ANNUAL REPORT

2007-2008

Samuel Neaman Institute
FOR ADVANCED STUDIES IN SCIENCE AND TECHNOLOGY

Technion - Israel Institute of Technology

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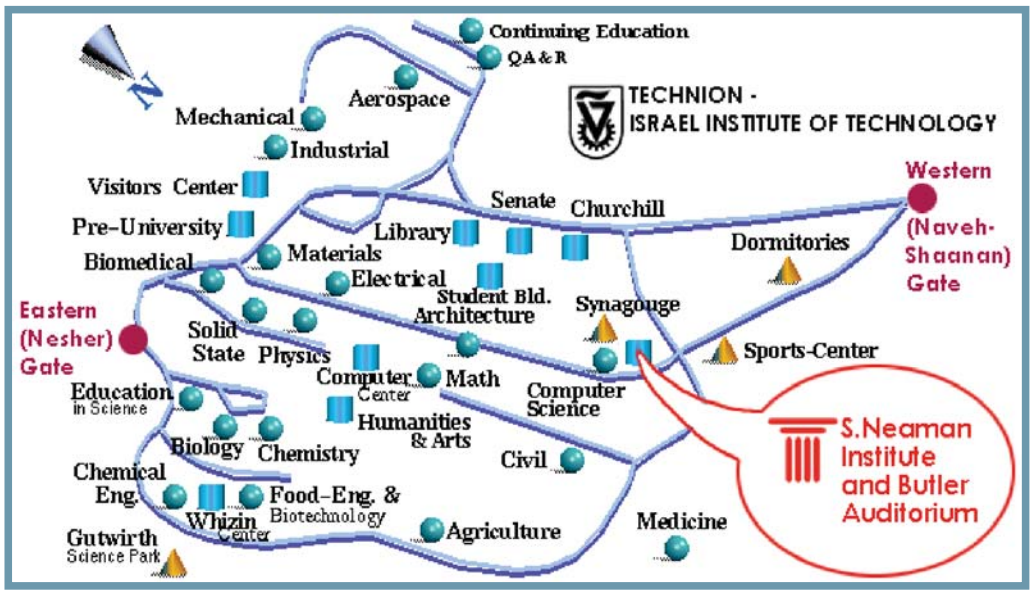

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THE SAMUEL NEAMAN INSTITUTE

The Samuel Neaman Institute for Advanced Studies in Science and Technology is an independent, interdisciplinary public-policy research institute, established in 1978 and located at the 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, drawing from experts within the Technion and outside of it. 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 S. Neaman Institute is now considered the largest and leading research institute in Israel for economic and social policy related to science and technology. The country's top scientists and experts are conducting research under its auspices – developing solutions for national challenges in the areas of economic, social and scientific development in Israel.

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 sponsored 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. These studies and reports are distributed to Israel's policy-makers, and are available, free of charge, on the S. Neaman Institute website: www.neaman.org.il. A survey of these studies is presented in the Institute's series of Annual Reports.

Organization

The Director of the S. Neaman Institute, appointed jointly by the President of the Technion and the Chairman of the Institute's Board, is responsible for formulating and coordinating policies, recommending projects and appointing staff. The current Director is Professor Nadav Liron. The Institute's Board of Directors is currently chaired by Professor Zehev Tadmor. The Board is responsible for general supervision of the Institute, its overall policy, approval of research programs and overseeing financial affairs. An Advisory Council, made up of members of the 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, back to Israel, and then to the battlefields of WWII in the Mediterranean and Europe, where he led his troops as an officer in the British Army. With the end of the war, the pre-state leadership appealed to him to leverage his high officer status to raise funds for the country to be, a mission that took him to the United States and South America. Yet throughout all his life's journeys, Sam never lost his identification with Israel, and his deep connection and love of this country led him, in 1978, to establish the Samuel Neaman Institute at the Technion.

Sam passed away 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, and provide them with sound, well-researched policy alternatives.

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

This year we are celebrating Israel's 60th anniversary of independence, a highly appropriate occasion to reflect on what has been accomplished in this country so far and what remains to be achieved. On May 14, 1948, David Ben Gurion made the compelling case in the Declaration of Independence for establishing a Jewish state in the Land of Israel:
The Land of Israel was the birthplace of the Jewish people. Here their spiritual, religious and political identity was shaped. Here they first attained statehood, created cultural values of national and universal significance and gave to the world the eternal Book of Books.

The state he envisioned was modern, liberal and democratic:
The State of Israel will be open for Jewish immigration and for the ingathering of the exiles; it will foster the development of the country for the benefit of all its inhabitants; it will be based on freedom, justice and peace as envisaged by the prophets of Israel; it will ensure complete equality of social and political rights to all its inhabitants irrespective of religion, race or sex; it will guarantee freedom of religion, conscience, language, education and culture; it will safeguard the holy places of all religions; and it will be faithful to the principles of the Charter of the United Nations.

Much has already been accomplished over these six decades: the population of Israel has grown tenfold, absorbing in the process most of the survivors of the Holocaust, whole Jewish communities from the Arab world and dozens of other countries, and eventually the massive immigration of Jews from the former Soviet Union and the ancient Ethiopian Jewish community. In this momentous process, assisted and supported by the great Jewish communities of the USA and other Western countries, virtually no immigrant was left hungry, without shelter, employment or medical care.

Over these six decades, illiteracy has been eradicated and mandatory schooling for all children provided. The 2000-year-old Hebrew language, revived from dormancy in the beginning of the 20th century, has become a vibrant and expressive spoken language, sustaining an extraordinary and growing body of Hebrew literature, poetry, theater, television and cinematography. In these six decades a great higher education system was created, led by world class universities; Israeli science became renowned throughout the world for its quantity and quality, and Israeli technology for its creativity and innovation. The Israeli economy reinvented itself time and again from an agricultural based economy to a publicly owned state-building economy to a market driven, modern, export-oriented economy with GDP per capita reaching that of the European community.

These outstanding historic accomplishments were realized in parallel with the development, practically from scratch, of a unique and fiercely competitive democratic system, an advanced judiciary system, a national healthcare system and modern armed forces considered among the most powerful in the world. Finally, all these great accomplishments were realized while wars were repeatedly waged against enemies sworn to the destruction of the country and its people. Yet in spite of the hostilities, Israel repeatedly extended a hand in peace to our neighbors, succeeding to sign formal peace agreements with Egypt, the greatest of the Arab nations, and the Kingdom of Jordan.

Out of this unique history, a vibrant, multiethnic and multicultural society evolved. The expansive and complex tapestry of Israeli society is captured in a novel S.Neaman Institute free-access Web Portal called "The Israelis", which will be launched this year on Israel's 60th Independence Day. The details of this website are described in the pages of this report.

In spite of all the above accomplishments and more, Israel's future is still at risk, its long-term existence is not yet secure, and its economic success lacks long-term sustainability. After sixty years, Ben Gurion's vision of Israeli society has yet to be achieved. The proliferation of nuclear weapons in the region poses an existential threat and the religious radicalization of the Arab world and the Palestinian people casts an ominous shadow over the future prospects for peace and tranquility between Israel and its neighbors. Moreover, the cohesive, unifying foundation of Israeli society is gradually being eroded by political, ethnic, radical religious, messianic, and economic centrifugal forces.

Over the years, a dual economy has developed – with a small but advanced high-tech sector heavily counter-balanced by a large but inefficient low-tech and service sector. This situation cannot sustain the level of growth needed for prosperity and security; furthermore it entails an unjust socio-economic gap evidenced by unprecedented levels of poverty and neglect. This situation is intolerable for any thriving society and certainly for a nation still at risk. In addition, the very low participation of Ultra-Orthodox men and Arab women in the workforce seriously limits the potential growth of the Israeli GDP per capita.

Finally, the K12 school system is in a disastrous state, characterized by fragmentation into separate and segregated school networks based on religious and ethnic criteria, and has proved resistant to repeated attempts at reform.

All these and more present huge challenges for this generation of Israelis, who are called upon to exhibit levels of vision, dedication, talent, perseverance and love of their country that match or even surpass those of the founding fathers of this country.

This year a comprehensive national strategy plan entitled *"Israel 2028: Vision and Strategy, Economy and Society in a Global World"*, intended to overcome many of the above concerns threatening Israel's future, was developed and presented to the Prime Minister. The S. Neaman Institute played a key role in preparing this plan and by doing so it hopefully contributed its share in trying to resolve the foregoing challenges facing our generation. Details of this project are given in the pages of this Annual Report.

Finally, I would like to note a changing of the guards at the institutional level. On July 1st 2008, in compliance with the by-laws of the S. Neaman Institute, the tenure of Professor Nadav Liron, Director of the Institute, comes to an end. With great vision and wisdom, Nadav, a professor of mathematics at the Technion, led the Institute over the past 5 years to new heights and many accomplishments. He will be replaced by Professor Moshe Moshe, a professor of theoretical physics at the Technion. I wish to express thanks and appreciation to Nadav and a warm welcome and sincere wishes for success to Moshe.

FROM THE DIRECTOR

Professor Nadav Liron

This is the last time I will be writing to you as the Director of the S. Neaman Institute, as the Institute completes its 30th year of activity, and my five year tenure draws to a close.

The role of the Institute, as it was envisioned by its founder, Samuel Neaman, was to seek rational solutions for national problems related to the economic, scientific and social development of Israel, with an orientation towards the medium and long-term timeframes. For this purpose, Mr. Neaman established the fund which enables the Institute to carry out its work.

The Institute's strength and influence are derived from several factors. First is our ability to identify topics which have long-reaching implications at an early stage. Second, we select the most appropriate people in the country to lead and carry out the projects - whether they are from academia, industry, the private sector or from the different branches of government. Third is our bipartisanship - no effort is spared both in carrying out the projects and in publishing their results, and every report is posted and freely accessible on the Institute website. Fourth, we have built a framework of communication with all of the relevant entities, free of competition. And finally, but not least, with the resources at our disposal, we are able to select projects according to one single criterion: national importance.

Does the work of the Neaman Institute make a difference? In one year, from March 2007 to February 2008, the Institute website was visited over 285,000 times. The number of downloads from the website exceeded 103,000 – over 81,000 of articles alone!

The level of interest in the issues which the Institute deals with is clearly illustrated in the statistics of one month - March 2008 – during which there were 20,845 visits to the site, 51,995 separate pages were viewed, and a total of 12,601 publications and news items were downloaded. The 20 publications which were most frequently downloaded in March were:

	Publication	No. of Downloads
1.	Human Resources for Science and Technology in Israel	424
2.	Science, Technology and Innovation Indicators in Israel: An International Comparison	399
3.	A Strategy for Developing Employment Opportunities for Arabs in Israel: The Vision for Expanding the Arab Middle Class	343
4.	The Necessity of Strategic Thinking: A Constitutive Vision for Israel and its Implications	247
5.	Sustainable Energy Market in Israel	210
6.	The Concept of Social Resilience	201
7.	Distributive Justice and Real Property: Land Readjustment According to Israeli Planning and Building Law	200
8.	Between Technology Development and Public Transparency: Creating Tools for Public Discussion on Business Ventures and Technological Alternatives for Treating Solid Waste	200
9.	Environmental Technologies: The Green Future	197
10.	National Environmental Priorities in Israel – Position Paper 5	185
11.	Guidelines for Climatic Energy Planning in Residential Buildings	172
12.	Evaluation of a Plan to Establish a Wind Farm in the Mediterranean Sea – Final Research Report	154
13.	The Ramifications of Technology Transfer Based on Intellectual Property Licensing	151

14.	Reclaiming the Dead Sea, Alternatives for Action	143
15.	National Priorities for the Environment in Israel – Position Paper 3	139
16.	Privatization in Higher Education	118
17.	The Quality of Israeli Academic Institutions: What the Wages of Graduates Tell About It	116
18.	"Two Seas Canal": Is it a Real Aim or Some Kind of a Preconceived Solution to an Unspecified Target?	114
19.	A National Plan for the Chemical Industry in Israel	108
20.	Environmental Obligations of Public Transportation in Israel	101
	Total	**3922**

It is worthwhile noting that, while most of the publications are from the last 5 years, the publication at number 11 is from 1992!

Over the past year, the Institute carried out a number of particularly important projects. For example, we were involved in the national project "Israel 2028 – Vision and Strategy, Economy and Society in a Global World", which our Chairman, Prof. Zehev Tadmor, describes in his report. The results of these projects, in their entirety, which served as the basis for part of the above plan, will be published later in the year. Also important to note is that the project supporting R&D in the war against terror, in cooperation with the Council for National Security, was adopted by the government and included in the national budget for 2008.

The past year was overshadowed by the critical problems facing the higher education system. The longest strike in the system's entire history (90 days), ended with an appropriate salary increase for the university faculty, but the core problems were left unresolved. Even though almost a year has passed since the Shochat Committee report was submitted (June 2007), the government has yet to discuss it and the universities are surviving from hand to mouth. If a solution is not found and the budget for the higher education system is not increased accordingly, Israel will continue to experience massive brain drain and a decline in its basic research. The writing is on the wall!

The S. Neaman Institute continues its activities in the area of higher education in collaboration with "Bashaar" and the Fulbright Foundation. The Forum for Higher Education continues to meet, and in January of this year we held a conference with a large number of international experts on the topic of "Privatization in Higher Education Systems". The proceedings of this conference will be published as a book. Already today, all of the conference lectures can be viewed on the Institute website. We are also evaluating the topic of brain drain with governmental and other entities, trying to assess the dimensions of the phenomenon and develop a policy to protect the single most important resource the state of Israel has – its human resources.

I can look with great satisfaction over the period of my term as Director of the S. Neaman Institute and say with full confidence that the Institute is fulfilling the vision of its founder. This success is due first and foremost to the excellent staff of the Institute and all of its partners, many of whom were full partners in our vision and not for their own benefit. My greatest appreciation goes out to them all.

I would like to extend special thanks to Prof. Zehev Tadmor who was involved in every detail of what took place at the Institute, initiated research projects, yet gave me full freedom of operation. And finally, to Professor Moshe Moshe, the incoming Director, I wish that under his leadership, the Institute will reach new heights.

