



Israel 2028

Vision and Strategy For Economy and Society in a Global World

**Presented by a Public Committee
Chaired by Eli Hurvitz
Edited by David Brodet**



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Foreword

“Israel 2028: Vision and Strategy for Economy and Society in a Global World” is an extensive plan to achieve national objectives - rapid, balanced growth and reduction of social gaps – aimed at positioning Israel among the 10-15 leading countries in terms of economic achievement and quality of life, over the next twenty years. The plan addresses a broad range of issues: economy and society, government and public administration, globalization, and science and technology. It also discusses questions of policy on issues such as the labor market, national infrastructures, education, higher education, scientific research, traditional industries, and integration into the global process. These and other issues are discussed and presented as a mirror to Israel’s future and its position at the economic, social, educational and cultural forefront of the world’s nations. This expansive plan was created through the initiative of US-Israel Science and Technology Commission (USISTC) on the one hand, and individuals involved in economics, business, science and technology in Israel, on the other, who saw it as their civil obligation to undertake and promote this important mission, with the help of experts in the various fields.

Initially, the plans’ initiators at the USISTC intended to concentrate on topics directly and immediately related to US-Israel cooperation, as well as to promoting Israel’s rapid growth and integration into the global process, primarily in the science, advanced technology and manufacturing infrastructure realms. However, given Israel’s complex reality, in which an advanced, globally-integrated economic sector exists alongside a broad sector that lags behind technologically and suffers from low productivity, and which is characterized by broad income gaps, significant education disparity and a low rate of participation in the labor force, it became clear to USISTC that rapid, sustainable growth, necessary for promoting cooperation with the US as well, is a multi-faceted development, whose existence depends upon a broad range of factors and policy measures, only part of which involve R&D and advanced technology. The other part involves promoting traditional industry sectors, advancing government and institutional quality, improving labor policy, expanding higher education, improving the school system, reducing social gaps, developing physical infrastructures and enhancing environmental quality. The various realms are closely connected and mutually influential, although these links are sometimes obscure. We believe that a valuable strategic plan must reveal these important connections as well as the critical factors that impede growth and reduction of social gaps; it must propose a multi-disciplinary policy to address these realms.

The initiative of these individuals from the economics, business, science and technology realms in Israel was born out of the recognition that we, residents of the state of Israel, are responsible for shaping our existence and our fate in a changing, dynamic world. We are responsible for

shaping the state's nature and character, to be left after us for future generations. Out of this recognition was born the need to shape a clear, consistent strategy that ensures the realization of the great potential of Israeli society and economy, in order to meet Israel's unique internal and external challenges. The common view of the Commission and the group from Israel as regards the issues facing the economy and society, and the agreement they achieved as regards the goals the state must adopt, produced a shared effort whose outcome is the plan presented here.

The work of formulating the plan continued for nearly two years, and was based on considerable research and knowledge at the service of the members of the working groups. It examines Israel's fundamental issues, elucidating them in a multi-disciplinary discourse, and integrating the various chapters into one paper with a unifying approach that identifies the mutual influences and the connections between the various realms and issues. The plan profited, on the one hand, from the high academic ability of its members from the science and research world, as well as from the considerable knowledge, expansive perspective and rich experience of others from the practical world, on the other hand. All members worked out of recognition of the plan's importance and a sense of urgency.

In 2028, Israel will mark its eightieth year. Most of the founding generation, which lay down the foundations for the Israeli state's independence, will no longer be with us, but we owe it to them and to coming generations to make all efforts possible so that Israel, the dream of so many, not only survives, but fulfills its historic mission as an exemplary nation.

The building of the Israeli nation is a process that will continue for many years to come; its foundations were created during pre-state times and the state's early days. It is our duty to add another layer to fortify this building. We believe that Israel cannot afford to have mediocre levels of economy, science and technology, government and security. It cannot allow large social gaps or the strengthening of the forces that crumble it from within. The great challenges that Israel faces at home and abroad require the building of a quality education system, world-class science and technology infrastructure, an outstanding economy, and a society based on justice, tolerance, conciliation and social solidarity.

The strategic plan is wide-ranging and presents numerous essential issues in detail. It is intended for adoption and decision-making by the government of Israel and to serve as a platform for public discussion. Public agreement will facilitate fulfillment of the plan. Realizing the vision and attaining the ambitious, important objectives presented by the plan require determined national leadership that sets clear, transparent, long-term economic, educational and social priorities, and implements the proposed strategy for the sake of Israel's future.

This plan was created by an extensive team that included many people. As stated, its formulation

was initiated by USISTC and the group from Israel, and was funded by the US-Israel Science and Technology Foundation (USISTF). We wish to thank the Samuel Neaman Institute at the Technion, and Shaldor, who assisted in research and funding.

A public steering committee headed by Eli Hurvitz led the mission and was very active in the shaping of the document and its content. Research teams with various areas of expertise, from Israel and abroad, were responsible for preparing the materials and writing the chapters. Michal Eitan directed the project's complex administration with talent and dedication.

Yarom Ariav, Yoram Gottgeld, Prof. Elhanan Helfman, Ariel Weiss, Dan Tolkovsky, Prof. Manuel Trachtenberg, Dr. Karnit Plug and Alex Keinan read the draft of the plan and contributed valuable comments.

A heartfelt thanks to all who took part in this important, comprehensive endeavor and to all who contributed comments to improve the plan.

David Brodet

Editor-in-Chief

List of Participants

STEERING COMMITTEE

Eli Hurvitz (Chairman)

Chairman, Teva Pharmaceutical Industries

David Brodet (Editor-in-Chief and Director)

Chairman of Board, Ben Gurion University

Former Director-General, Ministry of Finance

Dr. Eli Opper

Chief Scientist, Ministry of Industry, Trade and Labor

Major-Gen. (Res.) Prof. Isaac Ben-Israel

Professor of Philosophy, Tel Aviv University

Member of Knesset

Former Director, MAFAT, Ministry of Defense

Yoram Yahav

Director, Technion Institute of Management

Board Member, USISTC

Prof. Joshua Jortner

Professor of Chemistry, Tel Aviv University

Former Chairman, Israel Academy of Sciences

Rafi Maor

President, ECI Telecom

David Miron-Wapner

Director, USISTC

Sami Friedrich

Chairman, Shaldor

Prof. Zehev Tadmor

Professor Emeritus of Chemical Engineering

Chairman, Samuel Neaman Institute

Former President, Technion

Board Member, USISTC

US-ISRAEL SCIENCE & TECHNOLOGY FOUNDATION MEMBERS

Arnold Brenner

Board Member

Former Vice President, Motorola

Ann Liebschutz

Director

Dr. Denis Simon

Board Member

Provost and Vice President of Academic Affairs, Levin Graduate Institute, The State University of New York

ADMINISTRATION

Michal Eitan (Director)

Former Vice President, Check Point

Ili Ramon

M.Sc., Management Sciences

Edith Even-Chen

Operations Manager, USISTC

Na'ama Ron

Program Manager, USISTF

INTEGRATING TEAM

David Brodet (Team Leader)

Chairman of Board, Ben Gurion University

Former Director-General, Ministry of Finance

Arieh Bar

Former Senior Economist in State Service

Ili Ramon

M.Sc., in Management Sciences

GLOBALIZATION TEAM

Yoram Yahav (Team Leader)

Director, Technion Institute of Management
Board Member, USISTC

Prof. Shlomo Maital

Professor Emeritus of Economics, Technion
Academic Director, Technion Institute of Management

Clyde Prestowitz

President, Economic Strategy Institute,
Washington DC

Ben Carliner

Research Director, Economic Strategy
Institute, Washington DC

PUBLIC SERVICE INSTITUTIONAL CHANGE TEAM

Sami Friedrich (Team Leader)

Chairman, Shaldor

Dr. Neta Sher-Hadar

PhD, Political Science
Faculty, Mandel Institute
Lecturer, Sapir College

Anat Brodsky

Director, Shaldor

Anat Hering

Consultant, Shaldor

Micha Friend

Consultant, Shaldor

Gil Rabinovich

Consultant, Shaldor

Keren Sagi

Program Coordinator, Unit for Senior Civil
Service Programs, Mandel Institute

SCIENTIFIC/TECHNOLOGICAL R&D LEVERAGING TEAM

Prof. Dan Peled (Team Leader)

Professor of Economics, University of Haifa
Senior Researcher, Samuel Neaman
Institute, Technion

Prof. Barry Bozeman, Academic Consultant

Professor of Public Policy, University of
Georgia

Prof. Morris Teubal

Professor of Economics, Hebrew University

Gil Avnimelech

R&D Policy, Ben Gurion University

Dr. Dan Breznitz

Asst. Professor, Political Science, Georgia
Institute of Technology

Researcher, Samuel Neaman Institute,
Technion

Shiri Breznitz

Economic Geography, Cambridge
University

Dr. Ehud Gelb

Agricultural Economist, Former Chief
Information Officer for Rural Development,
Ministry of Agriculture

Dr. Daphne Getz

PhD, Physical Chemistry
Senior Researcher, Samuel Neaman
Institute, Technion

Arkady Katzman

Economist, Samuel Neaman Institute,
Technion

Naftali Moser

Research Coordinator, Samuel Neaman
Institute, Technion

TRADITIONAL INDUSTRIES & SERVICE SECTORS TEAM

Prof. Dan Peled (Team Leader)

Professor of Economics, University of Haifa

Senior Researcher, Samuel Neaman Institute, Technion

Prof. Barry Bozeman, Academic Consultant

Professor of Public Policy, University of Georgia

Prof. Uzi De Haan

Professor of Strategic Management and Entrepreneurship, Technion

Former COO of Telecommunications, Philips Electronics

Founding CEO, Philips Electronics Israel

Col. (Res.) Moshe Elad

Research Coordinator, Samuel Neaman Institute, Technion

Meir Ben Haim

Market Research, Midrag Systems LTD

Daniel Wasserteil

Economist, Applied Economics LTD

Arkady Katzman

Economist, Samuel Neaman Institute, Technion

Gary Laufer

Industrial and Management Engineering, Midrag Systems LTD

LABOR POLICY TEAM

Dr. Neri Horowitz (Team Leader)

PhD, Political Science

Director, Unit for Senior Civil Service Programs, Mandel Institute

Keren Sagi

Program Coordinator, Unit for Senior Civil Service Programs, Mandel Institute

MACRO-ECONOMICS TEAM

Dr. Ya'akov Sheinin

CEO and Scientific Director, Economic Models

PhD, Economics

Sani Ziv

Vice president, Macro Division, Economic Models

MA, Economics

HIGHER EDUCATION & SCIENTIFIC RESEARCH TEAM

Prof. Zehev Tadmor (Team Leader)

Professor Emeritus of Chemical Engineering

Chairman, Samuel Neaman Institute

Former President, Technion

Board Member, USISTC

Prof. Hanoch Guttfreund

Professor of Physics, Hebrew University

Former President of Hebrew University

Prof. Shula Volkov

Professor of History, Tel Aviv University

Member, Israel Academy of Sciences

Dan Vilensky

Entrepreneur

Former President, Applied Materials Israel

Gury Zilka

Higher Education Consultant

Former Director-General, Planning and Budgeting Committee

Prof. Joshua Jortner

Professor of Chemistry, Tel Aviv University

Former President, Israel Academy of Sciences

ENVIRONMENTAL TEAM

Prof. Yehuda Hayuth (Team Leader)

Professor Emeritus of Geography and Transportation; Former President, University of Haifa

Senior Researcher, Samuel Neaman Institute, Technion

Prof. Yoram Avnimelech

Professor Emeritus of Civil and Environmental Engineering, Technion
Former Chief Scientist, Ministry of Environmental Protection

Dr. Ofira Ayalon

Lecturer, Program for Natural Resource and Environmental Management, School of Social Sciences, University of Haifa
Environmental Policy Project Coordinator, Samuel Neaman Institute, Technion

Michal Eitan

M.Sc, Urban and Regional Planning

Tal Goldrat

Samuel Neaman Institute, Technion

PHYSICAL INFRASTRUCTURES TEAM

Prof. Yehuda Hayuth (Team Leader)

Professor Emeritus of Geography and Transportation and Former President, University of Haifa

Senior Researcher, Samuel Neaman Institute, Technion

Prof. Arnon Bentur

Professor and Dean, Faculty of Civil and Environmental Engineering; Former Vice President, Technion

Senior Researcher and Former Director, Samuel Neaman Institute, Technion

Prof. Yoram Avnimelech

Professor Emeritus of Civil and Environmental Engineering, Technion

Former Dean, Faculty of Agricultural Engineering, Technion

Dr. Ofira Ayalon

Lecturer, Program for Natural Resource and Environmental Management, School of Social Sciences, University of Haifa
Environmental Policy Project Coordinator, Samuel Neaman Institute, Technion

Col. (Res.) Moshe Elad

Research Coordinator, Samuel Neaman Institute, Technion

Adam Buchman

Economist and Accountant

Prof. Doron Balasha

Faculty of Civil and Environmental Engineering, Technion
Head of Ran Naor Center for Road Safety
Former CEO, Yefe Nof and Netivei Ayalon
Engineer Gideon Hashimshoni
Transportation Expert
Head of the Israel Center for Transportation Planning and Research
Employed by the World Bank

Prof. Adam Mazor

Professor Emeritus of Urban and Regional Planning, Technion
Senior Researcher, Samuel Neaman Institute, Technion

Dr. Maria Marinov

PhD, Urban and Regional Planning, Technion

Prof. Daniel Czamanski

Professor of Urban Economics, Faculty of Architecture, Urban and Regional Planning, Technion

Prof. Yehiel Rosenfeld

Professor of Civil and Environmental Engineering, Technion
Former Head of Construction Management Department, National Building Research Institute

Executive Summary

This plan for Israel's economy and society was created out of a concern for Israel's future. A state in the making, Israel has struggled throughout its history, in difficult conditions, for its existence, its identity, the welfare of its residents and its place in the world. During its short history, Israel has experienced a number of economic and security crises, and its government has taken emergency measures in times of deep crisis. This was the case in the mid-1980s, when the threat posed by high inflation to economic stability made it quite clear that without bold measures, Israeli economy and society would be in dire straits.

Today, we face a completely different situation, but one that is no less disturbing. Israel's economy is no longer in immediate danger, but a number of warning signs caution of a real risk for the future of the society and the state. These risks stem from deep, worrisome social and economic processes in Israel, which cannot be remedied by quick, relatively simple solutions, but rather require a wide-ranging, visionary national strategy, as well as perseverance and forbearance.

Following are headings of the major issues, policy topics and strategy components addressed by the plan:

Social and Economic Challenges

Dual Economy. Two parallel economic systems have developed in Israel: a progressive economy alongside a traditional one. The progressive economy is knowledge-intensive, employs advanced technologies and sometimes even leads technological innovation. It responds well to the challenges of globalization, enjoys high productivity, rapid growth and expanding exports, employing only 6% of the economy's employees and contributing 9% to the business sector's output. Alongside this advanced, knowledge-based economy, there exists a traditional economic sector, comprising manufacturing and services, which suffers from low productivity and low growth. Forced to compete in an international market abundant in low-cost labor, this sector pays its employees low wages.

Large Income Gaps – A Polarized Society. Israel has one of the largest income gaps among developed countries. The resulting social polarization produces social disintegration and prevents fulfilling the potential of economic growth.

