMON Consortium Seminar
December 12, 2004

Sam Neaman Memorial Lecture II – "The Jewish People in our Times: Between Determinism and Independence" – Professor Avi Ravitzki, Israel Prize Laureate
December 27, 2004

PUBLICATIONS OF THE S. NEAMAN INSTITUTE

These and other publications can be downloaded at the S. Neaman Institute Website: **www.neaman.org.il.**

Publications in English

Ber, H., Yafeh, Y., "Can Venture Capital Funds Pick Winners? Evidence from Pre-IPO Survival Rates and Post-IPO Performance.", STE-WP-23, October 2004.

Breznitz, D., "Innovation and the Limits of State's Power: R&D and Industrial Policy in Taiwan in IC Design and Software.", STE-WP-21, April 2004.

Czapski, G., Ilan, Y., "International Status of Isra Research: A Comparative Analysis Using Scientometric Indices.", October 2004

Eckstein, Z., Cohen Goldner, S . "Immigrants in The Hi-Tech Sector: Comparison to Natives and the Effect of Training.", STE-WP-22, September 2004.

Hirsch, M. in Ayalon, O. et al. "Air conditioner survey in Israel- conservation potential and policy measures", December 2004.

Menuchin, Jonathan, and Nir Hashsi, "Firm Growth Profiles (FGPs): Towards an Action-Based View of Firm Development.", STE-WP-24-2004.

Shperling, Zipi, Denise M. Rousseau, "Ownership and the Changing Employment Relationship: Why Stylized Notions of Labor No Longer Generally Apply", October 2004.

Publications in Hebrew

Avnimelech, Y., Ayalon, O. (Eds.), "National Environmental Priorities of Israel, Position Paper IV: Vol. 1: Environmental Education", November 2004.

Avnimelech, Y., Ayalon, O., "National Environmental Priorities of Israel, Position Paper IV: Vol. 2: The Energy Market in Israel.", November 2004.

Avnimelech, Y., Ayalon, O., "National Environmental Priorities of Israel, Position Paper IV: Vol. 3: Environmental Management.", November 2004.

Avnimelech , Y., Ayalon, O., "Sustainable Agriculture. How may the external values of agriculture be integrated as part of the farmer's income, in the different areas of Israel", January 2004.

Ayalon, O., "Proceedings of conference- Business opportunities in Environmental Technologies", June 2004.

Ayalon, O., Goren, Y., "The Global Environmental Market – An Economic Opportunity for Israel - Primary model to assess the costs and benefits of governmental investment in the field of environmental technologies", December 2004.

Bar, A. Oren – Bashaar. "Higher Education and the Research Universities from the Perspective of the Israeli Public", January 2004

Tzadaka, E., "The Overall Tax Burden on Income from Labor", January 2004.

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Professor, Faculty of
Mechanical Engineering,
Technion

ACADEMIC COORDINATORS

Prof. (Emeritus) Yoram Avnimelech
Environmental Studies
agyoram@tx.technion.ac.il

Maj. Gen. (Res.) Uzi Dayan
National Security Forum

Prof. Adam Mazor
Israel 2020 -2050 Project
arch@mazor-first.com

Prof. Dan Peled
Economy and National Security
Forum
dpeled@econ.haifa.ac.il

Prof. Manuel Trajtenberg
Science, Technology and Economy
(STE Program)
manuel@post.tau.ac.il

PROJECT COORDINATORS AND RESEARCH FELLOWS:

Prof. Rachel Alterman
Senior Research Fellow
alterman@tx.technion.ac.il

Ofira Ayalon, Ph.D.
Senior Research Fellow
agofira@tx.technion.ac.il

Moshe Ellad
Project Coordinator
eladm@tx.technion.ac.il

Amnon Frenkel, Ph.D.
Senior Researcher
amnonf@tx.technion.ac.il

Daphne Getz, Ph.D.
Senior Research Fellow and
Consortium Program Coordinator
daphne@tx.technion.ac.il

Debby Kaufman
Business Development
Debby1k@bezeqint.net

Joseph Linhart, M.Sc.
Consortium Program Coordinator
lyosef@tx.technion.ac.il

Prof. Shlomo Maital
Senior Research Fellow
smaital@tx.technion.ac.il

Naftali Moser
Project Coordinator
nmoser@inter.net.il

Abraham Rotem, Ph.D.
Researcher
dmtc@tx.techion.ac.il

Zipi Shperling, Ph.D.
Post-Doctorate
zipis@post.tau.ac.il

INFORMATION SPECIALISTS

Ella Barzani
barzani@tx.technion.ac.il

Orit Berl
berl@tx.technion.ac.il

Efrat Gilad
efratg@tx.technion.ac.il

Oren Malberger
orenm@tx.technion.ac.il

Orly Nathan-Shats
shats@tx.technion.ac.il

RESEARCH ASSISTANTS

Mariana Ardetz
ardetz@tx.technion.ac.il

Hanni Mansour
mansour@econ.ucsb.edu

Marian Shumaf
marian@tx.technion.ac.il

STAFF

Rebecca Best
Office Head
rebecca@tx.techion.ac.il

Drora Einziger
Secretary
drorae@tx.techion.ac.il

Irit Levy
Consortia Secretary
iritl@tx.technion.ac.il

Sima Nadler
Bookkeeping
accounts@tx.technion.ac.il

Golan Tamir CNE
Information Technology
Coordinator
golant@tx.technion.ac.il

The Samuel Neaman Institute
The Technion-
Israel Institute of Technology
Technion City,
Haifa 32000, Israel
Tel: 972-4-829-2329
Fax: 972-4-823-1889
www.neaman.org.il

Editor: Abbie Rosner
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