RESEARCH PROJECTS AND ACTIVITIES OF THE S. NEAMAN INSTITUTE

ISRAEL 2028: VISION AND STRATEGY, ECONOMY AND SOCIETY IN A GLOBAL WORLD

Prof. Zehev Tadmor, Chairman, S. Neaman Institute

On March 20, 2008 a report entitled "Israel 2028: Vision and Strategy, Economy and Society in a Global World" was submitted to Prime Minister Ehud Olmert, to be adopted by the Government of Israel as a national strategy. The report was initiated and sponsored by the USA Israel Science and Technology Commission (USISTC), led by a Steering Committee which included Gen. (ret) Yitzchak Ben-Israel, MK, Mr. Sami Friedrich, CEO of Shaldor, Prof. Joshua Jortner, University of Tel Aviv and former President of the Israeli Academy of Sciences and Humanities, Mr. Raphael Maor, CEO of ECI Telecom, Dr Eli Opper, Chief Scientist of the Ministry of Industry, Mr. David Myron Wapner, Director, USISTC, Prof. Zehev Tadmor, COB of the S. Neaman Institute, and Mr. Yoram Yahav, Director of TIM – Technion Institute of Management. The Commission was headed by Mr. Eli Hurvitz, COB of Teva and directed by Mr. David Brodet, former Director General of the Ministry of Finance. The work was carried out over a period of two years by some 60 experts from the business sector, government and academy, in nine working groups, five of which were at the S. Neaman Institute. The Institute matched the expenses of the work done under its auspices.

This national strategic plan integrates economic and social factors designed to meet the following mission statement:
The State of Israel will be among the world's ten to fifteen leading countries in terms of income per capita; it will strive for the good of all its citizens, their quality of life and the future of its young generation. Israeli society will be open and enlightened; its economy will be free, balanced and fair and will rely on Israel's cultural and scientific/technological capabilities, the wealth of its human capital, on innovation and initiative. The State will achieve all of this through collaboration of all of its sectors, while maintaining its values and strengthening Israel's image in the eyes of its citizens, and its partners in the Jewish world.

The completed report is a landmark in that, for the first time, a sound national/economic/social vision and strategy was presented to the government and has a chance of being implemented. We at the S. Neaman Institute are proud of having played a key role in formulating such a national strategy.

Fortuitously, the report was completed just in time for Israel's 60th anniversary of independence, which is a time for contemplation and soul searching regarding our future. Much has been accomplished in 60 years, yet much more is to be done. Without a coherent, comprehensive national strategy along the lines described in this report, Israel's future may be at risk.

Israel, the report concludes, cannot survive for long under its current 'dual economy'- consisting on one side of a relatively small world-class, high efficiency, high-tech sector (the 'locomotive' of the economy), and a much larger, inefficient low-tech and service sector on the other. Such an economy (and society) is inherently instable and cannot provide the kind of GDP per capita Israel needs for a strong, sustainable economy,

nor can it provide the standard of living of a developed country or secure its significant defense needs. Moreover, a 'dual' economic structure inevitably leads to a split society consisting of a well-to-do minority (in the center of the country) and a vast and frustrated low-income majority (in the periphery) living outside the boundaries of success and well-being. This growing socio-economic gap leads to a non-cohesive, instable society and carries within it a time-bomb waiting to explode.

One of the important findings of this report is that the economic necessity for reaching a GDP per capita on par with that of a developed nation - which mandates the abolition of the dual economy by sharply increasing the productivity of the traditional industries and services - also automatically leads to a narrowing of the huge socio-economic gap in our society, bringing about greater cohesion and stability. What morality, empathy, and decency could not bring about, perhaps cold and pragmatic economic necessity will.

The report further observes that the current success of the Israeli economy, or rather the high-tech sector, from a historical perspective, may end up as a transient mirage unless a proper national strategy, as recommended in the report, is adopted. The economy rests, by and large, on ICT (information/communications technologies) or rather electronics/computers/communication (ECC) based industries. This is the result of 50 years of investment in the defense infrastructure (with its strong foundation in ECC or ICT). The next wave of high technologies, however, will emanate from other disciplines such as life sciences, molecular biology, nanotechnologies, material sciences, chemistry, and pharma – with roots in the basic research laboratories of the universities as opposed to the defense industries. Out of these laboratories are emerging both new technologies as well as skilled graduates who can handle, adopt and promote them, whether developed in Israel or imported from the rest of the world. Even the next stages of ICT will increasingly be coming from the basic sciences, as is the case with quantum computing. Yet in the absence of a national policy for the universities, let alone for the entire higher education system, it is not clear how these institutions will be able to supply the knowledge, skills and human resources needed to abolish the dual economy.

The report also addresses the inadequacy of current labor policies and the public service sector in handling the kind of radical changes needed to implement a new national strategy, and the lack of planning infrastructures within the government ministries to adopt and implement such plans.

The report concludes that Israel has a totally insufficient physical infrastructure for sustaining a modern, vibrant economy, and a devastatingly bad record regarding environmental concerns and protection. Rectifying these shortcomings demands a giant investment which will have to be made to meet the national goals. Finally, the report places all the above conclusions in the perspective of the global world and markets we live in, with appropriate recommendations.

The work performed by the Institute related to this report is briefly outlined in the following sections.

The report is available on the S. Neaman Institute website.

LEVERAGING TECHNOLOGIES AND RESEARCH AND DEVELOPMENT FOR SUSTAINED AND BALANCED GROWTH

Head of Project: Prof. Dan Peled; **Team Heads:** Prof. Morris Teubal, Prof. Uzi de Haan;
Project Coordinators: Moshe Elad and Naftali Moser; **Research Assistant:** Arkady Katsman

This project is part of the "Vision and Strategy for Israel 2028" program, launched in 2006 by the United States – Israel Science and Technology Commission, (USISTC), to design a strategic plan to position Israel among the most advanced countries in economic and social dimensions by the year 2028. The Technologies and R&D team is one of six teams working within this program, and is jointly sponsored by the USISTC and the S. Neaman Institute. Its mission is to design a technological innovations policy that will enhance R&D capabilities and assist in diffusing advanced technologies to a broad range of industrial and services sectors, while exploiting Israel's strengths in high-tech entrepreneurship and technology development.

The work of the R&D and Technology team progressed in parallel directions by two groups, with the participation of 12 researchers from the S. Neaman Institute and several universities in Israel and abroad. One group, headed by Prof. Teubal, crafted a strategy for an Israeli science, technology and higher education policy, advocating a unified systemic-evolutionary approach and priority setting, based on an analysis of existing strengths, market and system failures, and current and future developments in the global technology markets. The second group, headed by Prof. Uzi de Haan, worked in a 'bottom-up' fashion, mapping existing strength and weaknesses in industrial sectors, surveying tendencies to invest in new technologies and innovations, and identifying the policy enablers and infrastructures that contribute most to the long-term development of industrial and service sectors. An important part of the second group's mission was to determine how to improve cooperation and technology transfer between academic science and technology research and industrial sectors.

The team's recommendations were summarized in several working papers to be published by the S. Neaman Institute, and two chapters in the Vision & Strategy final report, which will be submitted to the Israeli government by the USISTC during 2008.

The full report is available on the S. Neaman Institute website.

HIGHER EDUCATION IN 2028

Project Leader: Prof. Zehev Tadmor

One of the key strategic issues addressed by the "Israel 2028 -Economic and Social Vision and Strategy in a Global World" report is the higher education (HE) system. The report concludes that the country's HE system has a key role to play if we are to accomplish the goals set by the report. In order to do so, however, the HE system must undergo major expansion and reform. The HE system today comprises seven research universities, the Open University and 65 colleges, attended by 250,000 students. The system (with the exception of private colleges) is centrally managed by the Council of Higher Education (CHE), which was established by Knesset Law, and the Planning and Budgeting Committee (PBC), which acts as a subcommittee of the CHE, established by a government decision.

In the context of national planning, the HE system has three major objectives: (a) conducting world-class basic research in the sciences and engineering to ensure Israel's position at the forefront of future high technologies; (b) cultivating the human resources and leadership a modern country needs, and the human resources necessary to support these future technologies and (c) enabling, within 20 years, post secondary education for about 75% of a given age cohort, which implies a student body of 750,000.

The report finds that in order to accomplish the above set goals, both increased national funding and a major reform of the system are needed. Furthermore, it recommends the following key steps: (a) a major increase in basic research funding and a change in the PBC's funding policy so that institutional research funding is gradually shifted to national competitive research funds. This will ensure that adequate funding is provided to the best scientists and research groups in the country and carries the hope that at least 2-3 research universities from among the seven will reach the stature of being ranked among the 15 best universities in the world; (b) including all the 2-year post-secondary institutions which grant associate academic degrees into the HE system; (c) reach a compact among the various type of institutions to easily accommodate the transfer of students from one type of institution the next; and (d) substantially reduce the powers of the CHE and PBC by passing most academic, administrative and financial responsibilities and power on to the individual institutions themselves.

STRATEGIC DEVELOPMENT OF NATIONAL INFRASTRUCTURE IN ISRAEL TOWARDS THE YEAR 2028

Project Leader: Prof. Yehuda Hayuth; **Steering Committee:** Prof. Arnon Bentur
Coordinator: Moshe Elad

"Strategic Development of National Infrastructure in Israel towards the Year 2028" concentrates on future demands for physical infrastructure in Israel and on the ability to construct infrastructure systems adequate to accommodate the country's projected demands over the next 20 years. As a primary layout the study is examining the projected infrastructure demands vis a vis a "Business as Usual" scenario, emphasizing the main problems and constraints. The study deals primarily with land transportation — roads and rail, the network of sea and air ports, production and distribution of energy and water, and environmental and human capital development related to construction and infrastructure.

This project is integrated into a study being conducted in the framework of the US-Israel Science and Technology Commission (USISTC), which is designing a long-term national strategic plan for economic development for the State of Israel for the year 2028 — the country's 80th anniversary. Creating this future strategy, which takes into account the economic and social markers and population forecasts for the next twenty years, is critical. The infrastructure study, carried out at the S. Neaman Institute, is analyzing the implications of the national infrastructure system on the country's economic, social and quality of life development. It attempts on the one hand to examine how and why the examined infrastructure systems become barriers to economic growth, and how this can be avoided. On the other hand, it tries to assess how infrastructure systems can support and promote growth.

The study emphasizes the innovation and sophistication within the different infrastructure areas, and how their employment and technological contributions can lead to business opportunities. In parallel, the project examines the mutual impact between infrastructure systems and other socio-economic elements, including leveraging technologies, productivity, globalization, institutionalizing policy-making processes, society and employment and the higher education system. Ultimately, all of these will be integrated into an economic model which will be developed in the context of this project. The project is comprised of several research teams: Land Transportation: Prof. Doron Balasha and Gideon Hashimshoni; Water and Environment: Prof. Yoram Avnimelech and Dr. Ofira Ayalon; Energy: Prof. Daniel Czamanski and Dr. Maria Marinov; Human Capital in Construction and Infrastructure: Prof. Yechiel Rozenfeld and Adam Buchman; Ports: Prof. Yehuda Hayuth.

ISRAEL 2028 - ENVIRONMENT

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

In the modern world, in an era of globalization and employee mobility, sound environmental policies are essential for sustainable development. Furthermore, the rise of living standards brings with it a demand for improving environmental quality. At the same time, it is common knowledge that non-sustainable use of limited natural resources can lead to irreversible damage without the appropriate technologies or economic resources for rehabilitation.

With this in mind, the "Israel 2028: Vision and Strategy, Economy and Society in a Global World"" Plan is addressing environmental issues and suggesting clear conclusions on environmental policy needs. The environmental chapter concludes that economic development in Israel must be based on clear and consistent policy, without which market growth will be limited and will not meet the desired goals.

Preserving the open spaces in a crowded country like Israel requires clearly defined initiatives, effective policy and an increase in public awareness. These efforts must be addressed both in urban areas, where the vast majority of the population is concentrated, and in rural areas, with their natural and recreational resources.

Inter-ministerial coordination on all infrastructure and environmental issues is essential, and demands the establishment of a dedicated framework for this purpose - an "Infrastructure and Development Cabinet". Investment in environmental projects should be similar to the investment rates of other developed countries – 1.5% of GDP. Ultimately, a greater investment in preliminary planning, prevention and treating environmental problems will lead to lower costs and higher benefits in the long run.

STRATEGIC DEVELOPMENT OF NATIONAL INFRASTRUCTURE IN ISRAEL FOR THE YEAR 2050

Project Chair: Prof. Yehuda Hayuth; **Steering Committee:** Prof. Arnon Bentur;
Coordinator: Moshe Elad

This project deals with the design of a long term strategy for development of physical infrastructure in the State of Israel. The project is based on the findings of the **National Infrastructure in Israel - 2028 study**, but with an expanded, longer-term perspective.

While the 2028 study focuses on infrastructure requirements and options for development, the 2050 study emphasizes the importance of a systemic approach, taking into account the interactions between social and physical forces in the country. Special attention is placed on the interrelations between the different infrastructure systems.

The project's main focus is on land transportation systems (roads, rail), ports, energy transport, water and the environment. If the 2028 project's area of interest was mainly within the country's borders, the 2050 study has broadened this scope, embracing the geophysical reality of the country, and its implications on the relationships and cooperation with neighboring countries. The long time periods associated with planning, budgeting and building national infrastructure, and the need to maintain options for future development, demand long-term strategic planning. Special emphasis in this project was placed on incorporating new technologies whose feasibility has been proven in scientific studies and practical experience in other parts of the world.

The national infrastructure project team analyzes the projected demand for infrastructure in relation to population growth forecasts and various scenarios of economic growth. To establish a baseline for comparison, the study analyzed the projected infrastructure demands in a "business as usual" scenario. This analysis revealed that the main obstacles for infrastructure development are the physical, environmental, social and institutional constraints inherent in this scenario. In parallel, the potential contribution of an integrative approach to infrastructure development was examined, which took into account the economic, social and environmental elements, and evaluated their broad implementation, as well as infrastructure, as drivers of growth.

The project comprises five research teams: Project Management Team and Steering Committee; Land Transportation Team (Roads and Rail); Energy Team; Water and Environment Team; and Ports Team.

A NATIONAL PLAN FOR THE CHEMICAL INDUSTRY IN ISRAEL

Steering Committee Chair: Dr. Gilead Fortuna; **Coordinator:** Moshe Elad

The National Plan for the Chemical Industry in Israel is a large project that the S. Neaman Institute has been leading since 2004. The project analyzes past and present chemical and pharmaceutical activities in Israel, presents alternatives and proposes new industry branches in this field. This project compares these industries with other global markets and suggests policy tools for Israeli decision makers. The basic assumption was that despite its significant potential, this industry sector faces a number of limitations which may prevent it from reaching an optimal contribution to the market. The proposed plan is intended to overcome these obstacles and enable the industry to reach its full potential, with the associated contribution to the national economy.