Slow Growth – Shortage in Resources vs. Multiplicity of Needs. In 1973, the economy went from rapid growth to ongoing, slow growth. The GDP per capita has since increased by a yearly average of 1.5% (even the improved growth figures since 2004 are far from the growth rate requirements outlined in the plan). The shortage in resources is intensified by slow growth, while competition tightens among social and defense objectives over the reduced resources produced by the economy.

Challenges of Globalization. The advanced sector is able to successfully deal with the challenges of globalization. However, the larger part of the economy cannot handle quickly-changing international conditions – in terms of imports, exports, international capital and labor markets. Globalization has created a dynamic world characterized by frequent technological changes, quick transitions of comparative advantages as well as risks – among countries, population groups, and manufacturers. The rapidly-changing global reality, primarily the rapid growth of the economies of China, India and Eastern European nations and their penetration into elite technologies, pose a significant competitive challenge for Israel.

Low Participation Rate in the Labor Force. Israel's labor force participation rate, 55%, is among the lowest of developed countries. We cannot achieve the needed growth rate or reduce income gaps as desired, without a significant increase in the rates of labor force participation and employment among the adult population.

Infrastructure Challenges

Public Education – We are witness to public education's low achievements and multiple challenges, in both elementary and high school. Israeli students' achievements on comparative international exams are disconcerting, as are the high degree of variability in academic achievement; the low numbers of students eligible for matriculation certificates among those completing high school; the low level of general knowledge; and the manifestations of Israeli youth culture.

Higher Education and Research – Israel's higher education institutions are declining, the scope of scientific research is diminishing, and a brain drain out of Israel is occurring.

Government and Public Service in Israel – Over the years, the quality of public service has deteriorated, in terms of its employees' professionalism, the scope of knowledge at its disposal, and its ability to plan and formulate long-term public policy in its various areas of responsibility.

Standards of Physical Infrastructures and Environmental Protection – The level of investment in roads, ports and public transportation is not appropriate for the needs of an advanced economy that wishes to be integrated into globalization processes and to achieve a high GDP per capita. Environmental issues do not receive adequate treatment or sufficient investment.

These difficulties and the concern and urgency that accompany them, are the driving force behind the formulation of this proposal for a strategic plan for society and economy for 2028 presented herein.

Summary of the National Plan for Economic Growth and Reduction of Social Disparities

Following is a general outline for a national plan for Israel's economy and society. The document in its entirety will detail the plan and its numerous components, present dilemmas, and analyze the approach as well as the reasons for choosing this strategy and its courses of action. The program presents a vision from which the planning strategy for 2028 is derived. This comprehensive plan is founded on a social and economic world view that adopts the advantages of the market economy, but, like many other nations, does not accept the neo-liberal economic approach as regards government's role in the economy. The approach aims for a free, balanced, fair and compassionate economy, which relies upon Israel's cultural wealth and scientific/technological ability. At its core lie Israel's high-quality human capital and its nurturance.

At the foundation of the strategic plan is the vision formulated by its initiators at the outset of this endeavor. Following is a summary of the vision:

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 that of its future generations.

Israeli society will be open and enlightened; its economy will be free, balanced and fair and will rely on the cultural and scientific/technological capabilities of its people, on its wealth of human capital, and on innovation and initiative.

These goals will be achieved through the participation of all segments of Israeli society, while sustaining the values of the nation, reinforcing the pride of its citizens in their country, and the appreciation of the Jewish people and Israel's friends worldwide.

The objectives derived from the vision upon which the strategic plan is founded are numerous and the challenges ambitious. In this plan we outline Israel's projected economic and social development for the next twenty years. The vision places Israel among the world's leading countries not only in terms of GDP per capita (over \$50,000 in 2028, as compared with \$23,000 in 2007), but also in terms of numerous qualitative measures in the areas of education, higher education, society, science and technology, governance and the environment. The state will afford all its residents a high standard of living and high quality of life. The state's achievements will be based on innovation in the fields of economy and governance and the creativity of its residents and citizens. For this vision and strategy we have chosen a long time period of twenty years, out of the understanding that significant, deep, substantive changes must be spread out over an adequately long period. The experience of Israel and other countries shows that twenty years is sufficient for realizing the requisite changes. By the end of this period, the maturing of

economic and social processes will also be discernable, especially in the areas of schooling, higher education, basic research, infrastructure investment, and the labor market. Following is a summary of the strategy that will enable realizing the vision by utilizing Israel's advantages and recruiting its residents' abilities in the realm of world competition:

A national strategy of innovation based on advanced knowledge and the values of excellence and originality, in an open society that promotes high quality and treats all its segments fairly.

Following are the Primary Objectives of the Plan:

- Rapid, balanced economic growth (average yearly GDP growth of over 6%, and average yearly GDP per capita growth of 4.7%, for a twenty year period), and a lessening of the duality of the economic structure
- Reduction of social gaps
- Recruitment and inclusion of all segments of Israeli society to deal with the challenges
- Achievement of the primary objectives will be based on **policy guidelines** established upon on a fair and balanced market economy and government involvement in the realms of national infrastructures (in their broad sense) and public service, on six major issues:
- Promoting and strengthening the education system, from kindergarten through higher education and applied scientific research.
- Increasing labor force participation rates of economically vulnerable sectors including the Arab and ultra-Orthodox communities.
- Strengthening and enhancing government mechanisms and improving government's and state institutions' governability.
- Dispersing interdisciplinary innovation and leveraging technology throughout traditional economic sectors.
- Creating conditions for continued rapid growth of knowledge-based industries.
- Enhancing national physical infrastructures.

The primary objectives are interwoven; their achievement is dependent upon adopting the strategy and guidelines in their entirety. It will be impossible to attain rapid, sustainable growth and reduction of Israel's economic duality and income disparities unless all segments of the population are included in the economic effort and in the fruits of economic progress.

Unless post-secondary education is broadly applied within the labor force, innovation will not be dispersed within traditional sectors, nor will Israel be able to compete internationally in a broad and effective manner; subsequently, it will be impossible to produce rapid growth and a significant, sustainable increase in the incomes of society's lower-earning segments.

The primary goals of reducing the duality of the economic structure and lessening income disparities require pursuing a strategy that will significantly improve the quality and uniformity of public schooling, and strengthen and expand higher education and scientific research. Significantly expanding the sphere of education will not occur without cooperation of those population groups that traditionally avoid general/secular education, such as ultra-Orthodox men and Moslem women.

The ability of economic and social agents' to function, including the means to implement this plan, if adopted, depend to a large degree on the professionalism and effectiveness of the government and public service. We propose a strategy to increase public service's effectiveness, strengthen its planning ability, enhance its professionalism and open it to dialogue and deliberation with centers of knowledge and civil society.

The chances for Israel's social and economic prosperity also depend to a large extent on strengthening regional trends of peace and calm, both in the immediate (Palestinian, Syrian and Lebanese) circle and in the further circle of threats from Iran and other focal points of radical, hostile Islam. The circles of economy, technology, policy and security interface with and feed each other.

The macro-economic evaluation and assessment upon which this work is based indicate that with the right management, the Israeli economy will be able to fund the realization of the plan's objectives, both for building the required physical infrastructure as well as for maintaining social services and investing in education and higher education.

"Israel 2028: Vision and Strategy for Economy and Society in a Global World" presents an extensive bill of policy measures in the areas of macro-economic, fiscal and monetary policy, alongside necessary policy measures regarding the labor market, sectoral policy, education, higher education and research, national infrastructures, the environment, globalization, governance and the public sector. Adopting the proposed strategy and fully implementing the detailed measures will enable fulfillment of its ambitious objectives.

Israel will advance to the forefront of the world's leading countries in terms of economy and quality of life. This is not an unattainable dream. In the framework of the right public strategy, Israel's dynamic, creative and entrepreneurial population can make the outlined vision a reality. Fulfilling this vision and achieving the objectives at the foundation of the outline of the plan we present involve the adoption of long-term thinking, adherence, and determination and require setting clear, transparent economic and social priorities. It will require determined national leadership as well as the public's identification. In the past, Israel made impressive, significant social, scientific/technological and economic achievements. This national plan envisions a competitive, balanced and fair economy, taking its inspiration from long Jewish traditions of

national solidarity, respect for knowledge and education, and excellence in the material and spiritual realms.

In our assessment, realization of the ambitious goals outlined in this plan is feasible, and will lead Israel to the forefront of the world's advanced nations, at the same time fostering its values.

The Implications of Relinquishing a Strategy of Social and Economic Change

In the event that the strategy proposed in this plan is relinquished and existing trends continue, Israel, its well-being and its future will face real dangers. An increasingly established and entrenched dual economy, on the backdrop of rapid globalization processes, will broaden income gaps, shatter social solidarity, increase the sense of alienation, and impair the state's economic strength and its social and economic soundness.

The continued deterioration of the school and higher education systems and reduction in scientific research will remove Israel's sole comparative advantage in a competitive world. Such processes will preclude rescuing Israel's traditional economic sectors from their technological lag and lifting uneducated, low-income populations from their difficult situation.

Perpetuating education gaps and the wide-ranging avoidance of labor force participation deepens and broadens the occurrence of poverty and divides Israeli society into two groups: one group that experiences economic stress and depends upon support and assistance, and the other, made up of highly-skilled employees whose work supports a growing sector that avoids work or is at the bottom of the employment ladder. This social polarization, which involves an increasing financial burden on a broad middle class, may encourage emigration of citizens who are significant contributors to economic strength and power.

Perpetuating traditional sectors' technological lag will prevent rapid growth and will impede the provision of appropriate responses to the social and security challenges facing Israel. The technological lag of many economic sectors will deepen the wage gap between low-skilled workers in traditional sectors, and employees in advanced sectors. Rapid technological changes and globalization processes are transforming a growing segment among service sectors, which were previously internationally non-tradable, into sectors whose output is traded on the world market. These processes endanger the future of employees in traditional service sectors that do not adopt new technologies nor adapt to a changing world.

A continued downward trend in public service's capability and functioning and in governability prevents the achievement of prime national objectives, impairs the business sector's performance and diminishes its achievements.

The ongoing lag in Israel's physical infrastructures will impair its integration into global processes, impede foreign investment and hamper economic growth.

Objectives, Policy and Recommendations

Realization of the vision and its quantitative and qualitative objectives is interwoven with the formulation of a master strategy and the numerous, varied policy measures required for many spheres of action. The concentrated and condensed list that follows relates only to those primary measures that are applicable system-wide, and does not contain all the measures, objectives and recommendations that are presented throughout this plan and which constitute an inseparable part of the plan.

Following is a summary of objectives and strategic policy measures in the various realms:

Maintaining a Competitive Economy

An essential condition for long-term, stable growth is the existence of a competitive economy that is able both to successfully sell Israeli products in international markets and successfully compete with foreign products offered in Israeli markets. The government should encourage a high level of economic competitiveness by reducing the centralization of several sectors and restraining the market power of monopolies and oligopolies. It is also crucial to continue competitiveness reforms in major public infrastructure sectors in order to improve Israel's market competitiveness. A special effort should be devoted to lands reform, including planning and licensing procedures in residential, business, commercial and infrastructure construction sectors. Reform on these issues is essential, in view of the many negative external effects of the existing regulation of the lands and construction markets. The absence of competition, or the low level of competition in some sectors, seriously impairs their efficiency and output level. Sectors that purchase their services, as well as the Israeli consumer, suffer as well. Sector reforms aimed at increasing efficiency and competition will help achieve the large increase in productivity that is required for the fulfillment of this plan's ambitious growth objectives. In a global world, domestic economic policy must focus on building competitiveness capability that relies upon efficient government management and economic and social reforms.

Macro-Economics

Responsible macro-economic policy is a crucial and fundamental condition for the maintenance of a functioning economy. Fiscal policy and the budget policy at its center make up the core of macro-economic policy. The considerable fiscal policy efforts made by Israel's governments since the mid-1980s served as the basis for the economy's recovery. We must ensure the achievement of fiscal objectives in the future in order to maintain economic stability and to attain the growth objective of over 6% annually on average for the next twenty years. Over the next twenty years, the per capita military budget will not increase. Civilian budgets will increase at a higher rate than that of population growth, in order to allocate increasing resources for social and economic development goals.

Government must maintain a balanced budget on average for the next twenty years.

The rate of **overall public sector expenditure from the GDP will decrease**, as compared with the current rate of about 45% in 2007, to about 40% in 2018 and about 39% in 2028. At the same time, the **tax burden will decrease** from the current rate of 37% to about 32% during the second half of the 2020s.

Following is a projection of the possible increase in real public expenditure for the coming years, according to the plan's accelerated growth path, by average annual percentage:

2009-2012 – 2.5%

2013-2015 – 3.5%

2016-2019 – 4.5%

2020-2028 – 5.5%

These rates of increase will enable a **reduction in public debt**, decreased overall public expenditure out of the GDP and a lower tax burden, according to the growth assumptions presented in the plan's macro-economic model. Current fiscal management will, of course, match the rates of annual public expenditure increases with actual growth rates. At the same time, small deviations from the growth trend will not require adjusting the planned change in public expenditure. On the contrary: a pre-planned increase in public expenditure that does not precisely follow deviations from the trend, has a stabilizing effect that facilitates return to a multi-annual growth path.

It is very important to **reduce the public debt/GDP ratio**. This will give the government greater flexibility in applying economic policy and broader maneuverability during economic or security crises. The current public debt/GDP ratio is 84%; the proposed target is no more than 60% for 2018 and no more than 45% for 2028. The targeted public debt rate is lower than that proposed in the Maastricht Treaty; this is intended to "compensate" for relatively high budgetary pension expenditures and support for "old" pension funds, and to create a safety zone, in view of the Israel's high risks of exposure to security and economic crises.

Monetary policy is the primary tool for maintaining price stability. We must **maintain the Bank of Israel's independent status to enhance fulfillment of its function**. This notwithstanding, among its considerations, the Bank of Israel must take into account its policy's implications on growth and employment in view of Israel's economic and social conditions. The Bank must continue to endeavor to achieve inflation objectives set by the government from time to time in the framework of price stability objectives.

Israel's **balance of payments policy** must adopt the following principles: government will adopt

an export-oriented growth policy and maintain balance in the goods and services account in the balance of payments, in order to maintain the economy's strength and stability. An export-oriented policy will be assured through a strategy of innovation, facilitated by leveraging technology in knowledge-intensive economic sectors to traditional sectors, and supporting applied scientific research. Continuous export-oriented growth depends, among other factors, upon world demand and the shekel's real exchange rate. Policy that produces a significant rise in productivity in non-tradable sectors will also facilitate the real devaluation of the Israeli currency (or prevent its revaluation), thus easing achievement of export and growth objectives.

Improving and Strengthening Public Service

The challenges that Israeli economy and society have faced over the past twenty years require institutional changes and changes in government conduct. The proposed economic approach is indeed based on a market economy and limited government intervention, but nonetheless assigns primary economic importance to government's performance and professionalism, as well as to the provision of high-quality public services.

The Prime Minister's Office must be the lead agency directing government policy. We recommend that the Prime Minister's office be based on four central policy units that will assist the Prime Minister in formulating policy proposals in three areas. Two of the units already exist, but need to be solidified and strengthened; two new units are to be created.

a. **Foreign Policy and Security.** The National Security Council, established in 1999, is the body responsible for preparing and formulating policy proposals in this realm; it is supposed to be led by the Prime Minister's National Security Advisor.

b. The Prime Minister's Advisor **on Economy and Society**, who chairs the National Council on Economy and Society (a professional body established in 2006, responsible for formulating policy proposals in this realm), will also head an public advisory council comprised of public sector representatives.

c. A **Science and Technology** Advisor to the Prime Minister will be appointed and will chair a new Advisory Council, which will formulate and implement policy in these areas. One of the new council's goals will be maintaining Israel's comparative advantage in academic and applied research over time, in an ever-changing global world.

d. We propose that a new unit be created in the Prime Minister's office, subordinate to the Director-General of the Prime Minister's office, to address **systemic issues** that are not addressed by the councils listed above.

Strengthening **government ministries' planning units** that are responsible for shaping the various ministries' policies.

Government ministries are the foundation of policy-making in the various areas of governance. They must be capable of formulating and implementing comprehensive as well as sectoral government policy, and need to be strengthened in order to perform their full range of duties in shaping and managing public policy in their respective areas.

A National Council for Competitiveness and Globalization will be established adjacent to the Ministry of Industry, Trade and Labor, to be responsible for the economy's competitiveness.

It is important that the leaders of Israel's political parties agree to the structural changes proposed here, pertaining to the establishment of new councils, strengthening of existing ones, and strengthening of government ministries' policy-making and implementation capabilities. The proposed structure's effectiveness will depend upon its stability over the years.

Public service employees are responsible for providing a variety of government services, in terms of planning, deliberation, monitoring, regulation, and implementation of all services that the government itself provides (without outsourcing). Ensuring the quality of public service employees and nurturing a public service **ethos** are necessary conditions for sound government performance, as well as being necessary for a more efficient economy and just society.

Ongoing cooperation and communication between various economic and societal sectors should be nurtured. This cooperation helps to achieve social and economic objectives, as demonstrated by other countries' experience as well.

Improving governability is a necessary condition for maintaining stable, sustainable growth. Good governance means maintaining the rule of law; a low level of violence; proper public monitoring of the work of the government, the Knesset and the legal system; transparency of elected officials and public employees; prevention of nepotism in public appointments; and reduction in the number of political appointments. Improving governability requires enhancing the quality of social statistics so that social policy and its achievements may be evaluated.

The Labor Market – Expanding the Participation Rate

The labor market is the central arena in which citizens active in the economy participate in the creation of the domestic product. The rate of citizens' participation in the labor force is an important measure of economic strength. Social, cultural, and political developments in Israel have created a reality in which the **participation rate** in the labor force by citizens of working age is relatively lower than that of all developed countries among whom we wish to be counted.

Updated, modern labor policy must be created; for this purpose, the **Ministry of Labor** should be re-instituted as an independent government ministry. In view of the challenges and complexities posed by modern labor policy, creation of a Labor Ministry is crucial for building a varied tool box to tackle relevant labor market issues.

We must gradually but significantly increase the **labor force participation rate** in Israel. The current participation rate is slightly over 55%. The proposed targets are 58% by 2018 and 60% by 2028.

The government has recently set an employment rate target of 71.7% for ages 25-64, for 2010. We propose that a target be set for an additional increase in employment by 2018, for ages 25-64, to reach 74%, which is the currently accepted rate among developed countries in the Western world. Increased labor force participation by groups with low work skills may come at the cost of decreased productivity. In order to halt this trend, intensive efforts are needed in the realms of schooling, adult education and continuing education over the employee's life cycle.

The increase in the participation rate involves a significant increase in the participation rate of the **ultra-Orthodox sector**, from the current rate of 40% to 55% by 2028.

An additional group whose participation rate must be significantly augmented is that of **Arab women**, requiring an increase from 19% to 50% over the next twenty years.

The **unemployment rate** will not exceed 6%. This objective will be achieved by the end of the first five years of the plan. Employment policy must strive to stabilize the unemployment rate at around 5%.

The number of **foreign and Palestinian workers** will not exceed 3% of Israel's labor force (in 2007, they made up 8.5% of the labor force). This objective will be achieved through administrative and fiscal means.

Integration into the Global Process

Integration into globalization is a key process in fulfilling our capacity for an average annual growth rate of over 6% for the next twenty years. Numerous steps must be taken in order to intensify our economy's involvement in the global world.

Establishing large **global companies** in the Israeli economy is one of the most prominent tasks in the realm of globalization for the next twenty years. We must set a target of at least one company a year, whose annual sales exceed \$1 billion. We must also enable the growth of at least six additional global companies over the next twenty years, whose annual sales exceed \$2.5 billion. Conditions must also be created facilitating the growth of three additional Israeli global companies over the next twenty years, whose annual sales exceed \$5 billion each. We should aim for at least one additional new Israeli company to join those companies whose annual sales exceed \$10 billion, over the next twenty years.

Yearly follow-up must be done of **comparative economic, social, technological and scientific measures (benchmarking)**, and a governability measure created for Israel, comparable to that of the world's leading countries.

Industrial Policy (Traditional Industries and Service Sectors)

Traditional industries and service sectors constitute the bulk of Israel's business sector. In order to maintain high overall growth, appropriate conditions must be created for these sectors, too, to experience increased productivity and high growth.

Increased productivity in these sectors requires greater utilization of ICT (Information & Communication Technologies). Government support tools should be adapted for investment in these areas.

Innovation must be encouraged in traditional industries in the broad sense: not only technological innovation, but also marketing, business and organizational innovation. For this purpose, the considerable cumulative knowledge of the Office of the Chief Scientist in the Ministry of Industry, Trade and Labor may be of assistance, and its support tools should be adapted for this undertaking.

Policy for Technological Industries

An important objective for high-tech industries is the maintenance of innovation and continued rapid growth during the coming years. Future policy will have to take into account world developments, including the fact that many countries are choosing to specialize in their respective preferred sectors, in order to gain a competitive advantage. To achieve this objective we must act according to the following policy guidelines:

We must maintain a **broad base of higher education** as a source for academic and technological manpower. This is the foundation for continued growth in knowledge- and technology-intensive sectors, and for assimilating technology into other economic sectors.

Given the complexity involved in creating comparative advantages, Israel's industrial and technological policies must be adapted to the fact that many countries worldwide are espousing a new industrial policy. Government support policies aimed at encouraging research and development via the Chief Scientist must be based on neutrality among sectors as has been the practice to date, and a certain gradual preference for investment in sectors whose development can produce significant positive external benefits for the economy.

Determining the external benefits of investment in technology sectors must be done through a methodical process, under the responsibility of the **National Council on Economy and Society** in the Prime Minister's office (see paragraph 9 above). The Council will establish complete supra-systemic policy in the areas of science, technology, R&D and higher education.

Government R&D support of knowledge and technology industries must continue, in view of the market failures existing in these fields (wherever market failures exist, government

intervention is required). Government intervention may bring about increased investments, thus increasing the benefit to society. Government should focus on supporting basic technological R&D conducted in the business sector. In these areas, **the bulk of government contribution should be focused on evaluating and pricing risks, and participating in insuring against them.** Applied-engineering development may rely on the capital market, where investment will be financed primarily by the business sector. The fields in which Israel enjoys an advantage and which demonstrate good prospects for success in the world market, beyond the information industry sectors, include **space industries, alternative energy, agriculture, water, and life sciences.**

Alongside excellence in R&D, the Israeli economy specializes in capital-raising for R&D, particularly through venture capital funds. Conditions must be created to enhance the economy's international capital raising capability through venture capital funds.

We must nurture **basic scientific research** that is driven by scientific inquiry, the inexhaustible fountain for future technologies. At the same time, the relationship between basic academic research and the industrial and business systems should be strengthened, in order to create positive external influences to increase the business potential of the research as well, and to create the next generation of researchers.

Higher Education and Scientific Research

The higher education system creates the foundation for educated, skilled manpower, enabling continued rapid growth of the technology sector as well as the enhancement of traditional industries and services. More than any other factor, it is the higher education system that contributes to creating Israel's comparative advantages and its ability to meet its growth objectives.

According to the objective, the **number of students** will reach 610,000 in 2028, as compared with the current 250,000. The proportion of the relevant age group enrolled in all types of post-secondary education will reach 75%.

Additional resources will be allocated for **expanding funding for basic university research** based on excellence and competitiveness. In addition, new research funds will be established to advance necessary fields where there are knowledge and standards gaps, in cooperation with universities and government research organizations.

Structural/organizational changes must be instituted in the higher education system. The system will be composed of four tiers that operate alongside each other, nurture competition and the aspiration for excellence, and complement each other. The academically highest-level tier will be comprised of at least two elite universities whose standards place them among

the top twenty institutions world-wide. Next will be a system of research universities that will confer the full range of academic degrees. In addition, there will be academic colleges and two-year community and vocational colleges that will upgrade the current post-secondary school institutions. Some community and vocational colleges will allow convenient absorption of ultra-Orthodox students seeking institutions that accommodate their values.

The system will be open to easy transition of students between its tiers, in accordance with their ability and inclination. **Tuition should be fair**, taking into account a reasonable balance between the education's value to the individual and its contribution to society.

Welfare Policy

Alongside Israel's economic successes and its participation in the global process, serious problems of **poverty and inequitable income distribution** have been created. This phenomenon is not unique to Israel, and concerns various countries and international organizations. International experience demonstrates that it is appropriate for government to set long-term economic and social objectives to direct its actions on this issue.

Disparities in income distribution must be significantly reduced. This may be done through integrated policy for growth and support of the traditional economic sector, expansion of schooling and higher education, sectoral labor market activity to increase employment, and provision of benefits that enable a decent sustenance for those unable to work. The Gini coefficient, which measures income disparities, will be reduced from its current high level of 0.379, to the much lower level of 0.32 over the next ten to fifteen years.

The poverty reduction target: the income of the bottom fifth will increase by 10% beyond the rate of GDP growth per capita, over the next five years (2008-2012), and by an additional 5% during 2012-2018. This development will mean an increase in the lower classes' share of income in the economy and a significant reduction in the dimensions of poverty (in relative and absolute terms). This improvement will be achieved, among other means, by increasing the share of income from work, out of the bottom fifth's total income, from the current 43% to 45% by 2012, and to 46% by 2018.

Education Policy

The education system, at all of its stages, from kindergarten to higher education, is Israeli society's basic and fundamental infrastructure for providing the basic social values and skills required for a modern work force.

The education system must be based on **public education**. Public education will be the education system's highest priority, as society's primary tool for implementing equal opportunity, revealing commonalities and creating a unified society.

Core curriculum (providing general education, cultural values and skills for the labor force) must be shared by the entire education system in Israel. Schools that do not fulfill this requirement will not be funded.

Teachers' status will be promoted in terms of wages and image. **Appropriate status must be afforded school administrators**, who should also be provided with effective management tools. Provision of incentives should be allowed for those who excel at management and teaching.

The ratio of **overhead costs** (administration and supervision) and school expenditures must be cut in the education budget.

School funding should be determined by the number of students rather than by the number of classes.

Physical conditions for teaching and learning must be improved.

The number of pupils per class in overcrowded classrooms must be reduced, beginning in the lower grades.

Physical Infrastructures

High-standard physical infrastructures are necessary for maintaining a functional, efficiently-functioning economy and for participating in the global economy. Reliable provision of infrastructure services is taken for granted in a country designated for inclusion among the world's leading economies and whose government is interested in providing its residents with a high standard of living.

In order to avoid irreversible damage in building physical infrastructures, due to lack of coordination and planning among infrastructures authorities, **a government body should be established that will concentrate the powers and multi-annual budget** for planning and implementation, following government decision and completion of statutory processes at the national level. This body will assign appropriate importance to environmental considerations in the planning process (see also number 47 below).

In the plan presented below, the **required infrastructure investment** for upgrading and advancing infrastructures over the next twenty years has been estimated at about NIS 490 billion (in 2007 terms): about NIS 350 billion for land transportation, about NIS 20 billion for sea and air transportation, about NIS 80 billion for energy, and some NIS 40 billion for water and sewage.

Environment

As a small, densely-populated and economically-developed country, Israel must invest significant planning, deliberation and financial resources in the environment over the next twenty years.

Treatment of water, air and land pollution must be significantly upgraded. These areas have suffered from chronic neglect for many years. Global warming, which presents a significant threat to the future of humankind, requires additional investments by Israel, as well as changes in production patterns and behavior, as part of the efforts made by the international community. Joining the OECD will intensify Israel's need to deal with this issue.

Israel's economic development must be based on consistent, clear environmental policy. This policy will require **inter-ministerial coordination** in all realms of infrastructures and environment, the necessary level of coordination requires a common system for government ministries, i.e., a "cabinet for infrastructure and development".

Public and private investments in the environment must arrive at the accepted expenditure rate of developed countries – about **1.5% of the GDP**.

The government must set clear quantitative targets for **decreasing carbon emissions** (a reduction of at least 25% by 2020) as well as for the proportion of renewable energy use out of Israel's overall energy consumption.

Adopting and Implementing the Plan

The strategic plan presented here is multi-disciplinary and addresses issues that lie at the foundation of our existence as a society and state. If the plan is adopted by the government of Israel, it must be led by the Prime Minister's Office and receive the Prime Minister's support and involvement, We believe that the appropriate body in the Prime Minister's Office to professionally coordinate the plan and follow its implementation is the National Council on Economy. We believe that the plan's success requires coordinating a concerted effort of all government ministries along with economic and social sectors, to adopt its principles and implement the plan.

Part I:
Historical Background,
Vision and Strategy

Chapter I: Introduction and Historical Background

From the 1920s through the young state's first two decades, two central courses of development accompanied the revival of the nation of Israel in its land: very rapid population growth as a result of immigration, and rapid economic growth. During 1950-1972, the state's population increased by 2.4 and the domestic product grew much more rapidly than even the rate of population growth. The GDP per capita grew annually at an average rate of 5.7% and the overall product increased by an average annual rate of over 10%. This rapid product growth may be attributed to the impressive growth in total factor productivity (4.4% on average per year), an extraordinary achievement by international standards. Alongside rapid population growth, a broad range of new jobs was created and the economy boasted full employment. In those days, the Israeli economy was considered an economic miracle.

Two factors shaped Israel's character and development: being a Jewish state in a hostile environment, and being an immigration-absorbing state, most of whose residents were immigrants. The resistance to the existence of a Jewish state in the region compelled Israel to devote a large part of its resources to security, and isolated it economically from neighboring states. As a country of immigrants, Israel concerned itself economically and socially with creating a national identity and integrating the influx of immigrants of different lands and languages, into one nation. The social and political ideas of the founders' generation, along with the wish to integrate the Diaspora as well as to ease the heavy security burden, determined the direction of economic policy from the outset: deep government involvement in the economy, creation of a welfare state and preference for communal action (e.g., for the *Histradrut* labor organization and the agricultural sectors). In the first decades, Israeli society was a mobilized society with high degree of social cohesiveness. The national and Zionist ethos placed the public interest at society's forefront, preferring it over personal interest or individual expression.

The government's deep involvement in all economic areas – investments, production, foreign trade, the capital market, capital import and foreign currency – played a central role in the building of society and economy, but took an economic toll. For many years, the economy suffered from continual external imbalance (balance of payments deficit), inflexible economic systems, extreme dependence on government bureaucracy, as well as extensive dependence on external aid. This stage in the life of the state is known as the "nation-building" phase.

The year 1973, the year of the Yom Kippur War, was a breaking point in Israel's economic development. From that year until today the average growth in GDP per capita decreased to a quarter of its previous rate, to 1.5% per year. Along with the economic slowdown came rapid inflation that peaked in 1984 at a rate of more than 400% per year, curbed only by the government's 1985 Stabilization Program. The crisis resulted from the Yom Kippur War and the

sharp increase in defense expenses in its aftermath, the oil crisis and the international increase in prices of basic products. Its protracted and intense nature, however, may be attributed to internal processes, particularly the lack of budgetary discipline, the lack of flexibility in implementing policy tools and the misuse of these tools, and mistakes in managing monetary policy.