The S. Neaman Institute has collaborated in this project with the Israeli Finance Ministry and the Israeli Manufacturers Association. A final paper was submitted to major decision-makers in the Israeli government, industry and financial markets; it was also presented in December 2007 at Israel Business Conference in Tel Aviv.

During 2005 the four sub-committees ("Chemistry Education", chaired by Prof. Judith Dori; "New Technological Directions", chaired by Prof. Yoel Sasson; "Infrastructure and Green Industry", chaired by Prof. Yoram Avnimelech; and "National Policy", chaired by Mr. Ohad Orenstein and Mr. Reuven Vax) completed the process of data collection and analysis of the various findings and began writing the first draft of the final paper. After a brainstorming process and study discussions, by early March 2006 the first draft of the final paper was completed and submitted to Dr. Gilead Fortuna, the Chair of the steering committee. The steering committee also decided that the paper would integrate the input from chemistry industry leaders. The steering committee eventually approved the comprehensive final paper which was submitted to the Israeli Government and other decision makers. Generally, the committee's work summarizes 4 major subjects:

1. Improving chemistry education and teaching at all age levels, and upgrading the educational investment.
2. Creating a basic solution to the mixture of environmental and industrial infrastructure.
3. Making the chemical industry an active partner in absorbing new technologies listed by the Chief Scientist and supported by the government.
4. Implementing all above-mentioned subjects within the framework of national policy.

The final report, once it is available, can be downloaded at the S. Neaman Institute website.

NATIONAL POLICY IN THE FIELD OF ENERGY AND THE ENERGY FORUM

Project Leader: Prof. Gershon Grossman; **Project Coordinator:** Dr. Ofira Ayalon
Forum Research Assistant: Ms. Tal Goldrath

The S. Neaman Institute, in accordance with its public policy role and technological and scientific expertise, initiated a process to determine meaningful steps towards creating sound energy policy. In the summer of 2005, the Institute Director, Prof. Nadav Liron, signed a memorandum of understanding with the US Department of Energy declaring the Institute one of ten centers of excellence in the world to promote clean energy technologies and to encourage energy reduction and conservation.

In 2006, the Institute initiated an Energy Forum, led by Prof. Gershon Grossman and coordinated by Dr. Ofira Ayalon, with the aim of creating a professional platform for discussions related to the field of energy in Israel. The forum is broad in its scope and provides a meeting place for sharing ideas and promoting projects in the fields of alternative energy, energy savings and energy conservation. Through the activities of the forum, ideas are developed and professional policy determined by relevant entities in the field and by decision makers from the various governmental agencies.

After each forum meeting, a report is published to summarize the highlights of the discussion, provide relevant information regarding activities in Israel and abroad, and provide operational conclusions.

The reports are designated for decision makers and any other public organizations, with the aim of raising national awareness of the potential contribution of these issues to the Israeli energy market. The Energy Forum reports are now acknowledged as important resources by experts from the Ministries of Finance, National Infrastructure and Environmental Protection.

During 2007, five forum meetings were held:

1. **Solar energy for the production of heat**
   While private consumers make abundant use of solar energy, it is hardly used in industry despite the fact it is much more suitable for this sector. A discussion was held to define the reasons for this. The forum highlights were presented to the Tax Authority in the Ministry of Finance for their evaluation.

2. **Renewable energy R&D needs**
   In the discussion of the needs of renewable energy research and development in Israel, there was consensus among the participating experts that R&D in this field will progress in Israel only if the state recognizes the strategic importance of this research field. Conclusions from the meeting were both theoretical and practical, and were presented to decision makers. Further discussions will be held with relevant Ministries, including Finance, Industry, National Infrastructure, Science and Environmental Protection.

3. **Efficiency and energy savings in air conditioning systems**
   Air conditioning is a critical issue in a country like Israel, which is technologically and culturally

progressive and has a warm and humid Mediterranean climate. Furthermore, Israel is an isolated “energy island", forcing the electric company to meet peak demands. Forum conclusions were delivered to decision makers.

4. **Biofuels for energy production**
   “Israel can become a world leader in plant science for better energy production.” This was the main conclusion drawn from this energy forum session. The goal of the discussion was how to position Israeli research and industry as part of the global effort to supply fossil fuel-alternative, sustainable and cleaner energy. In the participants’ opinion, there is a solid foundation of knowledge in Israel that can contribute to the global trends of biofuel generation in dry climate areas, such as those found in the Middle East. The world consensus regarding preservation of fertile soils and fresh water also gives Israel an advantage among the global researchers. Another conclusion from the discussion was that cooperation between academy and industry, and allocating land for field experiments is necessary to advance this research. This forum assembly was part of a joint research with the GM research fund.

5. **Demand and supply management**
   Demand and supply management (DSM) is a tool that, when used properly, can benefit both consumers and producers (electric companies), as well as the national market. DSM allows energy saving combined with demand control (from peak to off- peak demand), reduction of maximum demand and enhancing off-peak usage. By this, investments in infrastructure and equipment can be significantly reduced. The main tool in DSM is tariffs – creating an incentive to the consumer to shift his demand from peak to off-peak hours, and in many cases to initiate a load reduction. The forum participants argue that today’s electricity rates do not represent the full costs of electricity production, and must take into account the abatement of air pollution (local and global), utility land costs and others. Electricity costs during peak hours must be significantly higher to create an incentive to reduce demand.

All Energy Forum protocols in Hebrew and abstracts in English are available at the S. Neaman Institute website.

OTHER ACCOMPLISHMENTS OF THE NATIONAL POLICY IN THE FIELD OF ENERGY PROJECT

1. Mr. Doug Newman, Manager of the Global Energy Network project (of which the S. Neaman Institute is the Israeli representative) was invited to the Israel Globes Business Conference, where he presented a talk on carbon balanced cities.
2. Work done for the Meadowlands, New Jersey rehabilitation project (see 2006 Annual Report) is being promoted by the Israel Export and International Cooperation Institute.
3. Kibbutz Ein Harod Ichud had been declared a "Green Kibbutz" by the Minister of Environmental Protection. Due to an energy survey supported by the S. Neaman Institute, critical energy consumption points were detected which paved the road to an operative energy conservation plan.

ISRAEL'S ROLE IN THE GLOBAL BIO-ETHANOL MARKET - NATIONAL PLANNING AND POLICY.

Project Leader: Dr. Ofira Ayalon; **Project Team:** Jonathan Spenser, Consultant and Agri-business entrepreneur, TerraVerde Agriculture; Dr. Haim Zaban, Zenovar; Dr. Miriam and Perry Lev-On, the LevOn Group, USA; **Research Assistant:** Ms. Efrat Elimelech.

This study was supported by the research fund of GM Israel

Biofuels originating from agricultural products are one of the "hottest" issues in the global energy and commodity markets. The political and economical implications of biofuels are significant, especially for industrialized countries, which consume and engage in commerce with energy resources.

The study included an overall survey of the emerging global bio-ethanol market, and the possible role of Israel in this area. Specific attention was given to issues such as growing plants for bio-fuel production, botanic and economic topics, defining the strategic advantage Israel has in agricultural development (biological and mechanical) and evaluating the experience of exported agricultural projects in the past. Mapping of Israeli companies and technologies in the field was also conducted to determine the possibility of engaging them in this field.

The full report in English can be downloaded from the S. Neaman Institute website.

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NATIONAL ENVIRONMENTAL POLICY

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

The year 2007 can be considered a turning point in public environmental awareness. The movie "An Inconvenient Truth" placed environmental issues at the top of the global agenda, earning Al Gore and the Intergovernmental Panel on Climate Change the 2007 Nobel Peace Prize. Multinational corporations are becoming increasingly involved in developing environmental technologies, fund raising etc.

In Israel as well, the "environment" has become a central topic in public and personal discourse. In this atmosphere, it is more important than ever that policy discussions and decisions be based on firm scientific, reliable and unbiased information. For this reason, the S. Neaman Institute's environmental activities are significant and influential at the national decision-making level.

In 1998, a special unit was established at the S. Neaman Institute to mediate on environmental issues between the interested parties: professionals in various institutes, the Ministry of Environmental Protection, industry, NGOs, academia and the general public, and to provide objective, calculated research findings to guide the decision-making processes.

During 2007, the environmental unit published several position papers on environmental issues of high national priority. These papers, focusing mainly on reclaiming the Dead Sea, environmental technologies, solid waste management, the Green Campus, etc., serve as important references for various government agencies, and place their content on the public agenda. Some of the environmental issues, such as biofuels, were discussed within the framework of the energy forum.

RECLAIMING THE DEAD SEA: ALTERNATIVES FOR ACTION

Project Leader: Prof. Yoram Avnimelech **Project Team:** Gad Rosenthal, Kivun LTD; Giora Shacham, Consultant, and a team of researchers from "Sustainable Negev Organization"; the Tamar and Megillot Regional Councils; the Dead Sea Research Institute; the Dead Sea Works and the Zukerberg Institute for Water Research at Ben-Gurion University. **Research Assistant:** Ms. Yifaat Baron

The Dead Sea, the lowest and saltiest sea in the world, is currently sustaining severe environmental damage. As a result of Israel, Jordan and Syria's pumping of water from the Jordan River, the Sea of Galilee and Yarmouk River, as well as the direct pumping of water from the Dead Sea by industries in Israel and Jordan, the natural supply of water to the sea is diminishing and the sea is slowly drying up. Carrying on in a "business as usual" scenario was found to be the most expensive alternative, both economically and environmentally, with environmental, infrastructure and recreation damages estimated at $90 Million annually.

The aim of this project was to evaluate and present different alternatives for rehabilitating the Dead Sea and the Jordan River. In the process, three main alternatives were examined: "business as usual", introducing sea water into the Dead Sea (from the Mediterranean or from the Red Sea), and water supply from the Jordan River.

The goal of this project was to present its participants, the Israeli public and the neighboring countries, a broad picture of the declining state of the Dead Sea, and options for its rehabilitation. The project assumes that placing this broad picture on the public agenda will enable meaningful discussion of the various alternatives, and will facilitate an educated decision-making process that will result in the most effective response with minimal environmental risk.

The report was submitted to the World Bank, which announced a tender for the planning of one chosen alternative described in the document. The document's publication led the World Bank and other decision makers to realize the complexity of the alternatives, and that focusing on a single solution will be neither economic nor environmentally wise. The report was also presented to the environmental lobby in the Knesset and is quoted frequently.

The full study (in Hebrew and English) is available on the S. Neaman Institute website.

WASTE MANAGEMENT IN ISRAEL

1. BETWEEN TECHNOLOGY DEVELOPMENT AND PUBLIC TRANSPARENCY: CREATING TOOLS FOR PUBLIC DISCUSSION ON BUSINESS VENTURES AND TECHNOLOGICAL ALTERNATIVES FOR TREATING SOLID WASTE.

Project Leader: Dr. Ofira Ayalon **Project Team:** Ms. Limor Spektorovsky and Dr. Noam Gressel, Assif Strategies Ltd. **Research Assistants:** Ms. Yael Atar, Ms. Yifaat Baron.

A joint project with the Ministry of Environmental Protection – Solid Waste Management Department.

Waste management in Israel is highly problematic and since current policy is deeply flawed, research and recommendations in this field are crucial. In a collaborative effort between the S. Neaman Institute, the Ministry of Environmental Protection and Nesher LTD, comprehensive solutions for this issue were sought.

The project included:

- Coordinating an operational team comprised of professionals and interested parties from the various related sectors.
- Evaluation of the various technological options according to cost/benefit and sustainability models
- Examination of relevant issues for mixed waste management, including technologies, necessary legislation, responsibilities of the different entities, public involvement and means for conflict resolution, and sustainability principles as a basis for evaluating the compatibility of alternative technologies for application.
- Defining strategies to encourage higher levels of involvement and commitment of the environmental organizations, the government and academia, for a system-wide approach to waste management (including an appropriate landfill tax, government investment and resolution of conflicts associated with public objection).
- Creating the infrastructure for a public lobby to encourage sustainable waste management.

The waste management Master Plan defined the main guidelines for waste management treatment. An additional appendix regarding public awareness and inclusion in decisions was required by the National Planning Authority. The S. Neaman Institute document is a practical guideline which will facilitate the application of the Waste Master Plan.

The full study can be downloaded from the SNI website

2. SEPARATION OF WASTE IN HAIFA

Project Leaders: Prof. Yoram Avnimelech; Dr. Ofira Ayalon; **Project Team:** Ms. Efrat Elimelech, Avi Novik, Shahaf Consultants Ltd.

The project was conducted with the cooperation of the Ministry of Environmental Protection and the Municipality of Haifa

The disposal of biologically degradable organic waste, which is now prohibited in Europe due to greenhouse gas emissions, will probably be banned in Israel as well. In the near future, waste landfills in Northern Israel will be filled and closed, a fact which is forcing Haifa Metropolitan to make imminent decisions regarding solutions for its waste management needs. As such, pre-treatment of organic waste is necessary, using one of two main options – aerobic composting or anaerobic fermentation. The "dry" waste will be sorted, recycled and the residues will be disposed-of in landfills.

The S. Neaman Institute examined three alternatives for waste management: maintaining the current situation – no source separation, limited recycling and landfilling of most of the waste; waste separation in a transfer station; or source separation at home – to "dry" and "wet" streams.

The study shows that source separation in Neve Shaanan is economically feasible. The total cost of waste treatment and the income from selling recyclables at the project's fourth year were estimated at 7.2 million NIS, compared to 7.5 million NIS if waste is separated at the transfer station. Maintaining the current waste management system will cost 8.3 million NIS. Over the first 3 years of the project, applying a source separation plan will lead to a 1.2 million NIS reduction in costs compared to the current situation.

We hope this model will become a national model for appropriate waste management in Israel.

The full report is available on the S. Neaman Institute website.

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ENVIRONMENTAL TECHNOLOGIES (Clean-Tech)

Project Team: Dr. Ofira Ayalon; Avi Temkin, Globes Research

A joint project of the S. Neaman Institute and Globes Business Newspaper

'Green' technologies in Israel and their business potential are relevant issues on the public agenda, with frequent media exposure. The environmental market is strong and growing worldwide, estimated at $600 Billion dollars per year, with an annual growth rate of 5-8%. Clean-tech comprises one third of the global environmental market. The importance of this field is recognized by government entities and private industry, and a carefully considered strategy is needed in order to take advantage of international opportunities in this important market sector.

The government of Israel had so far failed to respond to global development in the environmental field in general and in clean-tech in particular. Environmental issues are still considered merely as regulatory problems, and this lack of vision may result in potential market loss.