However, the crises of the 1970s and 1980s revealed the economy's weaknesses and vulnerabilities. Economists in Israel and abroad wondered whether the Israeli economic miracle had ended, and whether its economy was headed the way of South American recession and racing inflation.

Israeli economic policy had undergone changes and amendments since the 1950s, made in the aftermath of past lessons or under foreign influence, but it was economic crises that primarily drove the initiation of institutional and economic reforms and made the economic leadership recognize that taking new measures was essential.

The example *par excellence* of a sharp turn in direction following an economic crisis occurred in the crisis of the 1970s and 1980s. Israel experienced hyper-inflation, with a foreign debt reaching 87% of the GDP, and a public debt peaking at 180% of the GDP. The years 1974-1984 are considered to be the lost decade in Israel's development. In 1985, following this deep crisis, the Stabilization Program was put into effect, constituting a watershed in Israel's economic policy by imposing budgetary discipline, monetary policy restraint and broad administrative price regulation for the interim period. Among the long-term lessons of the crisis were the effort to reduce the size of government, privatization, encouraging competition through increased exposure to import and various other economic reforms. Much less was been done as far as decreasing the centralized, monopoly-controlled economic fields such as electricity, ports and banks. The Stabilization Program signaled the beginning of the stage of building Israel's modern economy, open to the global economy, and from here on the growth of Israel's modern economy.

In the 1980s, a new technological revolution of enormous impetus and force began in the US and other developed countries (including Israel). Based on breakthroughs in the fields of computing and communications, new materials and molecular biology, the technology revolution created valuable opportunities for Israel, which excelled in terms of its highly educated labor force. Israel succeeded in taking advantage of its manpower edge, first in the security industries, followed by numerous civilian fields. The high technology sector's rapid development was boosted by judicious public policy, by which the government supported research and development while creating innovative tools for assistance and support. As the knowledge-intensive sectors became more established and gained a considerable reputation, Israel became a focal point that drew investors in the high-technology and venture capital sectors.

During its years of existence, the Israeli economy has made a long journey from extensive government involvement in economic activity, broad use of administrative means of economic management, and little reliance on market forces. For five decades, the transition has been almost continual from a centrally-directed economy and protected production toward a competitive, much more market-driven economy. Acceleration of this process began, as stated, in the mid-1980s. The transition was attained through a variety of measures in different realms: removing protection of domestic production as regards import; liberalization of the money, foreign currency and capital markets; privatization of government companies; and attempts, only a few of which were successful, to increase competition in centralized sectors of the economy. Concurrently with these reforms, budgetary discipline was tightened, and monetary policy instruments were improved. While the Israeli economy's transition to an open, modern economy was not without difficulties and stumbling blocks, determination and resolve have shown the way to significant successes. Having said this, our journey continues in full force.

Israel is a small economy that is vulnerable to external market forces, which have influenced its development considerably. Israel's economic development has been determined in no small part by external factors as well, that are not controlled by economic policy: the security situation, world economic developments and business cycles, and waves of immigration.

The security situation's impact is evident in a number of economic areas. Deterioration of the security situation significantly diminishes the demand for consumption and investment, drives away foreign investors and damages the tourism sector considerably. In other words, worsening of the security situation impedes economic growth.

As an open economy with high import and export rates in relation to the GDP, Israel depends heavily upon international economic developments. As was demonstrated in the early 21st century, the economy is sensitive to changes in demands for high technology products, especially in the US (in 2006, the export-GDP ratio was 45% and the import-GDP ratio was 44%).

In the past, waves of immigration were an accelerating factor in development, growth and increased productivity. The wave of immigration from the former Soviet Union in the 1990s enriched Israel with a large addition of educated manpower, in whose training the Israeli economy did not invest. However, due to the relatively long process of immigrants' acclimation into the new employment conditions, the impact on productivity and output was felt only about a decade later.

The Israeli economy's sensitivity to factors outside of its government's control requires policy-makers to make the most of the economic and social factors they are able to control through economic policy. The globalization of recent years added a major dimension to the development of the Israeli economy, which has benefited greatly from the process; at the same

time, globalization processes take their toll, primarily in the social realm, necessitating changes in economic and social policy for the coming years.

The Reforms

The successful transition from a centralized economy with a high degree of government involvement to a market economy integrated in the global economy required numerous economic reforms in various realms, instituted over a long time period. Cumulatively, these reforms provided the economy with many capabilities for dealing with global and security challenges. We will briefly survey the major economic reforms of the past twenty years, following the 1985 Stabilization Program.

The Money Market

These money market reforms aimed to remedy distortions in the composition of the public's asset portfolio, caused by the imposition of government restrictions, and to improve the functioning of monetary policy. Accordingly, banks were permitted to accept deposits linked to the exchange rate and the price index, against which they extended credit to the public; quantitative restrictions on foreign currency credit were canceled; and government-directed credit regulations were terminated. These changes increased the efficiency of the money markets.

The Capital Market

Due to budget deficits, in the past the government nationalized the public's savings by requiring institutional investors to invest most of the public's savings in non-tradable government bonds. This requirement was gradually eased. Institutional investors were obligated to invest a gradually decreasing share of their assets in government bonds, and the government began issuing tradable bonds. Old pension funds were closed and new funds were required to operate according to actuarial considerations (preferred government bonds for pension funds). Increased life expectancy created a serious long-term actuarial problem for pension funds. Since the mid-1990s, two significant changes have been made in the field of pensions, in 1995 and 2003, respectively: the retirement age was delayed by two years, and in public service, the cumulative pension replaced the budgetary pension. The reforms were aimed at expanding the number of participants in the capital market, in order to make it more competitive and efficient, which is necessary for sustainable growth.

The Foreign Currency Market and Exchange Rate

In 1987, international capital movement began to be liberalized. At the end of this process, all restrictions were removed from foreign currency movement to and from Israel. For many years, the exchange rate was fixed, with a system of multiple exchange rates. The exchange rate was set by administrative government decision. For the greater part of Israel's existence, Israel's

inflation rate was higher than that of the countries with which it traded, and it was necessary from time to time to effectively devalue the exchange rate in relation to the primary currencies, whether by official devaluation or by raising import duties or increasing support for export. In the context of the exchange rate reform export subsidies were canceled. The fixed formal exchange rate was replaced by a managed floating exchange rate that fluctuated according to market forces, between upper and lower bounds. A fully floating exchange rate, without involvement of the central bank, was initiated in 1998.

Foreign Trade Policy

In the early years of statehood, foreign trade policy was based on various administrative restrictions and varying rates of import duties, according to the import's designation and considerations of domestic product protection. Exports were subsidized in various ways, directly and indirectly. A major manifestation of the beginning of foreign trade liberalization was the signing of free trade agreements, first with the European Community (1975) and later with the United States (1985). Another crucial step towards liberalization was made in 1991, by exposing domestic production to competing imports from countries with which Israel did not have a trade agreement. Foreign trade liberalization, along with the growth of economies abundant in cheap labor, particularly in Asia, brought about the decline of traditional sectors in Israel and other industrialized countries.

Globalization

Globalization is of great importance to Israel's economic development and success. As a country poor in natural resources, Israel's export and growth rely upon its comparative advantages, the products of its knowledge- and initiative-intensive manpower. The absence of economic relations with countries of the region, due to ongoing hostility or a "cold peace", motivated Israel to achieve an economic breakthrough by engaging distant trade partners and integrating into the global process. But globalization is a mixed blessing. Traditional sectors are no longer protected from import and are exposed to competition by producers in developing countries, especially in Asia, where workers' wages are about one-tenth of those of workers in the equivalent industries in Israel, sometimes even lower. Huge producers in growing economies also enjoy the advantages of size which Israeli manufacturers lack.

Monetary and fiscal policy reforms in the money, capital and foreign currency markets were a necessary preliminary stage for opening Israel up to the world economy and for achieving gradual and stable global economic integration. Economic management reforms and massive absorption of immigration from the former Soviet Union have provided Israel with the appropriate infrastructure for participation in the world economy, primarily through the advanced technology industries sector.

Sectoral Reforms

Major service sectors in the economy, some government-owned (or formerly government-owned), enjoy monopolistic status and consequently hold considerable market power. A number of reforms were planned in the 1990s for increasing competition in these sectors, but only few (such as in the communications field) were fully implemented. The relevant sectors include electricity, water, air and sea ports, fuel refineries, public transportation (railways and buses) and banks, sectors that provide services to the entire business sector and to public consumers. A lack of competition is detrimental to the efficiency and productivity of other economic sectors and to consumers. Achievement of competition in the communications field was possible due to a combination of two factors: public regulatory reform and technological developments that facilitated competition.

Privatization

As part of the steps taken to reduce the government's economic involvement, important government companies were privatized: Israel Chemicals, banks (those that had been transferred to state ownership following the bank shares crisis), El Al Israel Airlines, ZIM, Bezeq and the Oil Refineries. Some of the security industries remained under state ownership.

The success of most of the reforms made the economy highly competitive, enabling relatively smooth transition into international markets, and creating a basis for export- and technology-oriented growth. While these important achievements should be continued, they also require dealing with serious social and economic side-effects, development of a dual economy, and a polarized economy, in terms of income. This harsh reality must be changed.

Economic Achievements Alongside Challenges and Risks to Economy, Society and Government

Impressive Economic Achievements

The "small government" process that aimed to reduce government involvement in the economy and to restrain its budget had far-reaching implications, some of them positive – the process was productive in important economic areas. It saved the Israeli economy from the serious crisis of the 1980s and enabled it to make important achievements. The ratio of public expenditure to GDP, which peaked in 1984 at 70%, was reduced to a level of 46% of the GDP in 2007, an average level in European Union countries. However, the process had negative economic and social impacts as well, which we shall describe later.

The export sector's rapid growth, led by the high-technology industries, enabled the Israeli economy for the first time in its history, to achieve a balanced current account in its balance of payments in 2003; a balanced goods and services account for 2004; and a surplus in 2006

and 2007. The change in the foreign debt-GDP ratio since the mid-1980s also testifies to the enormous improvement in the economy's external state (from Israel's net foreign debt of 87% of its GDP in 1984, to a debt of some 19% of the GDP in 2006).

Inflation in Israel has been curbed completely. The economy has transitioned from hyperinflation in 1984, initially to double-digit inflation, then to the price stability of recent years.

By all international standards, Israel has made considerable achievements in the field of technological innovation and research and development, in terms of relative R&D investment and employment rates in R&D and high-tech sectors, and the number of patents registered by Israelis. The last four years have seen renewed rapid economic growth.

These measures indicate positive economic developments, but do not reveal the complete picture with all of its shades nor the threats hovering over Israeli economy and society.

Following is a brief survey of the challenges and risks still faced by Israel's economy, despite its achievements. The difficulties, the risks and the opportunities were the motive behind the extensive, complex work done by the authors of the plan for 2028, made up of a wide-ranging group of experts from varied fields of research, knowledge and practice.

Economy and Society: Obstacles and Threats

Development of the Dual Economy and Increased Income Gaps

For the past two decades, the growth of Israel's economy has been unbalanced, producing a dual economy: rapid growth and high productivity in high technology and other advanced sectors, in which Israel's economy has enjoyed a comparative advantage, in contrast to treading water, low productivity and sometimes even regression in traditional sectors. Knowledge-intensive industries have utilized globalization to their great benefit: their sales have reached expanding markets hungry for knowledge-intensive products and services. Concurrently with the expansion of export markets, new opportunities were utilized for acquiring inexpensive, competitiveness-increasing input from import.

Traditional sectors, producers of goods and services, have suffered from Israel's integration into the globalization process. Most of them were unable to maintain foreign markets or even to deal with competing imports and many lost the domestic market as well. The key to creating a competitive edge in a global market is found in increasing productivity and creating innovation in processes or products. Productivity-increasing and innovation-creating processes have occurred only to a limited extent in traditional sectors.

The dual economy creates two difficult problems: the overall growth rate is lower relative to an economy that is able to realize the productivity and growth potentials of its traditional sectors.

A too-low growth rate will leave Israel at a low ranking among the advanced nations, and especially, will not allow in the future for attaining the output required for raising the standard of living, funding security needs as necessitated by Israel's existential issues, advancing a solution to social ills, and closing the significant historic lag in the creation of physical infrastructures.

The dual economy is closely and causally linked to Israel's dismal social reality. Over a long period, income disparities have increased in Israeli society. At its inception, Israel was one of the world's most egalitarian states; now it is ranked one of the highest among developed countries in measures of income disparity (the 2006 Gini factor was 0.379). Leading Israel's income disparity are gaps in income from wages, produced to a large extent from gaps in productivity and product per worker between high-knowledge and traditional sectors. That is, creation of a dual economy fed the growth of income disparity in Israel. Extreme income disparities not only create social unrest and damage the delicate fabric of sense of belonging and social cohesion, but also harm economic growth. If a way is found to promote the growth of traditional sectors and to prevent polarization of the dual economy, the essential social need of reducing the income gap will also be served, primarily by increasing the lower tenths' income from work, and to a lesser degree by means of the tax system and welfare benefits. Increasing equality will occur, then, primarily through the building of a ladder by which low-income individuals may ascend levels of income from work.

Increased income disparities are a universal phenomenon related to globalization processes. These processes' influence is manifested in the development of the dual economy; the diminishing of affirmative national welfare policy; and education's growing impact on income. We will address ways to help reduce the worrisome magnitude of inequality: effecting change in the dual economy structure; pursuing vigorous educational activity towards the reduction of education gaps despite the social and political forces interested in preserving them; and instituting a labor policy that encourages increased participation in the work force and enhanced job stability.

Low Participation in the Labor Force

Another worrisome phenomenon is the low rate of participation in the labor force relative to developed countries (In 2006, the labor force participation rate was about 55%, as compared with a rate of 65% in the US). The low participation rate may prevent the achievement of the per capita GDP required for attaining our economic and social objectives, even if work productivity is similar to that of developed nations. To a large extent, the low participation rate can be explained by patterns of low participation of two groups in the population: Ultra-orthodox men and Arab women. These two groups typically also lack appropriate education for the modern labor force¹ (the ultra-Orthodox participation rate is 40% and that of Arab citizens of Israel is also 40%, as

¹ In recent years, a significant rise has been occurring in education levels among Arab women.

compared with 61% of the majority group in the population). Both groups' high natural increase rate, along with their current employment patterns and lack of general education, pose a real risk to the chances of achieving our economic and social objectives for the coming years. A demographic forecast based on existing birth rate patterns projects a proportionate decrease of the population's majority group (non-ultra-Orthodox/Arab) from 71% of the population in 2007 to 61% in 2028. Unless a change occurs in the minority groups' education and work patterns, the demographic data will be manifested in a decrease in the rate of labor force participation from the current 56% to 53% in 2028. In contrast, achievement of our economic and social goals requires an increase in labor force participation to a rate of 60%. The existing trends are in fact working in stark opposition to the desired development. A low participation rate is typical to a low-income population in general, not only in these two low-income minority groups. We must improve the state of the poor population in general, through state investments in childhood education and adult human capital, but this is insufficient as regards the two minority groups, ultra-Orthodox and Arabs. These groups have religious objections to acquiring the general education that trains for high-level jobs, and even to entering the labor force. The problem of these groups' low labor force participation rate and their low income when they do work, is interwoven with the issue of their resistance to acquiring the general education essential for the modern job market. An integrated solution to these two problems stands at our doorstep: acquisition of general education and greater participation in the labor force.

Excessive Numbers of Foreign Workers

At the end of 2006, some 240,000 non-Israeli workers were employed in Israel, 190,000 of them foreign workers and 50,000 from the Territories. They made up 9.5% of the general labor force, a high proportion by international standards. The significant rise in the number of foreign workers began in the early 1990s (spurred by the first "Intifada" and the subsequent sharp decline in workers from the Territories), peaking in 2002 at 269,000 workers. Since then, the government has made moderate efforts to reduce their numbers, an attempt that has had limited effect and was discontinued prematurely. Foreign workers are employed primarily in the sectors of agriculture, construction and nursing. The current number of foreign workers exceeds that of low-educated unemployed Israelis. As stated above, low-wage workers have paid most of the price of globalization as sectors they worked in were exposed to competing imports from countries whose comparative advantage was cheap labor. They became unemployed; some left the labor force. These workers found their natural haven from the processes of globalization in international trade in sectors that are internationally non-tradable: construction, agriculture and personal services, which, along with the public sectors, are not exposed to import competition. However, due to pressure from employers' economic lobbies, Israeli workers lacking in education have no natural haven, as globalization has penetrated powerfully into the movement of manpower as well – at present, only of workers at the bottom of the wage ladder. This policy increased the

income gap and placed an additional burden on the state's budget in the form of unemployment stipends and income supplementation, a socially detrimental policy which obligated the state budget to indirectly subsidize employers of foreign workers through welfare budgets.

Deficiencies in the School and Higher Education Systems

A major challenge casting its shadow on the Israeli economy's performance and future is the substantive failures of the education system, from kindergarten through post-secondary education. The school and higher education systems develop Israel's human capital and provide Israel with its comparative edge. Unless changes are made (to be discussed at length in this paper), the level of Israel's higher education will continue to regress, the brain drain will continue, and our only advantage in a competitive world and a hostile region will be placed at risk.

In view of their poor achievements, Israel's elementary and high school systems are in need of significant improvement. Without an increase in the rate of students completing a high school education, improved standards of education, and the acquisition of proper learning habits at a young age, the higher education system will fail to produce the educated labor force required for rapid, balanced economic growth. Without change, decreasing the income disparity will also not be possible in the long term.

Weaknesses of the Public Sector and Governability

Last, but not least in importance, a long process of erosion has affected government and public sector functioning and efficiency, as evidenced in various areas of decision-making and implementation processes, professionalism and expertise of public service employees, keeping and enforcing the law, maintaining integrity and government stability. This deterioration threatens society and economy. The debate on the structure of our government system, which has implications for many of the government's ills and its efficiency, exceeds the bounds of this plan. Nonetheless, the plan does address various important aspects relating to the effectiveness of decision-making and implementation and the proficiency of public employees in their areas of responsibility and expertise. The level of governability and functioning of state institutions, as well as the quality of debate on issues of public policy are essential factors in creating an economy and a society that are among the world's leaders.

Chapter II: The Vision

The vision proposed by the members of the task force outlines the targets to be reached by Israel's economy and society by the end of the third decade of this century. Being a vision, it is indeed wishful, but is founded on the deep recognition of the members of the task force – all of them experts in their respective fields, who share an aspiration to promote Israel's strength – that there exist many hidden creative forces within Israeli society; these forces can turn the vision into reality given an actual will to adopt it, and if we pursue the route outlined in the proposed strategy.

Following is a summary of the vision upon which this project is founded, as formulated by its initiators:

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 that of its future generations.

Israeli society will be open and enlightened; its economy will be free, balanced and fair and will rely on the cultural and scientific/technological capabilities of its people, on its wealth of human capital, and on innovation and initiative.

These goals will be achieved through the participation of all segments of Israeli society, while sustaining the values of the nation, reinforcing the pride of its citizens in their country, and the appreciation of the Jewish people and Israel's friends worldwide.

The overall strategy for enabling the vision's fulfillment is based on the following approach:

A national strategy of innovation based on advanced knowledge and the values of excellence and originality, in an open society that nurtures high quality and treats all segments of society fairly.

Given the considerable challenges Israel faces, it cannot afford to wallow in mediocrity or to relinquish excellence. If the education system, productive economy, scientific and technological infrastructure, and defense system do so, Israel's continued thriving will not be ensured, and its very survival will be put at risk. Israel must adopt a strategy of innovation, excellence, and quality in critical areas, in order to fully utilize its resources and to restore the course of rapid, sustainable growth, so that it may provide the many needs of a nation still in the process of building itself and fighting for its life. Innovation should be the cornerstone of shaping economy and society. It is the primary force in raising the product per worker to an annual rate of over 4% on average for the entire period.

While a rapid increase in GDP is an important objective, it is not sufficient. Standards of quality

and excellence must extend beyond the economic outputs measured in monetary values, to the realms of education, health, welfare, infrastructures, the environment, upholding the law, integrity, personal security and intellectual expression. Adopting high standards across the various domains will bring us closer to becoming an exemplary society.

The challenges of the future also raise a number of difficult dilemmas. For example, how can we adopt norms of Western liberalism, which place the individual and his or her needs in the center, without sinking into extreme individualism, hedonism and social alienation, in a society that still requires public mobilization and social solidarity? How can we balance the maintenance of an open, competitive market economy that enjoys globalization's advantages with the need to create a sensitive, fair society that minimizes income disparities?

Societies around the world have adopted different strategies for economy/society relations. What is sometimes termed the American approach, grounded in American history and ethos, places at the forefront economic efficiency and returns for initiative, industriousness, talent and capital investment. This approach views an individual's success as a reward for his or her efforts, and sees his or her failures as the product of inadequate personal investment. According to this view, the government should minimize its support of vulnerable populations (sharp controversy exists over this issue in the US, and change has occurred in this view in recent years). The social-democratic leaning European approach, by contrast, does not attribute an individual's achievements and failures to personal economic investment only, but also takes into account the fact that individuals' "starting conditions" are unequal, and that one's economic and social status is affected in a substantial way from one's starting conditions. According to this approach, it is the government's responsibility to remedy at least some of the distortion caused by inferior starting conditions, through taxation of the stronger strata and transferring of funds to the more vulnerable. High taxation of workers and producers and assignment of funds without adequately distinguishing among recipients may harm output, create a poverty trap, and in a global world, encourage capital flight and a "brain drain". Israel must find its proper, unique way to balance between these approaches while taking into consideration Israeli society's conditions and values. Developing Asian models and other examples world-wide indicate that there is no one successful model of economy/society relations. **The plan's creators envisioned the Israeli economy as one that is based on a competitive market economy, but does not neglect the more vulnerable segments of society, and maintains the appropriate balance between the various sectors of the population.**

The Jewish people have a rich value system. Outstanding social solidarity and mutual assistance protected the Jews for generations in harsh conditions of persecution and economic hardship under hostile regimes. In many communities, Jewish life was based on voluntary "civil society" institutions that exemplified a rich social life. Today's Israeli society would do well to adopt

elements of Jewish communal life and values. Such an approach would strengthen social solidarity not only through government activity, but would also create a modern Israeli society integrating today's progressive social approaches with the long historical experience of the Jewish people in the Diaspora. One lesson from the Jewish experience deserving of espousal is the importance of personal excellence and the primary place of education in individual and community life. Around the world, Jews' economic successes and their achievements in the fields of science and the humanities have actual significance that is very relevant to our lives here and which may help shape our vision for the future. We must make great investments in educating the younger generation, stress the importance of education, and nurture an economy that takes advantage of global mobility, innovation and excellence.

As this concise vision is unfolded and discussed at length in the detailed chapters of the plan that follow, education in its entirety, at all of its stages, is viewed as a focal point to be cultivated at the national level, and that the foundations of general education are to be adopted throughout the system.

The vision is ambitious, and its realization uncertain, even if all the recommendations detailed herein are implemented taken according to the strategic outline. Some factors that will shape the future cannot be controlled by Israeli decision-makers and policy-makers. Accelerated globalization, rapidly-changing communications technologies, impacts of new technologies and of economic growth on the state of the earth, all increase the interdependency between peoples and nations. Thus, the impact of developments and decisions in faraway places on our nearby surroundings and our immediate economic and political situation has been significantly intensified.

Israel's future and development depend, therefore, on many factors, including the state of the world economy, the changing international political and security situation, increasing efforts to curb the deterioration of the world's ecological state, successes of democratic nations in dealing with international terrorism, and the ability of the world's economic and scientific leaders to find a long-term solution to the energy crisis. Finally, Israel's chances for social and economic prosperity also depend in large part upon strengthening trends of peace and calm in our region, with the moderate Arab states, in the immediate circle that includes our Palestinian, Syrian and Lebanese neighbors, and the further, threatening circle of Iran and other focal points of extreme, hostile Islam.

We chose a relatively long time period for our vision and strategy, on the assumption that some national strategic issues involve long maturation periods. At the same time, we must decide now on the policy to be adopted for the required renewal, so that interim results are achieved gradually over the course of the time period. Due to Israel's burning existential issues and its political structure, it has not excelled in the past at long-term thinking. Its planning bodies

have suffered chronic weakness, and ongoing processes have been inadequately managed. The considerable changes in international conditions as a result of globalization and rapid technological developments increase the uncertainty and intensify the need for long-term deliberation and planning of economic, social and technological policy to better deal with a changing world.

Israel's nation-building process, now in full force, requires multifaceted renewal in the realms of economy, society, science, technology, culture, and infrastructure as well as security. A proper balance must be maintained for change and renewal.

According to the vision, Israel's economy and society will attain two primary objectives in parallel over the next twenty years. The first objective is balanced, sustainable growth that will lead Israel to the forefront of the world's nations. The second is inclusion of all segments of Israeli society in economic activity and in the fruits of economic growth, and reduction of social gaps.

Achieving Balanced, Sustainable Growth and Dismantling the Dual Economy

The economy will return to a continuous, rapid growth path. Over the next twenty years, the GDP per capita will increase by 4.7% on average per year (and the overall product by over 6%). This is a very high ongoing average rate for such an extended period, when compared with Israel in recent decades as well as by international comparison (over the past thirty years, Israel's average annual growth of GDP per capita has reached only 1.6%)². This ambitious objective will require a continuous, interdisciplinary effort in terms of both planning and implementation. As stated, an annual growth rate of 4.7% per capita will elevate the Israeli economy to a higher ranking among the world's countries by GDP per capita. The advantage of rapid growth is in creating extensive national economic resources that will enable, besides an increase in the standard of living, allocation of considerable resources for investment in education, health, infrastructure and increasing total factor productivity. Achieving sustainable rapid growth, however, requires gradually making changes in the differentiated growth patterns of the dual economy, which are among the primary factors creating the large, worrisome increase in the income gap that has long accompanied us. Achieving more balanced growth by encouraging traditional sectors' productivity and growth, through education, expanding knowledge infrastructure and training quality manpower, will facilitate the growth process itself and will reduce income disparities. Only a minority of Israel's workers (6%) are employed in the advanced technology sectors; it will be very difficult for the Israeli economy to achieve high growth rates and low unemployment rates as required, as long as growth continues to be based exclusively on the knowledge-

² Economic growth was renewed in 2004. During the past four years, growth of GDP per capita reached an average annual rate of 3.5%, which is significantly lower than that required for the next twenty years. International economic conditions threaten the stability of even this growth rate.

intensive sectors, while the bulk of the economy suffers from low productivity and lack of growth. Therefore, a major effort for the coming years will be to concentrate on increasing traditional sectors' productivity through industrial policy and the expansion and deepening of quality education.

Reducing Social Gaps

One of the most serious economic and social trends accompanying us since the early 1970s is the nearly constant increase in measures of income disparity. In the state's first years, Israel was the most egalitarian country in the democratic world. In recent years, Israel has some of the largest income disparities among developed countries. A healthy society cannot tolerate a high degree of disparity for long, as it significantly damages social cohesion, the sense of identification with the state and economic growth. It has been proven that the rapid growth of the high technology sectors does not pull the other sectors after it, in the absence of a state directed and driven policy. The data show that the overall disparity is led by the income gap from wages. The increasing disparity in income from wages is caused primarily by higher returns for education vs. lower returns for low-educated individuals. Increased return for education is a universal phenomenon. The data also show that the disparity measured in terms of gross income (prior to taxes and transfer payments) is much greater than that measured in terms of net income (as the effect of taxes and transferred payments mitigates the disparity). Finally, Israel has the lowest proportion among developed countries of employed individuals out of the total adult population. A low employment rate means that about half of the adult population supports not only their dependents but also the other half of the adult population that does not work, and their dependents. Non-participants in the labor force and unemployed persons, most of whom subsist on stipends, have very low incomes; the larger their proportion in the population, the greater the income disparity. These facts indicate the routes open to us that can truly reduce the income disparity. Indeed, we can go back and increase tax rates and stipends, thus reducing inequalities in net income, but this step will take us backwards. It will decrease motivation to work and will impair growth, while placing a great burden on the state's budget, pushing aside public investment in crucial areas such as education, health, infrastructures and security. We must therefore take action in the following directions: reducing the disparity in gross wages among employees; significantly increasing the rate of participation in the work force; and lowering the unemployment rate. The chapters of this plan describe the policy measures for achieving rapid growth while reducing income disparities. The projected path for the national economy predicts a significant decrease in measures of income disparity: the Gini measure of disparity in income will be reduced from the current 39% to 32% in 2018.

After sixty years of independence, Israel still struggles with difficult, complex questions, the likes of which no other nation faces. Throughout its history, Israel has met numerous tasks and

challenges, and has made impressive achievements that were inestimable at the time. Israel's future internal and external problems are no less complex than those of the past, and present difficult challenges for policy-makers. In view of the challenges facing the state, the coming years will be crucial for its future and its development. The present generation's role is to add a substantial, qualitative layer to the building of the Israeli nation during the next two decades.

The proposed strategy is based on broad systemic thinking, and is intended to lead society and economy a great step forward. Israel's unique circumstances do not allow us neither the maneuvering space nor the time to err, which may distance us from achieving our objectives and intensify the dangers that await us.

This weighty task is to be carried by Israel's government and civil society at the same time. The route to achieving the ambitious goals presented here is a difficult one, requiring great effort. It involves mobilization of all segments of society for a long, continuous effort. This route will not only ensure survival, but will afford Israel a respectable place among the world's nations. It will facilitate the building of a state that does not make do with merely ensuring the basic needs of its citizens, but also provides quality of life, nurtures culture, removes barriers of alienation among its various groups, and integrates all its components in the national fabric, while respecting their differences and uniqueness. This route will help integrate Israel into a rapidly-changing global world.

Chapter III: Dilemmas & National Strategy - A Mirror to Israel's Future

Introduction

It is the vision of this plan for Israel to be among the 10-15 leading countries in the world economy within twenty years. The primary strategy to fulfill this vision is based on continuous, interdisciplinary action, and must address the various challenges facing Israel's society and economy. Israel must navigate the stormy global sea that characterizes our era. Positioning Israeli economy and society on the global map requires finding a route appropriate for Israel's unique circumstances, which will be discussed in this chapter.