As a follow-up to research presented during 2004, a joint study with Globes Research was conducted, demonstrating the opportunities presented by this market in Israel and the need for the Israeli government to act in order to realize this potential. Only a coordinated and focused action (between government offices, government and academia, entrepreneurs and industry) and the definition of a common vision will position Israel as an important player in this field.

Over 30,000 downloads of the research report from the websites of the S. Neaman Institute and Globes indicate the importance of this study, and its impact.

The full report is available on the S. Neaman Institute website.

ENTREPRENEURSHIP, ECONOMY AND MANAGEMENT IN THE FIELD OF ENVIRONMENTAL QUALITY IN THE LOCAL COUNCILS

Project Leader: Dr. Ofira Ayalon

Project conducted in cooperation with MAFAM Galilee

Recognition is growing of the connection between economic activities, management of municipal systems and environmental quality. Increased public awareness, as well as strict legislation and enforcement, are leading to a transformation in managerial thinking, especially in municipal systems. An emerging trend is to create organizational systems which introduce environmental principles into decision-making, planning, operation and management.

The S. Neaman Institute, in cooperation with "MAFAM Galilee", created a new course for environmental managers, strategic planning unit managers, planners, etc., intended to deepen the participants' knowledge regarding environmental economy in order to improve their planning and promotion of environmental issues in the local authorities. The course addresses several fields connecting economic activity and environmental quality including resource conservation and cost savings (energy, water etc.), promotion of technologies which reduce environmental damage, and development of economic ventures in the fields of environment quality.

The objectives of the course are to:

- Provide an overview on economics and environmental economy
- Teach the basics of preparing an environmentally-oriented business plan
- Introduce successful ventures in the environmental field
- Examine obstacles towards implementing environmental technologies in local authorities and how to overcome them.

Course participants included environmental department managers, strategic planning managers, planners, etc. The final projects addressed issues such as management of construction and demolition waste, municipal waste treatment, precipitation water collection and more.

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THE GREEN CAMPUS AT THE TECHNION

Project Leaders: Dr. Ofira Ayalon and Prof. Yoram Avnimelech; **Activity Coordinator:** Ms. Tal Goldrath

The Green Campus project at the Technion, led by the S. Neaman Institute, is intended to introduce 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 model for other academic institutes in Israel for the implementation of the "Green Campus" agenda.

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, appointed by the President of the Technion, comprises of representatives from the academic faculties and key Technion's management personnel- managers in the administrative and maintenance branch, the Technion's spokesperson, and more.

The Green Campus project's activities are in the areas of education and environmental awareness, conservation of resources (water, energy, recycling, etc.), pollution prevention and more. The green Campus holds lectures for the wide audience, free of charge, intended to expose environmental issues, research, and new developments from the Technion and to enhance public environmental awareness.

In 2007, the Technion was officially declared a 'Green Campus' by the Ministry of Environmental Protection. The certificate was presented by the Minister, Mr. Gideon Ezra to Prof. Avnimelech, who has led the Green Campus project since 2000.

2007 was energy saving year at the Technion, which carried out a pilot project for electricity saving in its Electrical Engineering Faculty building. The project proved that significant savings can be made with only minor expenses, reducing electricity costs by 232,500 NIS in only 9 months at a total investment of 45,000 NIS. A coordinated action between environmental, engineering and management personnel has led to environmental and economic benefits. The Technion management is taking the project another step forward by applying the above model to other faculties, aiming to save the Technion millions of NIS, reduce greenhouse gas emissions and demonstrate to students and employees the importance and benefits of sustainable behavior. Representatives from campuses all over Israel have come to observe and consult on the green campus lessons, in order to implement them in their institutions.

Additional information on the Green Campus can be found at http://techunix.technion.ac.il/~greenweb.

DIALOGUE, MEDIATION AND CONFLICT RESOLUTION BETWEEN INDUSTRY AND COMMUNITY

Project Leader: Dr. Ariela Vranesky; **Project Coordinator:** Moshe Elad

In the past, industry has not always adequately addressed environmental issues, nor have the authorities developed laws and bylaws suitable to tackle these problems. Yet over the last decade, governmental and municipal authorities are taking a hard line on environmental issues, and public awareness of environmental risks is increasing. In recent years the chemical industry is perceived as being particularly harmful to the environment, and a crisis in the relationship between the chemical industry, the environmental authorities and the community is deepening. A similar situation can be observed in other industrial sectors such as metals and food, even when their impact on the environment is considered to be less damaging.

Over the last two decades, we are witnessing a change in the reciprocal relations between industry around the world and its neighboring communities. A tradition of disregard of environmental concerns by industry, and the criticism, mistrust and the defiance that this has engendered in the community, is gradually being replaced by attempts to negotiate, which are geared to creating peaceful coexistence between industry and its environment.

Since the beginning of the 21st century, the chemistry industry has been a part of this trend. During the latter part of 2006, an agreement was reached between the industrial council of Ramat Hovav and the Ministry of Environment regarding the environmental situation in the facility's vicinity. It is safe to assume that improved communication between industry and the communities helped to improve the environmental quality in the Negev region.

This project is exploring how to reinforce this positive trend, and to implement the lessons learned in other places in Israel, particularly in relation to industries and communities in the Haifa Bay. In this suburban area of Haifa, many communities feel threatened by the proximity to heavy industry, particularly following the experience of the Second Lebanon War, and in light of the effects of environmental pollution on public health. The methodology and tools for creating agreements are being developed within the framework of this project together with all of the involved parties. The S. Neaman Institute team is cooperating in this process with representatives of the central government, local authorities, economic organizations, civilian groups and social and environmental organizations.

The main goal of this project is to promote genuine dialogue between the industrial sector and the community on environmental issues. This dialogue is designed to expedite sustainable economic development, accompanied by ongoing

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environmental protection measures. This project combines scientific innovation and contributions to society, the economy, and the environment. Furthermore, it is intended to serve as a model for additional development and applications in Israel and in other countries.

This project employs findings from several other S. Neaman Institute projects, particularly "A National Plan for the Chemistry Industry in Israel" and "Air Pollution in the Haifa Bay"; interdisciplinary knowledge on how to constructively cope with complicated disputes, and lessons from the Chemistry Industry initiative (Responsible Care) in many countries worldwide, and recently in Israel as well.

THE HIGHER EDUCATION FORUM

Project Leaders: Prof. Mordechai Shechter, Prof. Nadav Liron, Prof. Neal Sherman

The Forum for Higher Education was created as an offshoot of the international conference entitled "Transition to Mass Higher Education Systems: International Comparisons and Perspectives", which was held at the S. Neaman Institute in December 2004. Among the conclusions of the conference, it was decided to create a forum that would enable open discussion between the country's universities and colleges. The forum was established by the S. Neaman Institute, in cooperation with "Bashaar –" Academic Community for Israeli Society, and the U.S.-Israel Education Fund (Fulbright Foundation).

The purpose of the forum's meetings is to reach a broad consensus regarding the common goals of the higher education system in Israel and of the roles of all the relevant players. Recently, the topics of the forum have been expanded and today the emphasis is on issues related to the higher education system and higher education policy in Israel.

All of the forum's meetings are filmed and can be viewed on the S. Neaman Institute website.

PRIVATIZATION IN HIGHER EDUCATION SYSTEMS – AN INTERNATIONAL CONFERENCE

In the period since 1990, Israel's higher education system has experienced both rapid growth and rapid structural change. One of the central policy questions arising in the wake of these developments is: "What should the relative roles of public and private institutions be within the national higher education system?" In January 2008, an international symposium on Privatization in Higher Education Systems took place, which aimed to provide a systematic, informed answer to this question in the Israeli context. The conference was held under the auspices of the S. Neaman Institute, Bashaar-Academic Community for Israeli Society, the United States-Israel Education Foundation, the Azrieli Center for Economic Policy, Bar-Ilan University and the Israel Academy of Sciences and Humanities.

The symposium's deliberation provided policy makers from the higher education system and from government with the opportunity to begin analysis of the Israeli situation in the light of international experience with the assistance of local higher education researchers and foreign experts. It is hoped that the process initiated by the symposium will encourage and contribute to the formulation of a rational, pro-active policy regarding privatization.

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FUNDING BASIC SCIENCE IN THE UNIVERSITIES

Project Leader: Dr. Meir Tzadok

During 2007, a final draft of the report was completed which describes the various methods of budgeting and funding systems of higher education and research from public and other sources. This draft was circulated among experts in the field and amended accordingly. The first draft was extended and enlarged with a focus on three different themes:

1. The personal contribution – the "story" behind.
2. Theoretical and methodological assumptions.
3. Ways of operation and technical methods.

The study relates to various institutions and methods, which include: The Israel Science Foundation, the First program; the budgeting model at the Planning and Grants Committee, and various other sources.

The study is available on the S. Neaman Institute website.

HUMAN RESOURCES IN SCIENCE AND TECHNOLOGY IN ISRAEL

Project Leader: Dr. Daphne Getz; **Project Team:** Bella Zalmanovich, Tsipy Buchnik

The economic strength of any modern country is based on its ability to translate scientific knowledge and technological innovation to new products and services. This is especially relevant in the case of Israel, which lacks natural resources. The basis for creating a scientific and technological knowledge base lies in the cultivation of human capital.

The goal of this project, which is operating under the auspices of the S. Neaman Institute and the National Council for Civil Research & Development (MOLMOP) in cooperation with the Central Bureau of Statistics, is to present data on the science and technology human resources in Israel. This data will assist the MOLMOP members in shaping a policy concerning science and technology labor force training for the industry and academic sectors.

During 2007, a final report was submitted, including a database that describes the supply and demand for a science and technology labor force in Israel. The supply aspect includes data on both the tertiary level and the secondary level by various segments (gender, locality of residence, population group, fields of study, degree levels). The demand aspect includes data on the current science and technology labor force and the projected demand in this labor market sector by various segments (gender, years of education, occupation, locality of residence, wage, and population group). The report also includes a literature survey on the supply and demand for science and technology labor forces in the OECD countries.

This project will continue during 2008 and will focus on the following subjects:

- Human resources supply forecast according to industry needs
- Policy measures to reduce brain drain
- The training of a population without tertiary education for the science and technology labor market
- A survey of academic engineering colleges in Israel
- Increasing the supply of master and doctoral degree recipients in science and technology
- Strengthening non-academic technological education
- A survey of collaboration between the academic and industrial sectors

The publication Human Resources in Israel can be downloaded from the S. Neaman Institute Web site.

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EFFECTS OF PRIVATIZATION ON THE QUALITY OF HIGHER EDUCATION

Project Leader: Elise S. Brezis; **Research Assistant:** Ariel Souari

The purpose of this study is to analyze the relationship between privatization in higher education and the quality of universities. An interesting fact is that of the top 10 universities in the US, nine are private. Previous studies have claimed that there is a relationship between the privatization of universities and their quality, since countries with a high proportion of private resources have superior universities.

This study intends to analyze if this supposed relationship is indeed due to empirical regularities between quality and ownership, or whether the two are unrelated. The analysis presented herein is based on data collected on 508 universities in 40 countries. I show that flexibility is the important element affecting quality, and not ownership per se.

The study is available on the S. Neaman Institute website.

AN INNOVATIVE APPROACH TO LEARNING MATHEMATICS IN THE CONTEXT OF CULTURAL PLURALISM

Project Leaders: Prof. Daoud Bshouty and Dr. Igor Verner

In this project we are developing a course entitled "Teaching Geometry in a Cultural Context" which will be delivered in the spring semester of 2008 at the Technion. In addition, we are preparing instructional materials that college student-mentors will use for teaching geometry in a cultural context in high school geometry and design classes. So far a 12-hour tentative curriculum has been developed and approved by the Ministry of Education. An instructional unit on "Rangolis – geometrical patterns in the Indian culture" has been published. Pilot teaching of the proposed curriculum is being conducted in three schools (Arab and Jewish) with the participation of school teachers and mathematics education students from the Technion.

Currently, the following educational projects are underway:

- Computer aided design of ornaments (college math education students).
- Geometric patterns in the Islamic culture (college math education students).
- Ukrainian – Jewish cultural connections expressed in ornaments (college math education students).
- Teaching geometry in the context of Indian ornaments at middle school (college math education students).
- Pilot teaching of geometry in a cultural context at an Arab high school (teachers).
- Pilot teaching of geometry in a cultural context at a Jewish middle school (teachers).

Some of the abovementioned projects are already at the stage of pilot implementation in schools. In parallel, two graduate studies are being conducted:

- Khayriah Massarwe, a high school mathematics teacher, is doing her Ph.D. study on "Learning Geometry through Inquiry into Cultural Contexts".
- Tatyana Nekritch, a design teacher, is conducting an M.Sc. study on "Social and Cultural Aspects in Design Education".

Findings from the study were presented in the conference "Academy – Community Partnership for Social Justice", Hebrew University, Jerusalem, January 2008.

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ECONOMICS OF NATIONAL SECURITY PROGRAM (ENS)

Program Head: Prof. Dan Peled; **Program Coordinator:** Colonel (Res.) Moshe Elad

The ENS Program was launched at the end of 2003 as an intermural research program aimed to initiate, encourage and support academic research on the mutual links between economic conditions and national security. Its main goals are to provide in-depth analysis of the economic costs and consequences of the Israeli security situation, the contributions of security and defense expenditures to economic progress, and to estimate the resources allocated to Israel's defense. There are some 40 active participants in the program, with an additional 30 participating on an ad-hoc basis. Participants are drawn from economics and other departments in Israeli universities, research departments of national and government agencies, and current or former senior staff members of the government, defense sector and industry.

The ENS Program has held monthly meetings over the past three years in which ENS members presented and discussed their research, and heard lectures by external speakers, including senior figures in the Israeli defense sector and industries, and economic policy makers. The program circulated Calls for Proposals among academic researchers and graduate students to foster research on defense economics in Israel, and after a careful selection process funded some 40 of the submitted proposals over the past three years.

During the past two academic years the program held some 10 researchers meetings, attended by about 30 participants on average. External speakers at these ENS meetings included: Miko Gilat, CEO and owner of Soltam Industries on coping with ever-changing global defense markets; Prof. Avi Ben-Bassat on the committee he chaired for restructuring the military service in Israel; Colonel (Res.) Shmuel Gordon on his methodology for estimating military power; Uri Reychav, former Chief Systems Engineer at Rafael, on the process of converting Rafael to a corporation; Dan Inbar and Hemi Pecker on National Homeland Security policy; Karnit Flug, Head of the Research Department at the Bank of Israel, on the Brodet Committee Report for examining defense budgets in Israel; and Brigadier General (Res.) Dr. Shaul Chorev, former Assistant to the Minister of Defense on Technology Transfer from Defense R&D.

On December 2006 a conference marking three years of the ENS Program was held in Herzliya, with some 100 participants. Selected research projects by ENS members were presented, in addition to keynote presentations by Dan Meridor, chair of the Committee for Designing the Security Doctrine of Israel; Prof. Zvi Eckstein, Deputy Governor of the Bank of Israel; and Major General (Res.) Uzi Dayan. A special panel of experts with Dr. Nadine Baudot-Trajtenberg (Bank Hapoalim), Yaacov Lifshitz (former General Director of the Ministry of Finance and former Chairman of the Board of TAAS), and Uri Reychav (former Chief Systems Engineer at Rafael), concluded the conference.

Publications of the ENS program are available on the S. Neaman Institute website.

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EVALUATION OF THE SPACE INDUSTRY'S IMPACT ON THE ISRAELI ECONOMY

Investigators: Dr. Daphne Getz, Arkady Katsman, Bella Zalmanovich, Vered Segal, Yair Even-Zohar, Deganit Paikovsky

This project is operating under the auspices of the S. Neaman Institute and the Economics of National Security (ENS) Research Program. Its goal is to map out the interconnections between Israel's academy, national defense system and industry in light of the country's growth in space industry and in space technology R&D. In the framework of this project, an attempt is made to evaluate the impact of the space industry on the Israeli economy by collecting, analyzing and presenting data on the industry, human resources training and R&D in this field. The aim is to collect the key data on this industry and on the factors that influence its development and impact, in order to examine the rationale for government support for this industry.

The project is divided into two phases:
The first phase (which began in 2006 and was completed in 2007) dealt with instrumental design and collecting existing data on the space industry. Based on collected data, reports were drawn up on:

- The scientific position of Israel in relation to other countries in space-related fields of science, according to bibliometric data
- Data on the space industry in Israel and worldwide
- Indicators of space-related activities in Israel
- A review of possible business models in the space industry

The second phase of the project (2008) is attempting to use this data, as well as additional data that will be assembled by interviewing space industry leaders and other experts in this field, in order to perform analyses that focus on space activity development and on factors of the space industry's impact on the national economy.

Analyses that will be performed will relate, among others, to major changes and trends in the space industry, the importance of R&D and innovation in the space sector, knowledge and technology transfer processes, market research, and policies in the space sector.

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R&D PROJECT ON FIGHTING TERROR

Project Leader: Dr. Orna Berry; **Project Team:** Prof. Avi Marmum, Prof. Nadav Liron, General (Res.) Dan Arditi, Dan Inbar, Chemi Peker and others

This project is a joint effort of the Council for National Security and the S. Neaman Institute. In this project, various methods for supporting and enhancing R&D to combat terror are evaluated, integrating the private, government and defense sectors. The Government of Israel has adopted the project and allocated NIS 25Million for it in the 2008 budget.

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CONDITIONS FOR THE PROSPERITY OF THE JEWISH PEOPLE AND THE STATE OF ISRAEL

Project Team: Prof. Aviezer Ravitzky, Prof. Zehev Tadmor, Prof. Moshe Halbertal, Prof. Shlomo Avineri, Prof. Ruth Gavison; **Coordinator:** Moshe Elad

In 2004, the S. Neaman Institute established a research project to address the fundamental problems facing the State of Israel and the Jewish people. To that end, the Institute assembled a group of the country's top thinkers and researchers in different areas of expertise – philosophy, society, law, politics and technology. Each group member agreed to write an independent analysis of the present situation in their area, and present recommendations for the future, with a focus on the chances and risks involved. The group members were to analyze the existing data, follow the processes that created them while trying to rise above immediate events and opposing interests, and observe reality from a reflective perspective. The documents were to reflect the personal positions of each author, and an effort was made to cover as wide a range of topics as possible, while coordinating between the different areas covered.

As such, this activity embraced an integrated, interdisciplinary approach, with a focus on cultural and practical aspects. It integrates individual work by experts in different fields, and includes mutual critiques. Most papers have already been published in both English and Hebrew. Two parts of the work were presented during the Herzlyia Conference in January 2008 in a special sessions devoted to these subjects.

Group Members and their Topics:

Prof. Aviezer Ravitzky – The Jewish People Today: From Determinism to Freedom

Prof. Zehev Tadmor – Science and Technology as Necessary Conditions for the Survival and Prosperity of Israel

Prof. Moshe Halbertal – Modern Jewish Identities and the Future of the State of Israel

Prof. Shlomo Avineri – Comments on National Governance in Israel

Prof. Ruth Gavison – The Necessity of Strategic Thinking: A Constitutive Vision for Israel and its Implications.

The project papers are available on the S. Neaman Institute website.

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ISRAEL'S SOsocietal RESILIENCE

Program Chair: Prof. Oz Almog; **Program Coordinator:** Moshe Elad

A new project which aims to explore Israel's Societal Resilience has been launched this year, chaired by Prof. Oz Almog of Haifa University. It is now common knowledge that over the years, Israeli society is becoming less homogeneous and the societal solidarity which once characterized Israeli life is diminishing. Ideological, economic and cultural gaps are growing and feelings of fondness and identification with the State of Israel are being replaced by alienation, criticism and even mutual hostility among different segments of society. Moreover, the willingness to contribute and make sacrifices for the country is being replaced by worrisome phenomena of egoism, narcissism and escapism.

Since its establishment, Israeli society has had to cope with serious social problems including daily hardships and inter-ethnic, religious, political and socio-economic tensions. However, it seems that over the last decade, as a result of a complicated set of causes, internal tension inside Israel is reaching unprecedented levels, to the extent that they endanger the survival of the State of Israel.

The sources for this crisis can be found in the collapse of politics and lack of public confidence in the country's leadership, the crisis in education, the emergence of materialism and hedonism, the upsurge of corruption and violence, ideological and political radicalization, the spread of poverty and economic gaps, the decrease in motivation to serve in the IDF and the strengthening of tribal relationships. The shortcomings and failures of the security and government networks during the second Lebanon War, as well as the national debate and the public and media protest over the war, further exposed and sharpened the country's deep social crisis. In this critical situation, where internal disintegration is countered by a growing existential threat to the nation, emergency redeployment is desperately needed. To "stop the bleeding", the internal tensions must be addressed with targeted strategies to recover the societal resilience that will preserve the nation. This project includes three main components:

a. Preparing a description of the groups and sub-cultures which compose the Israeli societal mosaic, including its socio-demographic dimension and its social-cultural weight (size, distribution, involvement in the national public debate, public prominence, political & cultural influence, etc.)
b. Analyzing and summarizing each Israeli sector's perceptions (values, beliefs, aspirations, expectations, etc.) emphasizing the following subjects: status of the state, national service (including IDF military service), education and knowledge, state borders, material and spiritual consumption (entertainment, art), communication, interpersonal relationships, leadership, "myself" and others" perceptions, the rule of law.
c. Preparing operational proposals for strengthening societal resilience (suggestions will be based on the research findings, on domestic and international research literature and on interviews and consultations with experts in various fields).

The results of the project will be available on the S. Neaman Institute website.

WOMEN-PHYSICIANS' INROADS INTO MALE SPECIALTIES (SURGERY)

Researchers: Professor Emeritus Bilha Mannheim and Pazit Savyon

This study addresses the changes which occurred in the rate of women entering the subspecialty of surgery during the years 1995-2005, and the factors associated with this trend according to women-physicians' perceptions.

Data from Israel and abroad, supported by the theoretical literature, point to the fact that despite the increase in female participation in the labor force, women are still underrepresented in occupations which are traditionally male. This situation encompasses medicine in general and certain subspecialties in particular which have been predominantly controlled by men throughout history.

The goal of this study is to present a precise picture of the changes which have occurred in the rate of female representation in surgery through a literature review examining the various factors which have brought about these changes, and by surveying female physicians who made these changes.

In this study we analyze two groups of factors expected to shed light on these issues. The first group comprises situational-organizational variables, including perceived male medical culture, lack of female role-models in surgery, and social discrimination/sexual harassment. The second group of factors comprises personal variables, including personal characteristics which lead a woman-physician to prefer the surgical sub-specialty, expected career/family conflict deriving from a career in surgery, and perception of surgery as presenting particular hardships.

Thirty female surgeons in hospitals were questioned by means of a closed questionnaire. Twenty female internists were questioned as a control group. Questionnaires were mailed out in cooperation with the Medical Association. Initial statistical tests followed by distributions, reliabilities, correlations and factor analyses are being performed.

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VOUCHERS FOR NEW IMMIGRANTS AS TOOLS FOR THE JOB MARKET

Principal Investigator: Prof. Miriam Erez

Over the past two years, the Ministry of Immigrant Absorption has operated a Vouchers Project, which seeks to increase adaptation of new immigrants to the Israeli job market. Within the project's framework, eligible immigrants receive vouchers which can be redeemed towards professional training in a program of their choice from a licensed college, as well as vocational counseling. Overall, 10,000 immigrants have taken part in the project.

The current study was commissioned by the Ministry of Immigrant Absorption in cooperation with the S. Neaman Institute, and examined whether the Vouchers Project was effective in facilitating employment and in upgrading the status of jobs held by the immigrants upon graduation.

The study consisted of two parts. The first is a longitudinal study which surveyed about 500 immigrants participating in the Voucher Project during their professional training and after its completion. Parameters included, among others, level of satisfaction with program and whether their employment status improved as a result. Collection of data will be completed by March 2008 at which time preparation of a final report will commence.

The second part polled 326 immigrants following their training regarding their level of satisfaction with the program and their employment status. The results demonstrate that most of the participants were satisfied with the Vouchers Project and with their training programs; many of them would not have taken part in the training without the Vouchers Project. Moreover, immigrants' employment status improved: of the participants in the Vouchers Project 74% were employed, compared to 65% of the immigrant population in Israel.

Furthermore, a significant number of those participating in the Vouchers Project were employed in the trained profession as opposed to their previous line of work; they received a raise in their salaries and were promoted to higher levels of job status compared to their employment status prior to their enrollment in the professional training programs. To summarize, the Vouchers Project has accomplished its main objective of improving the employment status of the new immigrants.

ARAB WOMEN'S EMPLOYMENT IN ISRAEL: STRATEGIC POLICIES FOR INCREASING THEIR PARTICIPATION IN THE LABOR MARKET

Project Leader: Dr. Yosef Jabareen

A significant problem facing the social and economic development of Arab society today is the low rate of Arab women's participation in the labor force. Only one fifth of Arab women participate in the labor force, compared to 60% among Jewish women in Israel. This low employment rate is reflected in the high poverty levels in Arab society where more than 50% of the Arab households live under the poverty line according to the 2008 statistics. Therefore, it is crucial to look for strategies that aim to increase the rate of women participating in the labor market as a means for raising the socio-economic levels among the Arab society in Israel.

Accordingly, the aim of this research is to identify the social, cultural, and ethnic obstacles that prevent the participation of women in the labor market, and then to develop strategies to increase their participation. The data collection is based on a wide empirical study using personal interviews among a random sample of Arab women. The sample is composed of 1500 participants, where 50% among them participate in the labor force and the rest do not. This is the largest and most comprehensive study undertaken which focuses on the issue of employment among Arab women in Israel. Many formal institutions and organizations of civil society have expressed interest in this study, among them the Treasury Ministry and the Social and Economic Council of Israel.

The study will be available on the S. Neaman Institute website.

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ISRAELI SCIENCE AND TECHNOLOGY INDICATORS (ISTI)

Investigators: Dr. Daphne Getz, Prof. Dan Peled, Yair Even-Zohar, Tsipy Buchnik

The goal of this project is to create datasets and indicators of scientific, technological and R&D activities taking place in Israel over time, in order to evaluate and monitor these activities on an internationally comparable basis.

This benchmarking activity provides quantitative assessments of Israel's R&D activities, scientific capabilities and infrastructure, and how they are funded. The databases are developed in close cooperation with the Israeli Central Bureau of Statistics (CBS) and in accordance with the guidelines officially adopted by the EU.

A second report in the series Science, Technology and Innovation Indicators in Israel: An International Comparison was published in September 2007. The report was developed and updated in cooperation with the CBS, and covers the following five core areas in R&D and S&T innovation, comparing Israel to several other developed countries:

- **National expenditures on civilian R&D:** estimates of resources invested and levels of R&D activities in Israel, distinguishing between financing and performing levels of such activities
- **Human capital in S&T:** the structure of the workforce engaged in new technology formation and R&D, including the number of students according to field of study, degree granted and other characteristics.
- **Scientific and technological achievements:** quantitative measures of R&D and S&T activities, including the number of patents, scientific publications and their citations.
- **Economic impacts of R&D and S&T activities:** estimates of the contribution of advanced technologies and their development to the Israeli economy and its foreign trade.
- **Technological readiness:** familiarity with and access to computers and information technology, and to IT infrastructures. The indicators specify a method to evaluate the "Digital Gap" in Israel and the relative position of Israel compared to other countries.

Use of these indicators and data in order to perform policy analyses focusing on R&D activities and construction of a scientific-technological infrastructure, and their impact on the national economy is represented in several papers prepared by the S. Neaman Institute, which can be downloaded from the S. Neaman Institute website:

- Investments in Civil R&D, Human Capital, and Scientific Performance in Israel: Data as a Basis for Discussing National Policy
- Israeli R&D – Current State of Affairs

THE NANOTECHNOLOGY LANDSCAPE IN ISRAEL

Project Leader: Dr. Daphne Getz; **Researchers:** Yair Even-Zohar, Larissa Eidelman.

As part of the S. Neaman Institute's activities in the area of nanotechnology, a study is underway to map the different nanoscience and nanotechnology activities taking place in academia, industry and government institutions that are determining policy in this area. One of the outcomes of the project is an article published in March 2007, entitled Israel's Nanotechnology Research Landscape: A Survey of Israeli Nanotechnology Capabilities and Technology Transfer Policies, by B. Rosenbaum, M. Ardetz, D. Getz, D. Shafer, A. Frenkel and H. A. Stones (Nanotechnology Law & Business, Vol. 4, Issue 1).

The article presents a current overview of Israel's goals, activities and general readiness in nanotechnology. A comparison between Israeli and U.S. technology transfer cultures and a useful primer on Israeli technology export law are also offered. Moreover, a high-level strength, weakness, opportunity and threat ("SWOT") analysis of Israel's nanotechnology R&D and commercialization landscape, along with some trends to monitor, is provided.

During 2008, the S. Neaman Institute will continue and expand the mapping and evaluation of the nanotechnology field in Israel in comparison with the rest of the world.