Realizing the primary objective of achieving rapid, balanced growth (reducing the economy's dual structure) and decreasing social gaps is based on strategy and policy guidelines on six primary issues:

- **Promoting and strengthening the education system, from kindergarten to higher education, and scientific research**
- **Increasing labor force participation rates of society's vulnerable segments, including Arab and ultra-Orthodox sectors**
- **Improving the quality of government mechanisms and enhancing governability**
- **Leveraging technology and introducing innovation into traditional economic sectors**
- **Continuing the momentum of growth of knowledge-based industries**
- **Enhancing physical infrastructures**

The chapter discusses the main difficulties and dilemmas that Israeli society and economy face towards the end of the first decade of the 21st century. Achievement of our economic and social objectives over the next twenty years will depend upon our success in contending with our difficulties and solving our dilemmas today.

The "Vision and Strategy" plan, the work product of the undertaking of a dedicated task force, does not merely outline economic and social objectives for Israel, but rather devotes most of its attention to examining the means and methods for achieving these objectives by 2028. The vision is ambitious: it is not satisfied with maintaining Israel's current ranking among world economies, nor does it accept existing social disparities. **The plan aims to achieve a GDP exceeding \$50,000 per capita (in 2007 terms) by 2028**, and presents a wide-ranging and varied list of objectives that characterize leading economies. We must remember, however, that

in historical perspective, the Israeli economy has made achievements that are no less significant than the vision we outline here for the coming twenty years. During the state's first 60 years, foundations were laid for the building of the Israeli nation. We view the time period of the next twenty years as an additional, important layer in the building of the nation, by the end of which Israel will be an exemplary state with a thriving economy. At its center will be a society that affords all of its members access to higher education and to a decent living from work, and treats its more vulnerable segments fairly. We present an integrated view of the objectives and means described in this plan, which perceives the economy and the society as complementary parts of a whole. Continuous growth is necessarily built on the balance and integration among various economic sectors, and between these sectors and society at large.

If parts of the economy and society continue to lag while others make rapid progress; if public investments in higher education infrastructure and physical infrastructures are not made that encourage the required extent of growth; if structural changes are not made in the education system; and if the public sector's efficiency and professionalism are not improved, economic growth will slow down and even come to a halt, ultimately causing harm even to currently successful parts of Israeli economy and society. **Per capita growth of 4.7% a year on average for the next twenty years** requires a comprehensive, consistent, multi-systemic national effort. It is not just an economic undertaking but rather the combined outcome of utilizing the capabilities and skills of the business economy, social institutions, the political system, science, the public administration system, and all parts of civil society. Such a far-reaching effort requires instituting collaborative communication routes among many economic and societal agents as well as changes in the culture of government, public discourse and labor relations.

In view of Israel's sixty years of experience, it is superfluous to demonstrate the importance of a quality society, not only for the state's prosperity but for its very existence. A society with a high proportion of individuals who have a general and technological education; without excessive income disparities; with a significant core of economic entrepreneurs; and which has at its service an efficient, professional, devoted and corruption-free public administration, can ensure economic prosperity as well as the allocation of significant resources for the security challenges that continue to threaten the state's well-being and existence, even after sixty years. This plan focuses primarily on the economic challenges we face, while examining the close connection between economy and society. It addresses the challenge of finding a way to build a thriving economy that serves all of its citizens and is based on high-quality human capital and excellence in education and research.

In order to elucidate the difficulties that the economy and society face for the coming years, we shall briefly describe below some of the dilemmas and challenges in critical areas, on the way to growth. These challenges require examination and investigation of the ways and means to

deal with the difficulties, and formulation of the primary guidelines for the future. Further, not all the dilemmas presented here have special chapters devoted to them, despite their importance: these include income disparity and poverty, the multicultural society and avoidance of education and work, and the education continuum from preschool to academia. On some these issues, this chapter discusses ways to tackle the problems. As for others, the route to a solution is multi-disciplinary and therefore integrated; it is illuminated in the discussion and the recommendations presented in some of the plan's chapters.

The plan is based on the assumption that a basic change will not occur in our security situation. **Achieving sustainable peace will change the perspective by which we view the development of the national economy and will considerably ease the achievement of social and economic objectives. Conversely, all-out war will impede their achievement.**

1. Government Involvement in the Economy

During Israel's first years of statehood, government involvement in the economy was extensive, leaving nearly no economic sphere without its direction and monitoring, as regards production, investments, capital markets, foreign trade and welfare. This involvement peaked during the first half of the 1980s, when public expenditure exceeded 70% of the GDP. The government's subsequent retreat from deep economic involvement gained momentum during the major economic crisis of the early 1980s. This process reached its peak in the years 2005-2007, when the scales were clearly tipped in favor of the market economy, very little government involvement on civilian issues, and a policy that was insufficiently attentive to social distress. It was this policy that produced the dangerous regression that occurred in education and higher education. Currently, public expenditure is about 45% of the GDP; civilian expenditure is less than 40%.

This plan proposes to the government interdisciplinary principles and courses of action, for a multi-annual endeavor aimed at maintaining high growth rates, while providing a more humane face to Israel's polarized, torn society. **We recognize and appreciate the importance of the market economy** and understand that it is irreplaceable for creating the state's material assets and wealth. The benefits gained by society and economy from global integration strengthen this appreciation even further. Through the proper, yet ever-elusive balance, our objectives will be achieved without dealing a serious blow to market forces. In order to serve these goals, the plan of action cannot, in our estimation, be based on conservative, neo-liberal principles that seek to minimize government involvement in economy and society.

The authors of the strategic plan believe that government has a responsibility towards society's vulnerable populations who are unable to work, and towards employees whom

globalization has ousted from the labor market, or relegated to the bottom of the employment ladder. Government has a central role not only in providing public products, but also in economic involvement in cases of market failure, including the planning and implementation of economic policy that encourages employment and increased productivity, outlining industry policy and establishing tools for its implementation, regional development and development of infrastructures for integrating Israel into the global world. We believe that government has a central role, along with the civil sector, to reach alienated, dissociated groups (especially the ultra-Orthodox and Arab sectors), and integrate them into the society and the economy.

It is the government's duty to promote and bring about the success of public school education and the system of higher education and research. The government must implement policy that impacts upon redistribution of the national income, in a society that carries the burden of some of the highest income gaps among developed countries. **In our estimation, the government's primary task in reducing income polarization is implementing policy that will lead to departure from the dual economy structure, by employing productivity-increasing measures, which will in turn produce a rise in wages in traditional sectors.** In the realms of taxation and welfare benefits, the government must find the complex balance between encouraging economic initiative and the will to work, and the economic understanding and moral obligation to improve the situation of society's vulnerable groups.

In the age of globalization, various democracies have resolved the issue of government involvement in the economy through various means and approaches. Some have attempted different approaches during different time periods. After being rescued from its major economic crisis and reaching economic and fiscal equilibrium, the state of Israel must find its way on this issue, by employing a balanced approach in the midst of deep public debate among the devotees of "small government" and those who support broad government involvement and restriction of the market economy. **We believe that now is the time for the government to carry out its responsibility to economy and society** according to the principles presented here.

According to the projected economic plan, assuming that the steps detailed in this plan are taken, the average public expenditure for the coming years will come to about 40% of the GDP (concurrent with rapid GDP growth of an average annual rate of about 6%) Most of the coming years' increase in public expenditure will be devoted to civilian issues. The relative share of defense expenditures and debt service will gradually decline over the course of the period.

2. Globalization: Benefits and Pitfalls

The global reality presents a challenge for Israeli economy and society. Israel reaps great economic benefit from globalization, while paying a significant social price. As a small country with a small number of workers as compared with large or medium-sized economies, it does not enjoy the benefits of production scale, relative to the other economies. Therefore, it is not worthwhile for Israel to engage in sectors based on mass manufacturing or on cheap labor. Israel does not have significant natural resources that can ensure the economic welfare of its population. These fundamental conditions necessarily lead to considerable dependency on international trade, import and export, more so than most of the world's economies. On the other hand, Israel stands out with its high proportion of high-quality, educated employees and relatively large number of entrepreneurs in various economic fields. These conditions explain why globalization holds so many benefits for Israel. Open international trade and movement of capital, which are the heart of globalization, enable the Israeli economy to take advantage of its clear comparative advantages in world trade in advanced technology sectors, research and development, innovation and initiative. Globalization opens markets for Israeli exports and offers Israeli consumers and manufacturers a broad array of consumer goods, production inputs, investment vehicles from import at low prices, and available capital for investment. Low-price imports of varying quality mean higher real wages for workers in Israel and more competitive advantages for Israeli manufacturers. The shapers of economic policy face the important tasks of creating conditions that prevent erosion of comparative advantages, and even contribute to sharpening them in existing areas and utilizing them in new ones.

Rapid technological changes and the access offered by globalization create a dynamic world that is being transformed at an ever-increasing pace. In such a world, any competitive edge in the global market is liable to be short-term. One country's traditional comparative advantage in a certain market may be transferred to another country because of a lag in research and development, a lack of innovation in production or marketing, or a shortage in appropriate manpower. In the past, India enjoyed an advantage based only on cheap labor. By investing in the expansion of its higher education system, it achieved a comparative advantage in information technology sectors. The map of comparative advantages in international trade, relatively stable in the past, is now being constantly transformed. Preserving existing comparative advantages or developing new ones in high-technology sectors requires training high-level manpower, investing in research and development, and employing innovation in management, production, marketing and organization. In international and domestic economic arenas, globalization redistributes opportunities and risks among nations, among economic sectors and among citizens.

Alongside globalization's benefits, we cannot ignore the hardships it creates for traditional economic sectors, nor the suffering of employees who have lost their jobs or have been pushed to the margins of the labor market. Powerful new forces are reshaping our socio-economic reality:

2.1 Deepening Income Disparities. Rapid technological developments world-wide, the importance of advanced technology for the economy, free international trade, international flow of capital, and the rapid economic rise of the huge populated countries, India and China, have all substantially changed absolute and relative returns from education. In developed countries, the wage gap between educated and uneducated workers has grown considerably. These processes have not passed over Israel, where wage and income gaps are expanding progressively more, due to a large extent to the effects of globalization.

2.2 Work Migration. These effects are further intensified by work migration to Israel and the subsequent creation of a large, cheap labor force at the bottom of the employment ladder, employed in inferior conditions to those of Israeli workers in the same occupations. Labor migration removed the protection that benefited low-level Israeli workers who were employed in internationally non-tradable sectors. Foreign worker employment has caused Israeli workers to be ejected from the labor force and the wages of low-level workers to be frozen, while the wages of educated workers have risen consistently³. International movement of labor has intensified globalization's contribution to growing income disparities in the country. High income disparities produce social disparities, undermine social cohesion and increase alienation and neglect. The route to reducing disparities requires a multi-dimensional effort and action on different fronts. Some of the means that will be discussed here, such as labor policy and technological leveraging of traditional economic sectors, will produce results only years after their implementation. However, reducing the number of foreign workers to about half of the current number (about 190,000 today) as we propose, is an effective means of reducing the income gap that can achieve rapid results. The job market will react to this policy by employing Israeli workers currently outside of the labor force, and by increasing the wages of low-level workers.

2.3 Brain Drain. One of the most serious risks posed by globalization that threatens a state such as Israel, whose economy relies primarily upon knowledge, is the "brain drain". The developed world encourages migration of an educated, skilled and entrepreneurial labor force, which has become the highest-demand "product". Globalization encourages

³ For considerations of profitability, manpower firms dealing in the import of foreign workers have increased the cycle and numbers of foreign workers, thus intensifying foreign workers' impact upon employees at the bottom of the wage ladder as well as upon unemployment rates.

vigorous world competition over these workers. Israel has been blessed with a relative abundance of educated individuals whose migration abroad is a great loss to Israel's economy and society. One of this document's goals is to outline the way to improve the economic, social and cultural conditions in Israel. Achievement of this goal will diminish the enticing lure of the global world for highly-skilled, educated workers.

The small size of Israel's economy does not prevent it from participating in global world processes. On the contrary: this fact affords Israel all the advantages of the global economy. A significant share of Israel's export products are high-added value products based on knowledge, technology and innovation that earn high profits in world markets. Usually, these products cannot rely on the local market. Positioning Israel at the forefront of the world economy in accordance with the goal we have set will require Israel's ongoing participation in the globalization processes.

Therefore, we must take advantage of globalization's benefits, while minimizing to the extent possible the damage to the Israeli economy

In order to promote Israel's integration into global processes and its utilization of its capabilities and comparative advantages, we must strengthen existing bodies and create new ones within the institutional system that will consistently examine and shape public policy in these areas. This system will incorporate three bodies: a National Council for Competitiveness and Globalization (adjacent to the Ministry of Industry, Trade and Labor); a National Council on Economy and Society; and a National Science and Technology Council (the latter two will belong to the Prime Minister's office).

We must adopt multi-disciplinary, coordinated policies that ensure that Israel integrates appropriately into the global world, while minimizing the negative social effects. Important relevant policy measures include: adopting macro-economic policy that strives for stability; fostering and developing world-class physical infrastructures; nurturing and improving education at all levels, from early childhood through higher education; instituting a flexible labor policy that can adapt to new labor market conditions; and carrying out a welfare policy that avoids creating a poverty trap and discourages avoidance of work, while espousing real support of those unable to work.

Economic policy-shapers must follow the rapid changes occurring on the international economic map and react accordingly. We must consider the increased weight and importance of Asian countries, chiefly China and India, and strengthen cooperation with these economies.

Israel must specialize in innovative, creative activity: creation of intellectual property on the one hand, and business model innovation for services and traditional industries, on the

other. Cooperation with the rising economies is an important source of growth that provides the economy with high added value.

As a participant in the global world, Israel must participate in efforts to curb environmental decline and world climate change. Addressing this challenge involves high costs for Israel's economy but also offers many new opportunities in the fields of research and business.

Another important arena in the global economic system is that of global companies, whose headquarters are located in the mother country, while sales, production, marketing, research and development and capital-raising activities are dispersed over many countries. Creation of large global companies centered in Israel may afford many advantages to Israel's economy. Today Israel has about 15 industrial corporations whose sales exceed \$1 billion annually, and which have clear global characteristics. About 15 additional services companies have the potential to integrate into the global corporate world (especially in the fields of communications, transport and energy) and have sales exceeding \$1 billion annually. Our objective in this realm is to grow at least one additional Israel-based global company a year whose sales exceed \$1 billion annually, and three additional Israeli global companies every ten years whose headquarters are in Israel and whose sales exceed \$2.5 billion annually. A further objective is for growing at least three additional new Israeli companies based in Israel and whose sales exceed \$5 billion annually, one of which reaching sales of \$10 billion annually, over the next twenty years. Creating the macro-economic, physical, legal and regulatory conditions that support domestic and global investment in Israel will facilitate this desired development. If these conditions are created, corporations will be developed whose primary business is sales of products and services in international markets, rather than sales of companies and transfer of knowledge abroad. The Israeli economy will certainly benefit from this.

The advantage of creating global corporations goes beyond expanding exports; the process also provides Israeli companies, executives and employees with the opportunity to become familiar with world markets, accumulate world-class management skills and technological knowledge and expand access to the world capital market. Not only the global company enjoys these benefits, but its local service providers do as well.

3. Adopting Innovation's Competitive Advantages

In a world of ever-increasing competitiveness, in which yesterday's competitive advantage disappears with the advent of new, more effective competitors, innovation is the stable factor whose presence can ensure an economy's high ranking in the world market, economic prosperity and increased standard of living. It is fitting to clarify the meaning of "innovation" which has been presented as a necessary condition for the Israeli economy's competitive

success. This term usually has to do with research and development and new technological products that capture the market, such as the cellular phone, the internet and development of new materials. But innovation has other meanings as well. It should be expanded to apply to fields beyond high-tech, even beyond the realm of production.