The article is available on the S. Neaman Institute website.

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DEVELOPING A BIOTECHNOLOGIES CLUSTER IN NORTHERN ISRAEL

Project Head: Prof. Karl Skorecki; **Project Leader:** Dr. Avraham Rotem

The Biotechnologies Cluster project, initiated by the S. Neaman Institute in 2005, is being led by a steering committee whose members represent the five organizations funding the project: the Haifa Economic Corporation, The Technion-Israel Institute of Technology, Rambam Healthcare Campus, The Rappaport Institute and the S. Neaman Institute. For the past two years, Prof. Karl Skorecki has headed the steering committee, while the ongoing activities have been led by Dr. Avraham Rotem of the S. Neaman Institute.

During the past two years, since funding has been provided by the organizations listed above, the following activities have taken place: An informational website was established about the project: **www.BioNorth.org.il.** Meetings and seminars were held on specific professional topics with the participation of representatives from academia and industry, including senior companies, incubators and start-up companies. These meetings were instrumental in raising awareness of the project's activities and in bringing together organizations operating in similar areas, resulting in several new collaboration with the Boston-Haifa Life Science Initiative, the Israel Life Science Industry, Bio-Jerusalem and Haifa's Small Business Council. All of these organizations are connected by links which help them to circulate information that will promote biotechnology in the North.

NATIONAL INNOVATION STRATEGIES: INTERNATIONAL COMPARISONS AND COLLABORATIONS

Steering Committee: Dr. Orna Berry, Prof. Shlomo Maital, Prof. Morris Teubal, Prof. Manuel Trajtenberg. **Ex Officio members:** Dr. Eli Opper, Prof. Nadav Liron, Prof. Gadi Ariav, Mr. Naftali Moser

3IP: India Israel Innovation Program

Steering Committee: Dr. Shuki Gleitman (Chairman), Ms. Anat Bernstein, Mr. Nachman Shelef, Prof. Morris Teubal, Prof. Manuel Trajtenberg, Mr. Raviv Zoller. **Ex Officio members:** Dr. Eli Opper, Prof. Nadav Liron, Prof. Gadi Ariav, Mr. Naftali Moser. **Scientific Committee:** Prof. Gadi Ariav (Chairman), Prof. Nadav Liron, Prof. Shlomo Maital, Dr. Dafna Schwartz, Prof. Morris Teubal, Dr. Orly Yehezkel. **Academic Director:** Prof. Gadi Ariav. **Research Fellow and Program Coordinator:** Mr. Naftali Moser.

In 2004 the S. Neaman Institute launched a research program for the study of the variety of issues which motivate – and prevent – business innovation in Indo-Israeli economic cooperation. The premise of the program has been the recognition that Israel and India have complementary interests in forming sustainable economic relationships. In particular, as India gradually assumes its central role in the geo-political landscape, the rapidly expanding Indian market is a premier growth engine for Israeli industry and Indian industry is a significant source for process innovation, while Israel constitutes an accessible and attractive source for relevant technologies and knowledge in a wide array of domains – from defense to arid agriculture. The India-Israel Innovation program has thus focused on the identification of complementary capabilities, the development of an international resource network, exchange of researchers and ideas, coordination of public policy and mutual transfer of information.

During 2007, 3IP continued to position itself as a significant center of activity dedicated to Indo-Israeli academic, economic and business relationships and policy. In particular, three research projects have been launched, of which the Affordable Drugs Study has started to gain momentum, the program resource network has been further cultivated, and publications were prepared and published.

Research Projects: The focus in 2007 was on two of the original topics, namely Affordable Drugs and Management of Intellectual Property Rights. In both projects, core teams of researchers met to discuss the scope and framing of the studies.

The Affordable Drugs Study team is being led by Dr. Gilead Fortuna, formerly an experienced senior pharmaceutical industry executive, and Dr. Robin Blatt, a biotechnology researcher associated with Harvard University. The team is in the process of studying potential synergies in drug discovery and development between Israel, India and the US.

Similarly, the Management of Intellectual Property Rights (IPR) study was launched by its core team, composed of Prof. Niva Elkin-Koren of Haifa University and Prof. James Conley of Northwestern University.

A new study was conceived within the context of 3IP to guide and facilitate policy and cooperation

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between the two countries in the development of the Indian rural sector. This initiative is being led by Dr. Martin Sherman.

Program Network: The program continued to nurture and expand the network of academics, government, industry and organizations in Israel, India and the US. Notable examples are the American Jewish Committee – which is active in promoting US-Israel-Indian cooperation - and the Boston Haifa Life Sciences Initiative, as well as the Indian Embassy in Tel Aviv and Prof. Y.S. Rajan, Principal Advisor to the Confederation of Indian Industry in Delhi. We hosted Prof. Rishikesha Krishnan of the Indian Institute of Management, Bangalore and Prof. Jandhyala Tilak of the National University of Educational Planning and Administration, Delhi.

Extensive preparatory work was conducted in advance of a visit to Israel and the S. Neaman Institute by a delegation from the Tata Group of companies, organized around the topic of "creating a pervasive culture of innovation throughout the organization."

A highpoint of the year was the meeting in Israel with Dr. A. P. J. Abdul Kalam, former President of India and co-author, with Prof. Y. S. Rajan, of "India 2020 – A Vision for the New Millennium". Dr. Kalam, one of India's most distinguished scientists, presented his vision for India Israel cooperation, which was followed by a lively discussion around the studies we have initiated and how our work can inform, guide and promote such cooperation.

Presentations of the projects are available on the S. Neaman Institute website.

POPULATION STUDIES IN MOLECULAR EPIDEMIOLOGY OF CANCER IN ISRAEL

Project Leader: Prof. Gad Rennert. **Research Team:** Dr. Ronit Almog, Dr. Flavio Leifkowicz, Dr. Mila Pinchev, Dr. Leon Raskin, Dr. Yoram Chaiter, Dr. Ada Tamir, Dr. Ofra Barnett, Mrs. Hedy Rennert, Mrs. Sana Shakour, Mrs. Sara Dishon, Mrs. Hana Arad.

The Department of Community Medicine and Epidemiology (CHS National Cancer Control Center, Carmel Medical Center and B. Rappaport Faculty of Medicine, Technion) is conducting studies, under the auspices of the S. Neaman Institute, aimed at collecting information about the characteristics of cancer morbidity in the various demographic groups of the Israeli population. Cancer usually results from behavioral exposures combined with the genetic background of the individual.

Some 13,000 participants have been enrolled IN THE STUDY thus far, about half are newly diagnosed cancer patients and about half are healthy controls undergoing the same study procedures as the cases. Participants include some 6500 people in the colorectal cancer study, about 5700 in the breast cancer study, 400 participants in the gynecological cancers study and 250 participants in the lung cancer study. Study participants are residents of Northern Israel, in the capture area of Haemek Medical Center in Afula, Western Galilee Medical Center in Naharia and Rambam, Bnei Zion and Carmel Medical Centers in Haifa. All study participants undergo a personal interview in the hospital or at home where they are asked to provide information assessing exposure to a variety of risk and protective factors related to cancer (such as smoking, diet, physical activity, hormone exposure, reproductive history, radiation, family history of cancer and more). In addition, a venous blood sample and tissue samples during operations are collected serving a wide array of molecular tests. The molecular evaluation aids in the genetic characterization of the patients, of the tumors and in identifying high-risk markers. Some 5-10% of the study participants have thus far been identified with gene related disease.

Data resulting from these studies serve as the information infrastructure for policy making in Israel in the field of cancer prevention and early detection. Such data enable focused handling of significant risk factors typical of the Israeli population as a whole, or specific demographic sub-groups. Study results also enable evaluation of cancer survival patterns and their determinants in Israel. The demographic data collected in these studies enables evaluating morbidity and risk factor profiles in different Israeli demographic groups (Jews/Arabs, males/females, Immigrants/veterans and more).

The results of these studies have thus far been published in many articles including in many leading journals such as The New England Journal of Medicine, Science, Nature Genetics, American Journal of Human Genetics and the Journal of the National Cancer Institute.

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THE ISRAELI INNOVATION SYSTEM: AN OVERVIEW OF NATIONAL POLICY AND CULTURAL ASPECTS

Project Members: Dr. Daphne Getz and Vered Segal

The Israeli Innovation System Project: National Policy and Cultural Aspects is part of an international project dealing with innovation policy within the framework of the United Nations Economic Commission for Europe (UNECE). Dr. Daphne Getz of the S. Neaman Institute was nominated to represent Israel in the Team of Specialists on Innovation and Competitiveness Policies (TOS-ICP).

The key objective of the Team of Specialists for 2007 was to identify good practices and policy options in innovation and competitiveness policies and to support their broad dissemination in UNECE member countries, including capacity-building in requesting countries. Materials were collected for this purpose from the associated countries (about 30 countries) and from specialists from universities and other institutions, and then assembled in a final report.

The goal of the current overview, which was prepared by the S. Neaman Institute, is to review the national policies and cultural aspects that support and lead Israeli innovation.

The materials for this document were gathered from various reports, documents and articles written on the subject, so as to present a comprehensive and general picture of the Israeli innovation system.

The first part of the document includes an overview of Israeli innovation policy and covers topics such as the setting of objectives in innovation, policy instruments targeting innovation-based competitiveness and policy implementation and evaluation. Large sections of this document were integrated in a document that was published by TOS-ICP: "Creating a conducive environment for higher competitiveness and effective national innovation systems. Lessons learned from the experiences of UNECE countries".

The second part addresses several of Israel's cultural aspects that encourage and support innovation and entrepreneurship. Emphasis has been placed on several components that are unique to Israel: the population's cultural fabric, military service in a technological and progressive army, immigration to Israel and the availability of resources/funding for innovation purposes.

The document can be downloaded from the S. Neaman Institute Web site.

PRIME 2007

Within the EU sixth framework program, the S. Neaman Institute has joined along with 48 other institutions from 16 countries in a network of excellence called PRIME. The network commenced its official activities in January 2004.

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 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 PRIME Network of Excellence has certain key characteristics. It is truly international and interdisciplinary, bringing together over 250 researchers (half with established international reputations) and 150 PhD students from four main disciplines (economics, management, political sciences and sociology), over 40 institutions and 16 countries. A Joint Program of Activities that balances three research activities was established. These activities are dedicated to producing world-class research and three structural activities aimed at achieving lasting effects in terms of structuring the field at the European level, focusing on database and indicators issues, training, and interactions with the full range of stakeholders.

Within the framework of PRIME, the S. Neaman Institute is involved in the following projects:

- **PRIME ENIP/ENID** aims to create a network of science and technology indicators producers. Dr. Daphne Getz as a project leader and Tsipy Buchnik as a research assistant, in cooperation with Prof. Baruch Raz and Dr. Doron Gal, have been performing a study that attempts to build an indicator that characterizes the current state and the trend of technological innovation in a given country. Primary results will be presented at the 2008 PRIME conference that will take place in Oslo.

- **PRIME EURO CV** is part of the PRIME network of excellence that examines the use of new indicators for science, technology and innovation (ENID). The project is led by Dr. Daphne Getz with the support of project team members Bella Zalmanovich, Tsipy Buchnik, and Yair Even-Zohar. The project constitutes the first collective and coordinated European effort to explore the potential of electronic curricula vitae (CV) data for indicator development and will also be the first PRIME project specifically targeted at assessing researcher mobility. The main objective of this project is to collectively explore the possibilities of using researchers' CVs in electronic form as an indicator for researcher mobility. For this purpose, several selected CV databases will be analyzed and the CV-based indicators will be

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used to study researcher mobility patterns and the effects of mobility on researchers' careers and scientific productivity. This project includes academic institutes and research centers from Spain, Portugal, Norway and Switzerland. The task of the S. Neaman Institute in the Euro CV project is to carry out methodological evaluation of electronic CV databases according to the following criteria: database coverage; database access; data quality; strengths and limitations in using the CV's data.

Preliminary results of this project will be presented at the PRIME ENID conference to be held in Oslo in May 2008.

- **PRIME – NANODISTRICT**, led by Dr. Daphne Getz with research assistance from Larisa Eidelman, Yair Even-Zohar, focuses on the dynamics of nanotechnologies and on the industries where nanotechnologies are going to be important (nanotechnologies-related industries). The S. Neaman Institute is a member of the Nanodistrict 2 project (a follow-up of the Nanodistrict 1 project completed in 2005), which aims at exploring new hypotheses on the S&T and economic dynamics in nanotechnologies. The project first attempts to characterize the paths of convergence in NST and describes how innovations travel amongst scientific, technological and commercialization fields. Secondly, it studies evolving industry networks related to nanotechnologies. It examines, in particular, the respective roles of start-ups and large firms and explores the implications in term of location, including location decisions of multinationals involved in NST. During 2007, the S. Neaman team presented three case studies of Israeli companies and took part in examining a bibliometric model to retrieve nanotechnology and nanoscience publications.

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RICAFE2

Project Leaders: Harry Yuklea, Prof. Shaul Lach, Dr. Amnon Frenkel

The RICAFE2 project was launched on March 1st, 2006 and is sponsored by The European Commission and DG-Research. The S. Neaman Institute participates in RICAFE2 as a national research node coordinated by Harry Yuklea and including three researchers:

Amnon Frenkel in Work-package 2.2: "Location choice of high-tech firms in intra-metropolitan area"

During the past year, A field survey was completed among Hi-Tech firms located in four selected employment zones in the Tel Aviv metropolitan region. The sample of 118 hi-tech firms constitutes 27% of the 440 hi-tech firms located in the four zones. The firms in the sample employ 8,250 workers, constituting 18% of the total number of employees in hi-tech firms in these zones. Most of the hi-tech firms in the sample are small and medium size so far as number of employees. The dominant sectors among them are electronic components and equipment (33%), software (39%), and communications equipment (16%). Only a small number of firms belong to the biotechnology and medical equipment industries. Analysis of the database employing statistical models has already begun.

Shaul Lach in Work-package 2.3: "Incentives, constraints and objectives in technology licensing offices and the effectiveness of technology transfer activities"

This study focuses on the relationship between technological change and outsourcing. The project aims at developing a dynamic model that analyzes how firms' expectations with regards to technological change influence the demand for outsourcing – an issue ignored in the previous models – and abstract from other considerations (e.g., transaction costs, specificity, etc.). The predictions of the model are currently being tested using a panel dataset on Spanish firms for the time period 1990 through 2002.

Harry Yuklea in Work-package 2.4: "Government policy and knowledge based entrepreneurship"

This study explores the idea that the ability of public policy to support the financing of innovative entrepreneurships must take into consideration the "weakest link" in the chain of interactions between different domains of financial activity. Therefore, pertinent actions in one field alone would not necessarily improve the overall performance, because the real bottleneck could reside in a different section of the chain. A model is proposed called "The Plumber Model of Entrepreneurial Finance", based on the idea that planning an effective entrepreneurial financing system is basically a capacity planning problem.

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ISRAEL'S PUBLIC DIPLOMACY (HASBARA)

Program Chair: Prof. Dov Shinar; **Program Members:** Prof. Aryeh Naor, Dr. Lea Mandelzis, Dr. Dalia Liran- Alper, Dr. Anat First, Amb. Shlomo Meir; **Program Coordinator:** Moshe Elad

The S. Neaman Institute, together with Israel Foreign Ministry, has initiated a project to develop a Public Diplomacy Plan (Hasbara) for the State of Israel. The project is based on the assumption that despite the ongoing exercise of public diplomacy by governmental entities and other authorities, there is a real need to periodically evaluate the contents and methods used, to redefine audiences and agents on the conceptual and strategic levels, and to check the actual level of activity. These checks and updates should be integrated into a comprehensive plan which will comply with the State of Israel and its needs, in accordance with the spirit of the times. The plan should also reflect recommendations based on past achievements and failures, approaches to dealing with controversial issues, the use of new technologies, and the need to create uniqueness and strength when introducing messages onto the media agenda.

Five work teams will carry out the project's objectives. Team 1 will conduct an historical survey and analyze its contents; Team 2 will develop content on key political issues; Team 3 will develop content on Israel's achievements in a variety of fields: Team 4 will explore ways and means to deliver messages; and Team 5 will identify target audiences in order to maximize message-delivery efficiency.

Pilots of the project will be conducted in two countries, one in East Asia (India) and one in Europe (Denmark). During the final stage of the project, a "Public Diplomacy Manual" draft will be distributed to participants at a professional conference. A final manual will be published after receiving professional input.

INNOVATION TRAP

Project Head: Prof. Dan Breznitz

Innovation Trap is a four-year international project, which began in 2007 with funding from the S. Neaman Institute, the Sloan and Kaufmann Foundations and the Enterprise Innovation Institute in Atlanta, Georgia. The first purpose of this grant is to conduct an international comparative study on the impact of innovation and local economic growth in our new world of global decomposition (also known as de-localization, fragmentation, and/or off-shoring of production/services activities).

To accomplish these goals there has been close cooperation with both industry leaders and government officials in Israel, the US and Ireland, Finland, France, Israel, China, and India on the issue of the internationalization of R&D and the appropriate technological entrepreneurship policy development. These efforts have also led to several research projects which are part of the now fully developed current research project – the innovation trap – as well as funding to continue this work for the next three years from the Irish government, the Ford Foundation, Georgia Institute of Technology and the OCS Foundation.

Feasibility studies have been conducted in China (where a full-scale study of the IT industry and government policy is now being conducted), India (with a focus on the IT-enabled services industry), Israel (looking at entrepreneurship and innovation in both high technology and traditional industries, France (Ile-de-France region), Ireland (specifically looking at the domestic industry), and the US (with a focus on within migration of new entrepreneurial high tech companies, and a full-scale case study of several states now been conducted).

Papers emanating from these efforts are either forthcoming or under review in leading journals such Challenge (a paper on entrepreneurial industrial policy), Governance (on the privatization of industrial R&D); Industrial and Corporate Change (On competition strategy and public policy in the development of high technology industries in emerging economies); Research Policy (on technological entrepreneurship policy), as well as in the popular press in Ireland and the United States. In addition, the results of this study have been presented at various conferences, including the SMS Special Conference on Entrepreneurship 2007, APSA 2007, ASA 2007, AOM 2007, ISA 2006 and 2007, DRUID 2007, and SASE 2007; and invited lectures were given in Helsinki, Atlanta, Dublin, Paris, Washington DC, San Francisco, Boston, Beijing, and Bologna.

The results of this study and selected articles can be accessed from the S. Neaman Institute website.

In the context of its international collaborations, the S. Neaman Institute is involved in several other international activities:

1. Cooperation with the New Jersey Meadowlands Commission Renewable Energy Task Force (see Energy section)
2. The 3IP-India Israel Innovation Program (see Science, Technology, Economy, Industry section)

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QUALITY OF ENGINEERING/SCIENTIFIC RESEARCH AT THE TECHNION AND OTHER ISRAELI UNIVERSITIES – A GLOBAL COMPARISON

Project Leader: Dr. Daphne Getz; **Researchers:** Vered Segal, Marian Shumaf-Tehwkho, Yair Even-Zohar

In the course of 2007, the S. Neaman Institute completed a study that examined the level of engineering research at the Technion and other Israeli universities in comparison to other countries, by means of objective tools. The study also inspected the tools that are used to evaluate the influence that engineering/scientific research has on Israel's economy, industry and society. The research comprised three parts:

1. A literature review of the criteria and methods for the evaluation of engineering and scientific research at the Technion in comparison with what is done at this field in other countries was prepared. The review studies the differences between applied/engineering research and basic/scientific research and the various dimensions for their evaluation. (The two main methods that are being used for research evaluation, besides additional indicators, are peer review and bibliometrics.) The review includes a survey of the university rankings around the world and the criteria and methods that they use. The literature review focuses on evaluation of the impact that engineering/ scientific research has on industry, economy and society. The main aspects of the impact evaluation deal with: university to market knowledge transfer; graduate training at various levels; technology transfer from universities to industry, market and society; partnership during the innovation process; and evaluation of the research impact on economic growth (using economic models), society and quality of life.
2. Bibliometric analyses were conducted based on the ISI (Institute of Science Information, Philadelphia, USA) databases, in order to compare Israel's scientific production relative to that of other countries in the world and the Technion's scientific production relative to that of other institutes in Israel and worldwide.
3. Emphasis was placed on three fields of knowledge: Information and Communications Technologies (ICT), Biotechnology and Aerospace engineering. The data and indicators for these fields were presented.

The research findings are presented in three publications:

1. *Evaluation of Engineering/Scientific Research and Its Impact on Industry, Economy and Society: A Literature Review;*
2. *The Status of Israel and the Technion Research in Comparison to Selected Countries and Institutes Using Bibliometric Indices*
3. *Data and Indicators on Aerospace Engineering, ICT and Biotechnology in Israel*

Concluding this research, the S. Neaman Institute conducted a comparison between the Industrial Engineering and Management faculty at the Technion and similar faculties abroad in terms of their research quality and researchers' productivity. As the engineering component of the Technion faculty's programs and degrees renders it unique, with no precisely comparable faculty elsewhere, a separate examination was required to compare approximately similar faculties in terms of their areas of learning, and a bibliometric analysis of these faculties' publications was conducted.

EVALUATION OF OUTPUTS AND OUTCOMES OF THE RUSSELL BERRIE NANOTECHNOLOGY INSTITUTE

Researchers: Dr. Daphne Getz, Larisa Eidelman, Yair Even-Zohar

The goal of this project is to evaluate the outputs and outcomes of the Russell Berrie Nanotechnology Institute (RBNI) at the Technion. RBNI was established in 2005 at the Technion and is equally supported by the Russell Berrie Foundation, the Government of Israel through TELEM, and the Technion. RBNI will be examined over time with the aim of evaluating the results and impact of the research activities within its framework. Several methods are used in the evaluation, including bibliometrics, i.e, an analysis of bibliographic data from publications and patents, and a comprehensive field survey among the researchers working within the framework of the institute. A specially developed questionnaire examines the researchers' activities in the areas of nanotechnology and nanoscience. The questionnaire also examines the results of various programs offered by the institute.

The current survey, held during 2007, created a baseline for comparison for results of follow-up surveys to be held during the coming years, as part of an evaluation of the institute's long-term impacts.

The first evaluation was presented to RBNI at the beginning of 2008

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EVALUATION OF THE MAGNETON PROGRAM

Project Leader: Dr. Daphne Getz; **Research Assistant:** Vered Segal, Eran Leck

The evaluation of the Magneton Program is a study initiated and funded by both the S. Neaman Institute and the MAGNET management, and is based on a preliminary study conducted by the S. Neaman Institute.

The purpose of the study is to analyze the program effectiveness as a tool for encouraging technology transfer from academia to industry by dual cooperation between one academic group and one industrial company.

The research will be based on preliminary interviews and on a field survey that will be distributed during 2008 to researchers from the academy and to Magneton project managers who have completed their activities. The survey will include data collection of the participants' characteristics, project characteristics, participants' modes of operation and program success indicators. This will enable an analysis of the relations between the variables, and identification of those that affect the program's success.

The research conclusions will relate to ways of increasing the Magneton Program's potential by means that can be facilitated by the program management.

"THE ISRAELIS" – THE ISRAELI SOCIETY INFORMATION PORTAL
www.peopleil.org

Program Chairs: Prof. Oz Almog and Dr. Tamar Almog. **Program Coordinator:** Moshe Elad

The S. Neaman Institute, in cooperation with Prof. Oz Almog and Dr. Tamar Almog, is establishing an "Israeli Society Information Portal". The project is designed to provide updated, factual and commentary information on populations, cultures and lifestyles in Israel. A quantitative and qualitative data collection mechanism will be established drawing from published books, encyclopedias, lexicons, newspapers, magazines, websites, governmental reports, Central Bureau of Statistics data, etc. At the same time, an internal research mechanism is being built, designed to enhance and update the database with surveys, observations, interviews and field photographs, all initiated by the center itself.

The project is supported by a pool of contributors who provide information on Israeli society based on their experience and knowledge of population sectors and their accessibility to materials, data and information which are not generally available to the public. These include scientists from various disciplines, media professionals, artists, military and police officers, social workers, instructors, physicians, advertising professionals, organizational consultants, community leaders, etc. The project is also formalizing a list of consultants from a variety of research fields (sociology, anthropology, psychology, statistics, linguistics, geography, history, communications, advertising, etc.) who could support the center.

The purpose of the project, inter alia, is to build a computerized informational database, accessible via the internet, which will provide online, real time audio-visual information including photos, video, voice recordings, music clips, etc. At a later stage, an information and services supply mechanism designed for a wider array of customers (answers to queries, courses on Israeli society, briefings, ethnographic tours, virtual instructions and tours and more) will be built.

The theme of the information portal is "Tolerance begins by knowing 'the other' and especially your neighbor ". Stereotypes and prejudices thrive on a platform of cultural ignorance. Therefore, the information portal built on this proposed model will make an important contribution to Israeli democracy and serve as a model for other universities and states.

USE OF BIBLIOMETRIC TOOLS AT THE S. NEAMAN INSTITUTE

Project Team: Dr. Daphne Getz, Yair Even-Zohar, Prof. Gideon Czapski

Bibliometrics is a type of research method that uses quantitative analysis and statistics to describe patterns of publications within a given field of literature. Alongside the peer evaluation method, bibliometrics is being used to evaluate the textual output of research (academic papers, patents), by measuring its productivity, quality and priority. The S. Neaman Institute uses bibliometric methods in a variety of studies in science and technology.

During 2007, the S. Neaman Institute purchased several bibliographic databases that enable the institute to make advanced quantitative analyses based on papers published in academic journals worldwide.

The S. Neaman Institute's projects that are based on the bibliometric method include:

- The status of research in Israel and the Technion in comparison with selected countries and institutions using bibliometric indices; a project that takes an in-depth look at the Technion's Faculty of Industrial Engineering and Management and Faculty of Civil and Environmental Engineering.
- Evaluation of the Outputs and Outcomes of the Russell Berrie Nanotechnology Institute.
- PRIME – Nanodistrict 2; a project that examines a bibliometric model to retrieve nanotechnology and nanoscience publications.
- Science, Technology and Innovation Indicators in Israel: An International Comparison.
- Analysis of the scientific position of Israeli space engineering – part of the Evaluation of the Space Industry's Impact on Israeli Economy project.

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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 the 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.

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NEAMAN INSTITUTE ACTIVITIES IN MAGNET CONSORTIA

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. The S. Neaman Institute has been active in the MAGNET program for fifteen years. The program was launched in 1992 by the Office of the Chief Scientist of the Ministry of Industry, Trade and Labor; MAGNET currently includes ten 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. The S. Neaman Institute defined the concept of a consortia central information center that would strengthen the collaboration among the researchers in the industry and the academy. The S. Neaman Institute established and currently 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; **MAGNET Information Centers Coordinator:** Josef Linhart

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. Currently, seven 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 by 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 that 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

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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 calendars for work group schedule management, mailing lists for the distribution of messages and alerts, and 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

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

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

The Consortia Information Centers Operating During 2007:

- Nano Functional Materials (NFM)
- 4G Mobile Communication (REMON)
- Short Range, High Data Rate Wireless Communication (ISRC)
- The 4Th Generation of Imaging Machines (IMG4)
- Next Generation Personalized Video Content Services (NEGEV)
- Bio-Medical Photonics (BMP)
- Innovative Spectrum Management Research & Technology (ISMART).

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THE S. NEAMAN INSTITUTE WEBSITE
www.neaman.org.il

The S. Neaman Institute website is considered one of the most important resources for data relating to science and technology in Israel. At the site, which is in English and Hebrew, all of the Neaman Institute publications can be accessed, as of 1987, and can be downloaded at no charge. The site is frequently updated, and every publication issued by the institute is immediately made accessible through the site.

The Neaman Institute website is easily navigated and the contents are divided according to the Institute's main topics of activity:

- Science, Technology, Economy and Industry
- Universities, Education and Human Resources
- National Planning, Infrastructure and Environment
- Social and Health Policy
- Data Centers

In addition, information on the seminars organized by the S. Neaman Institute is posted, as well as registration information. Videos and presentations from past seminars can also be viewed. Presentations from seminars which were filmed during the past year cover topics including:

- Privatization of the Higher Education System
- The Israeli Business Forum – Discussion on The Chemical Industry – Israel's Hidden Resource
- The next generation of medical products, techniques and services

During 2007, there were 285,240 visits to the site and 51,363 publications were downloaded. Regular users of the Neaman Institute website include national leaders and decision-makers and leading researchers in Israel and abroad. The site-use statistics show that two-thirds of the publications downloaded from the site are by users in Israel, and the rest, by users in countries including the United States, India, China, Sweden, France, Germany, Iran, Russia and more.