Innovation means instituting change and adopting productivity-increasing methods to increase productivity. Innovation is possible across various business realms: production, design, marketing, organization and overall business management. The traditional industrial and services sectors cannot be transformed without innovation in manufacturing, organization, management and marketing.

Innovation in the business sector is at the foundation of the projected increase in total factor productivity and the high growth rate projected for the coming years. Innovation is also applicable to public policy, when, following an educated situation analysis, new methods and tools are constructed that facilitate a breakthrough in achieving public administration goals for the advancement of society and economy. Innovation at its best combines the aspiration for high quality, creativity, initiative and the desire to make a contribution.

4. **Changing the Patterns of the Dual Economy: Creating a Turning Point in Traditional Sectors**

The Israeli economy's growth profile over the past two decades is characterized by high productivity and high growth rates in advanced technology sectors, which employ a relatively small number of employees, as opposed to low productivity and lack of growth in traditional sectors, which employ most of the economy's workers. This is in essence the dual economy dilemma. **We need to address ways in which to mitigate the severity of the dual economy syndrome: maintaining the momentum of growth and increased advanced technology export on the one hand, while creating a turning point in the course of growth and productivity in traditional industry and services sectors on the other.** The dual economy problem is interwoven with the serious social problem of the dual society, that is, the existence of large wage gaps that overlap with employment patterns to a large degree: higher wages for workers in technology sectors versus mostly low wages for workers in traditional sectors. Another aspect of the dualism is geographic/regional, i.e., the issue of center vs. periphery. We must search for a solution to the dual economy problem in the realms of macro-economic and sectoral policy, paying special attention to industrial and labor policy, discussed at length in Chapters VII and IX.

5. **Leveraging Technologies as a Growth Factor**

Israel was one of the first countries to adopt technology-based economic growth. Over the years, a consistent, comprehensive policy has been shaped. At its center is the Office of the

Chief Scientist, which relied on the existence of a sufficient infrastructure of graduates of university science programs and IDF and security alumni who applied high-tech capabilities in the business realm. Combining science and technology with entrepreneurship, Israel's high-tech business model has been successful, as exemplified by Israel's ranking of second in the world in the number of technology companies traded on US capital markets.

In order to create an annual economic growth rate of over 6% in the coming years, we must continue and even expand Israel's success as a focal point of high-tech industries based on leveraging R&D and technology.

However, the future economy cannot be based on the single growth engine of high technology, which produces about 9% of the output of Israel's business sector and by the broadest definition employs at the most only about 6% of Israel's employees.

Developing high technology sectors requires the provision of infrastructure and appropriate job training, which involve massive public investment. Other means have to do with the creation of support tools that encourage use of resources and capabilities for the creation and use of new business opportunities at home and abroad.

The primary factors that increase productivity and encourage growth are:

- Strengthening human capital and realizing its potential
- Maintaining ICT (Information Communications Technologies) advantages
- Creating close cooperation between science and technology
- Building new fields with business potential
- Entrepreneurship and innovation
- Maintaining a significant share of companies' management and activity in Israel

The government is involved in activities that advance knowledge and technology: supporting basic research and creating a research infrastructure, and directly promoting technologies and R&D. Government support should focus primarily on basic research and basic development, in which the business sector invests less because of their high-risk level. Government assistance is also justified in view of the considerable external benefits offered by these activities. Less risky applied development should be under the responsibility of the business sector. In the past, Israel's governments have made significant contributions to the shaping of Israel's R & D and its high technology industry. This contribution was based primarily on taking the role of lead user/client/developer of advanced military technologies; creating the Office of the Chief Scientist in the Ministry of Industry, Trade and Labor; and creating

an Israeli venture capital fund industry. It is important that this government contribution continue in the future as well. On these issues, as stated above, government intervention is economically justified, and past government activity has seen considerable success.

6. R&D Dilemmas for the Coming Years

Israel's entrepreneurial high tech sector is thriving, enjoys leading world-wide status, especially in the field of ICT, and conducts excellent R&D in many fields. There is, however, an increased sense that today's achievements are the fruit of past investments in research, a combination of external factors and judicious past policy. Concerns increase regarding Israel's future status in the high-tech realm, particularly in view of the probability that over the next twenty years and beyond, technological innovation will extend further than ICT, and will emanate from interdisciplinary basic research at universities, in the bio/nano/materials/chemistry fields, through Convergent Technologies. Israel faces a number of dilemmas in the area of advanced technology for the coming years:

- Budget cuts made in scientific research in recent years, totaling a cumulative cut of about 20% in university budgets and under-budgeting for research and designated support programs for Science-Based Industries such as bio-technology, agriculture, space, alternative energy and more.
- Decreased comparative advantages vs. EU or Eastern Asian countries that are currently making huge strides in high-tech sector development, some of which emulate the governmental R&D policy that Israel has employed for years.
- Most of the government expenditure on R&D support focuses on R&D in technological industry R&D (some NIS 1.2 billion in 2005, constituting some 30% of government R&D expenditure, including over 60% in ICT sectors and support for university research). This is the case despite the fact that that all manufacturing sectors together produce only 22% of the business sector's product in Israel. The challenges of globalization and maintaining Israel's competitiveness in the new competitive world will require making changes in the formula of R&D activity. Government expenditure on R&D objectives for the public good, especially in fields such as agriculture, environment and public health, is very low as compared with other countries.
- Government policy for supporting civilian R&D in Israel was characterized from the outset as "neutral": uniform criteria were set for selecting eligible applications for support, without explicitly or purposefully preferring one sector or another. However, the national system was inclined towards certain sectors, especially in the security field, emphasizing ICT sectors. Future policy must consider a mixed approach whose primary focus is creating a new formula for government involvement. The primary share of R&D

funds should continue to be allocated according to the principle of neutrality; however, the external benefits of varying intensity that are provided by investing in different sectors need to be taken into consideration. This policy will require creating a mechanism that will assess and weigh the external benefits.

- Government must finance policy research that is intended to reduce government **development** budgets for businesses, while transferring this funding burden to the market. At the same time, government must significantly increase state **research** ("science") budgets, as well as budgets for basic development.

7. Vulnerable Sectors, Income Disparities and Poverty

One of the toughest problems facing Israeli society and the economy as well is the considerable income gap, among the largest among developed countries, and the wide dimensions of poverty, with more than one-third of Israeli children living under the poverty line. The two phenomena are closely linked. Both are related to the lack of appropriate job market skills, especially a lack of education⁴. Unemployment and non-participation in the labor force are primary causes of poverty. Families with two working spouses have a poverty rate of only 3.4%. Workers who lack progressive job skills often suffer from employment instability, are pushed to the bottom of the wage ladder, ejected from the labor force, and often despair of chances of finding work. Reducing income disparities is a long-term process linked to reforms and improvements in the education system, expansion of general education to groups that distance themselves from it (especially ultra-Orthodox men), and technological leveraging and increasing productivity of traditional industries and services. We reiterate that in the short term, the number of foreign workers must be significantly reduced, which will lower unemployment and increase the wages of low-level workers. Changes must also be made in labor policy, to be derived from the various needs of diverse groups in the population.

A policy that reduces income gaps will also help decrease the magnitude of poverty. But reduction in the prevalence of poverty may be achieved more quickly than significant reduction in income disparities, especially among populations that are unable to work. The elderly and the severely disabled must be removed from the poverty circle through the use of a benefits policy. We must refrain from reinstating the Law for Families Blessed with Children as a way to deal with the extensive, problematic phenomenon of poor children. Restoring larger child benefits would indeed ease large families' situations in the short term, but in the long term would worsen the problem of poverty and increase income disparities. These benefits negatively impact on the will to work, stand in the way of attaining work

⁴ Among the factors that contributed to Israel's broad education gaps was the failure of the school system. Only about half of students who complete high school are eligible for matriculation certificates. In addition, for cultural and political reasons, some sectors in society fail to provide many of their youth with education that prepares for the labor market.

skills for parents and their children, and condemn a growing population to dependence on state institutions. It can be said that in the short term, children of poor families gain benefit primarily from public investments in their education and welfare, manifested in raising the employment rate and increasing workers' wages at the lower end of the wage scale. We cannot delay taking action towards a more just society. We have considerable ability to take steps toward this goal, but we must keep in mind that policy that addresses the causes of the social crisis rather than merely its symptoms will produce results only after years of action.

The government's decision in 2007 to adopt social objectives, in addition to economic objectives, was an important step emphasizing the urgency of poverty reduction. The government's chosen objectives are: to increase employment and reduce poverty (Chapter IX presents targets for labor force participation and employment). The government's short-term poverty-reduction objective is to raise the income of the lowest fifth of the population by 2010 by 10% beyond the growth of GDP per capita, meaning that the income of a household at the bottom fifth will increase by about 16%. In attaining this objective, the fruits of economic growth will trickle down to the weaker strata, even if this objective is not achieved in the initial stage by market mechanisms alone but rather through government intervention as well. In the long term (beyond the latest government program), the desired relationship between the income of the lowest-income segments and the average income should be attained primarily by increases in income from work, and less so through benefits.

Reducing inequalities in income distribution will be facilitated by making progress in the three directions noted below:

- **Decreasing Wage Disparities.** Leveraging technology in traditional sectors will increase their productivity. As a result, employees' wages will rise, which will reduce disparities in wage distribution. Expanding and improving the higher education system and instituting changes in high school education will deepen and broaden the investment in human capital as well as reduce wage gaps that stem from high returns for education and the inferior status of the under-educated in the labor market. A significant cut in the number of foreign workers will reduce the supply of under-educated workers. This step will increase the wages of employees at the bottom of the employment ladder, increase employment and also contribute to reducing wage gaps.
- **Increasing Labor Force Participation.** Increasing the labor force participation rate should be achieved by the following means: Labor policy should facilitate the integration of various population groups into the labor market according to their special needs (particularly ultra-Orthodox men and Arab women); refrain from providing benefits that release those able to work from the need to do so; and increase the proportion of people

who have an appropriate education for the labor force. All of these will increase the labor force participation rate from 55.6% in 2006 to 60% in 2028. Increasing the potential participation rate by about 4.5 percentage points is an essential condition for achieving our social and economic objectives.

- **Reducing the Unemployment Rate.** Accelerated growth and investment in the human capital of the under-educated will increase demand for low-level workers. The significant decrease in the number of foreign workers will reduce the supply of low-level workers. The combined impact of increased demand for workers and reduced supply of foreign workers will encourage employment of Israeli workers and lower the unemployment rate from 8.4% in 2006 to 4.4% by 2028.

8. Labor Policy and the Poverty Trap

Globalization and the sweeping technological changes significantly changed the labor market and role of public labor policy. Israel's main economic challenges include a low rate of labor force participation, high unemployment, and job instability for low-level employees. A low employment rate is a major cause of poverty. Thus, labor policy must first address raising the employment rate and increasing employees' job stability. Traditional labor policy does not deal adequately with these challenges. It relies primarily on employment bureaus that no longer serve as effective work brokers and vocational trainers and whose roles have become very limited. On the other hand, the Mehalev (Wisconsin) Program has attempted a new, more effective approach for placing workers at the lower end of the job market. Given the stratification and multicultural nature of Israeli society, labor policy's important roles in the global era are helping to increase labor force participation by removing barriers to entering the job market for low-skill groups; facilitating job persistence and assisting employees in work transitions. New labor policy is only one of several means designated to increase employment and economic productivity rates, achieve more balanced growth and reduce poverty.

Israel requires a new labor policy that fits the needs of the Israeli economy in the age of globalization. Such a policy will maintain the balance between economic and social objectives in the labor market; increase the participation rate among traditional groups; remove barriers to integration into the labor force; and promote life-long learning systems. The state will share in workers' job transition risks, in accordance with their needs and job status.

The new labor policy is an active policy derived from the needs of different populations and pays special attention to the soft job skills that are needed as the economy becomes more services-intensive. A coherent labor policy is directed not only towards the unemployed and non-participants, but also includes protection of employees at risk, temporary workers, low-

entry threshold and part-time workers. The policy will emphasize the supply side in of labor market, i.e., assist those wishing to join the labor force, while placing much less emphasis on the demand side, generally avoiding subsidization of employers to increase the number of workers they take on.

For this policy to succeed, we must restore the Labor Ministry's ability to determine and manage labor policy through pooling units that deal with policy from within the state service. An independent Labor Ministry will manage the Mehalev program, coordinate activity with National Insurance and the Welfare Ministry, and cooperate with civil society organizations.

In the coming years, increasing labor force participation must be a central aim of labor policy, in addition to placing the unemployed. Participation rate distribution by population groups demonstrates that the rate of non-participation among Arabs and the ultra-Orthodox is high and signals a sizeable future risk.

The participation rate should be increased through specialized interventions that create intervention baskets per defined population. That is, management through population groups. Apart from Arab woman and ultra-Orthodox men, important groups include the disabled who are able to work, single mothers, young people, and older individuals between ages 55-65, many of whom have low personal capital. Policy must focus on increasing the level of education and removing the barriers faced by each of the groups.

A crucial step in lowering the unemployment rate and increasing the participation rate is the significant reduction in the number of foreign workers, restricting their numbers to 3% of the labor force. As regards Arab communities, new Ultra-Orthodox communities and the geographic periphery, labor policy and regional development appropriate for their unique challenges should be employed.

9. The Arab Sector

The Arab sector in Israel suffers from ongoing underdevelopment as compared with the Jewish population. There are various reasons for this: many years of discrimination by government, alongside the existence of separate traditional cultural frameworks and a separatist nationalistic approach by some part of the Arab minority. We believe that forceful action is needed to change the state of the Arab minority in Israel and to fully integrate it economically and socially. The Arab population constitutes about one-fifth of Israel's population, and its relative proportion may increase in the coming years. This sector's economic and business potential is considerable. Israel must not neglect such a large proportion of its population or refrain from improving its situation and economic and social contribution. A sound economic partnership will contribute to transforming Arab society in Israel, as well as to Jewish-Arab relations and to Israel's economy. The proposed course of action must start with increased

awareness on the part of government and Jewish civil society to the Arab sector and its unique character. Action must combine regional development policy with employment policy, in accordance with the Arab sector's needs. It must be based on eliminating discrimination, understanding differences in business conduct and recognizing the Arab sector's unique needs, as well the difficulties and limitations it experiences within the majority population's spheres of employment and business. Obstacles relating to conducting business should be removed, thereby revealing this population's productive capacity, not merely its consumer power. As long as this sector is involuntarily and voluntarily segregated from majority Israeli society, social gaps will be perpetuated. Data on poverty demonstrate the difficult economic situation of the Arab population in Israel. In 2006, 54% of the non-Jewish families in Israel lived below the poverty line (as compared with 14.7% of Jewish families). The Arab population is mostly at the lower, traditional end of the employment ladder, in agriculture, industry and services. Even academically-educated Arabs have difficulty integrating into their acquired professions, due the obstacles standing in their way. This situation prevents the development of the mobility necessary for improving their economic and social status. The broad dimensions of poverty in the Arab population can be attributed in large part to the extensive non-participation of Arab women in the labor force. Their labor force participation rate is very low: less than 20%, as compared with about 50% of Jewish women. Working Arab women are paid low wages, due to their lack of appropriate education for the labor market and their preference to work close to home. The desired course of action would be to open new kindergartens and nursery schools, expand vocational training and subsidize suitable public transportation from Arab villages to centers of employment. The import of foreign workers dealt a serious blow to employees from the Arab sector, as foreign workers filled their traditional occupations, in agriculture (especially women) and construction (men), and pushed Arab workers out of the labor force. Lowering the number of foreign workers will benefit the Arab sector, and initially, will increase Arab workers' participation rate and earnings capability.