SEMINARS AND COOPERATIVE PROJECTS

Samuel Neaman Memorial Lecture Series

This year, the fifth lecture in a series commemorating the memory of Samuel Neaman was presented by Prof. Oz Almog on the topic of "The New Israelis – The State of Israel in a Global Era". 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". The third lecture was delivered by Professor Moshe Halbertal on the subject of "On Sanctity and Violence – From Political Conflict to Religious War". The fourth lecture, by Prof. Ruth Gavison, was entitled Consensus on the Identity of State of Israel as a Precondition for its Success and Prosperity.

National Planning

On December 9, 2007, a panel was conducted within the framework of the Israel Business Forum, on the Future of the Chemical Industry in Israel, based on a report prepared by the S. Neaman Institute (see National Planning section). Participating in the panel, among others, were Dr. Gil Fortuna, chief author of the Institute report, Dr. Eli Opper, the Chief Scientist of the Ministry of Industry, Trade and Labor, and Prof. Zehev Tadmor, Chairman of the S. Neaman Institute.

Energy

The S. Neaman Institute sponsored two joint lectures for students from MIT and the Technion, as part of the "HIBUR" project. The lectures, dealing with energy issues, were broadcasted live. The lectures were presented by Dr. Yang Chow-Horn of MIT on electrochemical preservation and storage of electricity on a nanometric scale, and by Mr. Doug Newman, Director of the National Center for Sustainable Cities, who, while visiting in Israel, spoke on developing sustainable, energy-saving communities.

Energy Forum

In the context of the S. Neaman Institute's Energy Forum meetings, the following topics were addressed: Solar energy for producing heat; Consumers of alternative energy research in Israel; Savings in air conditioning systems; Biofuels for producing energy; and Demand Supply Mechanisms (DSM).

Environment

A conference on economic tools for managing natural and environmental resources was held in March 2007, in cooperation with the Department of Natural and Environmental Resource Management of Haifa University, and the Faculty of Agricultural Sciences of Hebrew University. In July 2007, the S. Neaman Institute hosted a one-day conference on "Sticks in the wheels – a company car and the transportation economy". In December 2007, Dr. Ofira Ayalon represented the S. Neaman Institute in a panel of experts on Clean-Tech in Israel at the Israel Business Forum. Dr. Ayalon also represented the Institute at the annual conference of the Finance Ministry's Budgeting Office, on "the Clean-Tech Market – Passing Trend or Existential Need?"

Universities, Education and Human Resources

In January 2008, the S. Neaman Institute hosted an international conference on "Privatization of the Higher Education System", together with Bashaar-Academic Community for Israeli Society, the Azrieli

Center for Economic Policy, the Economics Department of Bar Ilan University, the US-Israel Education Fund, and the Israeli Academy of Sciences. The conference was intended to initiate systematic evaluation of the options in the context of the state of Israel.

Science, Technology, Industry and Economics

A Cluster of Biotechnology Industries

During 2007, seminars were held on the topics of, among others: "Biological methods for treating waste", "Innovations in antibiotic drug developments", "Applied bio-catalyzing", and "Next generation of medical products and systems".

3IP –India- Israel Innovation Program

During 2007, Prof. Gadi Ariav organized a seminar at Tel Aviv University entitled "Chindia". Advocate Anat Bernstein presented on behalf of 3IP at a seminar hosted by Yigal Arnon & Co. on the subject of Intellectual Property (IP) aspects of doing business in India. Two comprehensive articles on 3IP were included in the publication "India-Israel Potential Ahead", published by the Indian Embassy in Tel Aviv to commemorate 15 years of diplomatic relations. The articles were"Challenges of Collaborative Business Innovation" by Prof. Gadi Ariav, Prof. Nadav Liron and Naftali Moser, and Israel Building on Success in Indian Rural Sector, by Dr. Martin Sherman.

Collaboration with the World Bank

In April 2007, the S. Neaman Institute organized and conducted a study tour to Israel for the World Bank, Europe and Central Asia (ECA) region, entitled "Innovation Financing in Israel: Lessons for Eastern Europe and the former Soviet Union". The purpose of the study tour was to "examine whether and how successful cases of government-led intervention in Israel can be applied and adapted to ECA countries". This refers to programs of the Israeli Ministry of Industry and Trade, Office of the Chief Scientist (OCS), and other programs for small and medium enterprises (SME). The study tour consisted of a one day seminar at the S. Neaman Institute which discussed the history and development of the Israeli economy with specific regard to high-tech industries and government policy; a day of meetings in Tel Aviv with managers of the different programs of the OCS and with the Chief Scientist himself; and a day of meetings in Jerusalem meeting Government of Israel officials including Prof. Manuel Trajtenberg. The visit was organized by Naftali Moser of S. Neaman Institute. Dr. Dan Kaufmann prepared a report to the World Bank following the visit. Further details are available on the Institute website under Events.

Activities of Dr. Ehud Gelb

For the 6th European Federation for Information Technology in Agriculture conference, which focused on determining ICT adoption priorities and interaction with agriculture, the rural sector and R&D, Dr. Ehud Gelb prepared background materials, discussion and summary materials on the topic of information technology adoption. Conference, discussion and ICT questionnaire participants focused on adoption constraints, the critical importance of allocating research priorities and the gaping disparity between research and implementation of research results. The EFITA Questionnaire results and the e-Book on ICT Adoption provided background material for discussions and their summary. Both were

SEMINARS AND COOPERATIVE PROJECTS (contd.)

sponsored and funded in part by SNI. They with conference summaries will be presented in Japan at the World Conference on Computers in Agriculture. In addition, Dr. Gelb presented an invited talk at the European Seminar on Extension and Education in Agriculture on the strategic national significance of the constraints of ICT Adoption for Extension and Rural Development. These constraints were discussed in session and plenary based on the summaries of EFITA Conferences and the e-book "ICT in Agriculture: Perspectives in Technological Innovation" – both sponsored and funded in part by SNI. Discussion will continue in the framework of the ESEE participant's ongoing collaboration. Furthermore, Dr. Gelb prepared three study reports within the framework of the "Strategic Plan Israel 2008-2028", on The potential to establish Israel as a major player in developing advanced technologies and methods for their implementation in agriculture; The potential to establish Israel as a major player in developing advanced Water Technologies. The report was published in "Water Engineering"; and The potential to establish Israel as a major player in implementing Information and Communication Technologies (ICT) for bridging the Rural Urban Digital Divide.

Activities of Professor Shlomo Maital

During 2007, Prof. Shlomo Maital participated in two conferences. The first, Best-practice Medical Design for 2020: A Scientist-Practitioner Dialogue, was a one-day symposium of invited lectures, featuring both leading international and local researchers, engineers and designers, which gathered together disciplines of industrial design, bio-engineering, medicine, health care industry and hi-tech companies that generally attend separate conferences. The organizing committee included Dr. Noemi Bitterman, Head, Industrial Design, Technion, who was instrumental in building the program and organizing funding; Prof. Medardo Chiaponni, Head, Medical Design, IUAV, Venice, Italy; and Prof. Shlomo Maital of the S. Neaman Institute. Presentations are available at the S. Neaman Institute website. The second conference was Next Generation Medical Products, Systems and Services, which was the second time the S. Neaman Institute hosted GATIC – Global Advanced Technological Innovation Consortium, a global consortium linking leading universities with some 120 global companies. The first such conference was on Nanotechnology and Convergence. Presentations and videotaped lectures will soon be available at the S. Neaman Institute website.

In addition, Prof. Maital writes a regular Marketplace column for the Jerusalem Report, and edited a book entitled Recent Developments in Behavioral Economics, Elgar: London May 2007 – a collection of articles published in the past five years on behavioral economics and economic psychology.

THE SAMUEL AND CECILIA NEAMAN SCHOLARSHIP PROGRAM

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 Scholarship Program was established. The program, which was inaugurated at the 2004 Board of Governor's Ceremony, provides 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.

Scholarship recipients for the 2007-2008 academic year are:
Matthew S. Lippert – Faculty of Physics
Daniel Orenstein – Faculty of Architecture and Urban Planning
Hagai Shorer – Faculty of Biology
Arieh Nachnini – Faculty of Electrical Engineering
Sajeev Jotovsky – Faculty of Civil and Environmental Engineering
Natalia Silverstein – Faculty of Computer Sciences

Lecture Series in Honor of Samuel Neaman

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. In 2007, the fifth lecture was presented by Prof. Oz Almog on the topic of "The New Israelis – The State of Israel in a Global Era".
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". The third annual lecture was delivered by Professor Moshe Halbertal on the subject of "On Sanctity and Violence – From Political Conflict to Religious War". The fourth lecture was delivered by Prof. Ruth Gavison, entitled Consensus on the Identity of State of Israel as a Precondition for its Success and Prosperity.

PUBLICATIONS OF THE S. NEAMAN INSTITUTE

Investment Policies in Defense R&D Programs
Oren Setter, Asher Tishler

The Limits of Capital: Transcending the Public Financer – Private Producer Split in R&D (STE-WP-40)
Dan Breznitz, Amos Zehavi

Knowledge-Intensive Property Rights (STE-WP-39)
Cristiano Antonelli, Morris Teubal

Space Technology, Patterns of Warfare and Force Build-up: Between a Power and a Small State
Deganit Paikowsky

Solar energy for the production of heat. Summary and recommendations of the 4th assembly of the Energy Forum at SNI (Hebrew)
Gershon Grossman, Ofira Ayalon, Yifaat Baron, Debby Kaufman

Recent Developments in Behavioral Economics
Shlomo Maital

Liquidity Constraints on the Attainment of Tertiary Education in Israel (Hebrew)
Yoav Freedman

Equity and Efficiency Effects of Different Funding Arrangements for Higher Education: A Calibrated Analysis Applied to Israel
Yaakov Gilboa, Moshe Justman

A Strategy for Developing Employment Opportunities for the Arabs in Israel: The Vision for Expanding the Arab Middle Class (Hebrew)
Yosef Jabareen

The Possible Role of Israeli Solar Technologies in the Meadowlands – Renewable Energy Efforts
Ofira Ayalon, Efrat Elimelech

Allocating Security Expenditures under Knightian Uncertainty: an Info-Gap Approach
Dan Peled, Yakov Ben-Haim, Michael Ben-Gad

Renewable Energy R&D Needs, Summary and Recommendations of the 5th Assembly of the Energy Forum at SNI (Hebrew)
Gershon Grossman, Ofira Ayalon

Critical Success Factors for Entrepreneurial Projects within Incubators: A Comparative Study of Israel and India
Shlomo Maital, D.V.R. Seshadri, Shmuel Ravid, Alon Dumanis

The Cycle of Violence? An Empirical Analysis of Fatalities in the Palestinian-Israeli Conflict
Daniele Paserman, David Jaeger

Environmental Technologies - The Green Future (Hebrew)
Ofira Ayalon, Globes Researches

Information and Communication Technology (ICT) Investments in Israel STE-WP-37 (Hebrew)
Gil Shiff

Harnessing Success: Determinants of University Technology Licensing Performance STE-WP-35
Sharon Belenzon, Mark Schankerman

The Ramifications of Technology Transfer Based on Intellectual Property Licensing (Hebrew)
Niva Elkin-Koren

The Economic Consequences of the Use and Control of Land Resources by the Defense Sector in Israel (Hebrew)
Amiram Oren, Zalman F. Shiffer

Data and Indicators on Aerospace Engineering, ICT and Biotechnology in Israel (Hebrew)
Daphne Getz, Marian Shumaf - Tehawkho, Vered Segal

Are Voters Sensitive to Terrorism? Direct Evidence from the Israeli Electorate
Esteban F. Klor, Claude Berrebi

Efficiency and Energy Savings in Air Conditioning Systems, Summary and recommendations of the 6th assembly of the energy forum at SNI (Hebrew)
Gershon Grossman, Ofira Ayalon

A National Plan for the Chemical Industry in Israel (Hebrew)
Gilad Fortuna

Tertiary Education in Israel A New Paradigm for Policy Making (Hebrew)
Ami Volanski, Nissan Limor

Establishment of R&D Anti-Terror Warfare Mechanism for Homeland Security Protection from Terrorism
Orna Barri, Nadav Liron, Ilan Kuziatin, Shmulik Yachin, Manuel Trajtenberg, Danny Arditi, Hemi Peker, Dan Inbar

Reclaiming the Dead Sea, Alternatives for Action (Hebrew and English)
Yoram Avnimelech, Yifaat Baron, Gad Rosenthal, Nachum Yehoshua, Giora Shacham

The Status of Israel and the Technion research in comparison to selected countries and institutes using bibliometrics indices (Hebrew)
Daphne Getz, Marian Shumaf - Tehawkho, Yael Ilan, Gideon Czapski

Biofuels for Energy. Summary and recommendations of the 7th assembly of the energy forum at SNI (Hebrew)
Doron Gal, Ofira Ayalon, Tal Goldrath

Science, Technology and Innovation Indicators in Israel: An International Comparison (Hebrew)
Daphne Getz, Dan Peled, Yair Even-Zohar, Tsipy Buchnik, Sivan Frenkel, Marian Shumaf - Tehawkho

Privatization in Higher Education
Gury Zilkha

Do High-Skill Immigrants Raise Productivity? Evidence from Israeli Manufacturing Firms, 1990-1999 STE-WP-36
Daniele Paserman

"Two Seas Canal" - Is it a real aim or some kind of preconceived solution to an unspecified target? (Hebrew)
Dan Zaslavsky

Human Resources for Science and Technology in Israel (Hebrew)
Daphne Getz, Tsipy Buchnik, Bella Zalmanovich, Marian Shumaf - Tehawkho, Sivan Frenkel

Terror and the Costs of Crime
Eric D. Gould, Guy Stecklov

Between technology development and public transparency: creating tools for public discussion on business ventures and technological alternatives for treating solid waste (Hebrew)
Ofira Ayalon, Limor Spektorovsky, Noam Gressel

Recent Developments in Behavioral Economics
Shlomo Maital

E-Book on Information Technologies in Agriculture
In July 2006, Dr. Ehud Gelb published the E-book "ICT in Agriculture: Perspectives of Technological Innovation", sponsored by the European Federation for Information Technology in Agriculture, the S. Neaman Institute and the Center for Agricultural Economic Research of the Hebrew University. The publication is freely available at **http://departments.agri.huji.ac.il/economics/gelb-main.html.** During this second year, demand has increased to an annual 55627 accesses, averaging more than 4500 accesses a month. It attained a preferred reference status at **http://topics.developmentgateway.org/index.do.** Additional chapters include The Contribution of ICT to Publicly Funded Research in Agriculture, Broiler Breeding, Genomics, a Dairy Herd Book and the Development of Computerized Management Tools. The book details expectations from ICT Adoption in Agriculture and Rural Development, actual results and lessons – covering the past two decades – in Israel and abroad.

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