10. The Education Continuum: from Kindergarten to High School

The quality of the school system, from early childhood to the end of high school, is no less important for the individual and society than the quality of the higher education system. The stages of education from kindergarten to academia are built as links in a chain. One link's weakness impairs the strength of the entire system. In determining which issues would be addressed in detail, the steering committee relied on the existence of the Dovrat Commission report. Therefore, a special chapter was not devoted to formal education (K-12 to use the American term). However, the topic's special importance, and the education system's failures require that we present here a number of principles relating to its improvement and repair.

Education is a multifaceted process that contributes to shaping the student's character, teaches social skills, provides tools for learning and creative thinking, and imparts knowledge in diverse fields – the humanities, culture, science and technology. In today's world, schooling and education are an essential condition for social integration. i.e., moving away from the margins and acquiring active, influential participation in the social, economic and political experience. In the global world, education's importance and its contribution to the individual's income have increased significantly. World-wide, the income gap has widened between educated and uneducated persons. Mainly those who successfully complete the earlier stages of education can enter the gates of post-secondary and academic study. Education that fulfills its role successfully, positions its graduates at a good starting point for a life of social integration and economic well-being. **It is, then, quality education that substantiates the concept of equal opportunity.** Education is the essential condition for reduction of income gaps in the long term. The more deficient the student's home and family economic conditions are in the realms of education and knowledge, the greater the need for the formal K-12 education system to fill in the gaps.

10.1 Quantitative Data

In 2005, the overall public expenditure on education was NIS 53 billion (current prices), constituting 8.4% of the GDP (the lowest rate since 1993). Current national expenditure for educational institutions according to the 2003 education ranking is distributed as follows: preschool education – 10.7%; elementary education – 33.2%; different types of secondary education – 31.2%; post-secondary/higher education – 24.9%.

In the 2006/2007 school year, 1,438,000 students studied in elementary and secondary education, of them 1,066,000 Jewish students and 372,000 Arab and Druze students. 62% of Jewish students were enrolled in the state school program, 19% in the state religious program, and 19% in the ultra-Orthodox program (in the 1999/2000 school year, students in the ultra-Orthodox program made up 15% of Jewish students). In 2006/2007 there were 124,000 elementary and secondary teachers, 68,000 in elementary schools and 56,000 in secondary schools.

10.2 The Education System: Challenges and Risks for the Future

Evaluating the outcomes of elementary and secondary education is a complex issue. The measurable outputs of the system include academic achievements as reflected in national exams and international comparisons, the matriculation eligibility rate upon completion of 12th grade, and the proportion of students accepted into university. The system's academic achievements are low, and are apparently regressing. International math, science and literacy exams (conducted in the framework of TIMSS) demonstrate

that the Israeli fourth- and eighth-graders' average scores were very low as compared with those of other countries participating in the exams. The achievement gap among Israel's students was also higher than in most participating countries. As in employment and income, here too, Israeli society's fault line runs between the Arab and ultra-Orthodox groups on one side and Jews from the majority population on the other. The achievements of Arab and ultra-Orthodox students (of high school age) are significantly lower than those of the majority population. The results of the exams also indicate that among outstanding achievers, Israeli students place low in the international ranking. These results, which have persisted over a long period, indicate that many Israeli children will have difficulty attaining the knowledge required for participation in the global economy. They also show that the broad income gaps will increase, unless a significant effort is made to enhance the level of elementary and secondary education. Another worrisome outcome, consistent with the results of the international exams, is the rate of students eligible for a matriculation certificate among those who complete 12th grade – 54%⁵ (the low eligibility rate can be partly explained by the ultra-Orthodox sector's avoidance of general studies, as the community is not interested in providing its students with a "secular" education; see note 5). In the estimation of the plan's authors, the eligibility rate for matriculation certificates must reach 75% of the relevant age group, in order to meet the growth and higher education targets derived from it. This large gap between what is required and what exists cannot be bridged without far-reaching change in the standards of elementary and secondary education.

Other outcomes of the educational process are not quantifiable: shaping students' character, providing moral values, teaching cultural values, providing social skills and teaching social commitment. However, they are apparent and tangible in various other areas, and are cause for great unease. They are evident particularly in the increase of violence among youth, the drug and alcohol culture, the use of poor language, and the departure from general and Jewish cultural assets. School is not the only factor that shapes its students' character, but is one of many, including the home, the nearby surroundings, the social and political space, and the escalating flow of knowledge and ideas transmitted through modern information technology.

The failure of education in the global age has far-reaching implications. It seriously damages the individual's development and chances for social integration, a fair standard of living and social and economic mobility. The failure of education worsens gaps in

5 This total percentage was distributed as follows: Jews: general and religious track– about 62%, ultra-Orthodox track– 9.1%; Moslems - 44.9%; Christians - 63.9%; Druze – 50.3%. In order to attain the 75% eligibility target, and assuming that the ultra-Orthodox eligibility rate will not increase, and assuming also that the remaining groups will increase their respective eligibility rates while maintaining the existing relationship between the various groups' (except for the ultra-Orthodox) rates, the required eligibility rate for non-ultra-Orthodox Jewish students would be 87%, which is not feasible. If the proportion of ultra-Orthodox students increases as it has in the past, then the required rate of eligibility among non-ultra-Orthodox Jews will be near 100%.

education and tradable knowledge. Thus, it damages social cohesion and perpetuates income gaps, including disparities among ethnic groups, and between the center and the geographic periphery. In the age of globalization, when nearly everything is open to international competition, from the goods and services market to the capital and labor markets, and billions of workers offer their skills in a huge international market without borders, we are decreasingly able to hide behind the walls of customs and administrative protections in order to defend the jobs of employees lacking in competitive skills. An elementary and secondary education system that does not prepare its graduates for post-secondary education, nor equip them with a tool box that is appropriate for the global labor market, is abandoning them to a life of poverty in the margins **of society**.

10.3 Main Improvements Required for the Education System

This short survey does not purport to encompass or even approach exhaustion of the issue of necessary educational system reform. In 2005, the National Task Force for the Advancement of Education in Israel (the Dovrat Commission) appointed by the Minister of Education, proposed a national plan for education in Israel, called the Plan for Educational Reform. This plan has yet to be implemented. We shall present here the chief issues of the educational system that require, in our understanding, improvement or change.

We will address the following three main issues that determine the quality of school education: inequality in education; teachers' quality and compensation; and classroom overcrowding.

10.4 Public Education

Public Expenditure on Education – Public Consumption or Investment. The saying that expenditure on education is a long-term investment is a conventional idiom. However, according to accepted economic classification, current expenditures in the education budget are considered public consumption, not investment. Such is also the treatment of education expenditures in the considerations for setting the state budget, the deficit and the public debt. In fact, **expenditure on education is one of the highest-yielding public investments in the global age**⁶. In every decision regarding the size of public expenditure on education, long-term outcomes should be considered. Some of these outcomes are economically quantifiable, with a measurable relationship to education, such as contribution to economic growth and reduction of income gaps. Others are not quantifiable, such as enhancing social cohesion. For some outcomes, the relationship

⁶ This general statement leaves out the question of resource allocation within the education budget. Some spending items in the education budget have, apparently, much higher returns than others. Apparently, allocation is excessively biased in favor of administration and supervisory expenditures as compared with actual school expenditures. It also leaves out the question of appropriate management of the system.

is indirect and difficult to pinpoint, such as increasing compliance with the law and reducing criminality and violence in society. The quality of education and the extent of investment impact upon the individual's quality of life and standard of living as well as the face of society as a whole.

- **Public Education – Backbone of the Education System.** Israel's education system must be based on the public school system, which affords each student equal opportunity to receive a high level of schooling and education and to obtain fundamental values. Public education is the backbone of the entire system, and must be the highest priority for resource allocation. A major problem to be addressed is the collapse of the historic educational streams created during the 1950s, into numerous sub-streams within general state education, state religious education and ultra-Orthodox education. This divergence into numerous streams is a direct result of public education's failure to respond to the educational challenge of the global age. While ostensibly, this divergence indicates pluralism, it is really no more than the penetration of private education, whose quality is derived from parents' ability to pay, and the rejection of a more egalitarian public education.
- **Conditions for Supporting Non-Public Education.** Receipt of state funding support by non-public educational institutions will be contingent upon assessment of their implementation of educational and learning objectives. The percentage of support will be determined by the extent to which they incorporate general education, train for skills that facilitate absorption into the labor market, teach humanistic and democratic values and accept students in a non-discriminatory fashion.
- **The Right to Complete One's Education.** Israeli society cannot leave behind large groups of young people who lack a general education. Therefore, any graduate of an educational institution that does not provide core curriculum studies should be enabled to complete his or her education if he or she so chooses, at a later age and at the state's expense, in special frameworks to be created for this purpose. Each child has the right to a general education, regardless of the educational institution in which he or she studied.

10.5 Inequality and Education

The only way to preserve public education for all children in Israel is to improve education and teaching. The decline in the quality of teaching and education expedites the process of *de facto* privatization of education, even without a formal decision to do so, by creation of special schools, expansion of the education "basket" in prosperous areas through

parents' funding, private lessons, private purchasing of learning tools, higher budgets per student in more affluent local authorities, and more. The government education budget per student is more egalitarian than the national education expenditure per student. The gap between the two results from more economically prosperous parents' spending for their children's education. The inequality in the national expenditure on education has deepened the gaps between prosperous and lower-income groups. **In a global world, social mobility is achieved primarily by the route of schooling and education.** Schools must provide all their students with a starting point as equal and convenient as possible. Improving public education will provide a better starting point for children with disadvantageous home conditions. At the same time, it will make superfluous some of the monetary investments made by wealthier parents for their children's education, which were intended to compensate for under-investment in the public education system.

10.6 Teacher Quality and Compensation

Research done in various countries has shown that the single most important factor determining the level of education is the quality of teachers and administrators. Requirements regarding the level of teachers' education need to be made more stringent throughout the system's stages, as should the selection process for teachers' acceptance into the teaching profession. Teachers' in-school working hours should be increased, as recommended by the Dovrat Commission. At the same time, teachers' salaries should be significantly increased. Many talented, dedicated teachers are willing to teach despite poor compensation because of their love of the profession and their sense of calling in working with children and youth. However, the supply of teaching manpower is subject to the same considerations as those that apply to other occupations. Increased wages will attract quality manpower that today does not see its future in teaching due to low wages. Because of the state's nearly-total control over the wages of teaching staff, this sector's wages are not subject to direct competitive considerations as compared with wages of professionals with comparable education in the business sector, but rather mostly to budget considerations. Government could not afford to behave similarly as regards the wages of employees with similar levels of education, such as for example, lawyers or economists, as a rapid exodus would ensue of talented employees from the public to the private sector. In the case of teachers, the process of leaving or altogether avoiding the profession is more protracted and obscure, but does exist, and is manifested in the quality of education. Governments are willing to accept a level of teaching in public education that private individuals with sufficient means would not be willing to accept for their children in free market conditions. Education and schooling are the most important factors in providing equal opportunity in society, therefore each child in Israel must receive high-quality education. This is contingent

upon the payment of appropriate wages for teachers, comparable to wages paid to other public service employees at similar educational levels. As the number of teachers is large, such a change would make a significant impact on the economy, not only from a budget perspective, but primarily in terms of competition over quality manpower among different economic sectors, and within the public sector itself. It would also restore the balance to the employment equilibrium, which has long been disturbed, to teachers' disadvantage.

Alongside increasing teachers' wages, improving their terms of employment and enhancing the attractiveness of the teaching profession, the standards of teacher training and absorption into work need to be made more rigorous, and administrators need to have at their disposal more effective tools for school management.

10.7 Classroom Overcrowding

There is significant variance in the number of students per class throughout the school system, among different regions and educational streams. Classroom overcrowding impairs teaching and education. It particularly damages the relationship between the teacher and the individual student and the teacher's ability to personally relate to each student's unique needs. The personal relationship is an important part of the educational and learning process. Different students have different needs. Some have difficulty understanding the learning material; others excel and require special challenges. Students grapple with various personal difficulties. All of these require special attention and teachers' personal investment. Such investment is impossible in overcrowded classrooms. Controversy exists as regards the effect of classroom crowding on students' achievements. There is however, agreement that lower classroom density is important primarily in the lower grades. The number of students per class must, therefore, be lowered, first in the lower grades, wherever crowding is currently high.

Easing overcrowding is a step that involves investment in construction beyond natural population growth, as well as in training additional teachers. This should be done in a gradual manner, beginning as soon as possible. It will be necessary to ensure that the reduction in classroom crowding and the subsequent increase in the number of teachers do not impede the required process of enhancing teachers' qualifications.

11. Higher Education and Scientific Research – a Boon for Growth

The economic forecast for the next two decades is based on continued rapid growth of advanced technology sectors and technological advancement of traditional sectors. The most important condition for attaining this objective is the extensive training of an educated workforce, and broad investment in basic research, primarily at universities, as

well as in applied and basic development, in order to maintain and even strengthen Israel's comparative advantages. The social objective is reducing income disparities, which have, as stated, reached dangerous, intolerable proportions. The essential condition for attaining this objective, without relying primarily on welfare benefits and transfer payments, is the strengthening of education and expansion of higher education, to significantly increase the proportion of individuals with academic and other post-secondary degrees among the adult population in Israel. The higher education system in its current format is far from capable of providing these standards. Its scope is insufficient, its quality has been declining dangerously in recent years, it suffers from a "brain drain", and basic research lacks the tools to preserve Israel's comparative advantages. Therefore, objectives must be set for higher education for the next twenty years, changes must be instituted in the system's structure, and public economic resources must be recruited for attaining the objectives. The main objective is nurturing the quality of the higher education and raising it to the highest international standards. We believe that public investment in the higher education system, as well as in the school system from its earliest stages, is one whose economic and social returns exceed those of any other public investment today - as long as the investment is made according to suitable priorities. **A country whose comparative advantage is its educated work force must ensure high standards and broad application of schooling and higher education.**

Israel's higher education system has had many achievements, and has made an inestimable contribution to culture, economy and security. However, the system faces major challenges and difficult problems that await solution. The proportion of individuals with post-secondary and academic educations is insufficient among the relevant age groups in Israel, certainly from the perspective of the needs of a modern economy that wishes to grow rapidly and to be based in the future on knowledge-intensive sectors and leveraging technology in traditional sectors. Increasing the proportion of individuals with post-secondary education will decrease income gaps. On the other hand, we are witness to a decline in the quality of Israel's academic institutions, as evidenced by the lowered international ranking of Israel's universities. Other inter-related worrisome developments include the decline in research budgets and the brain drain from Israel. These developments undermine the infrastructures of knowledge, culture, science and technology, placing Israel's qualitative advantage at risk.

Over the next twenty years, a world-class, quality higher education system must be created gradually in Israel, including at least two research universities whose academic achievements place them among the world's top twenty institutions. The system will include a wide array of academic institutions: elite universities, universities that confer all degrees, an open university, academic and community colleges, all of which operate side by side, nurture competition and strive for excellence, and complement each other in certain areas. This

system will allow most of the public of the relevant age groups to participate in the higher education learning experience and to acquire skills, so that by 2028 more than 75% of the relevant age group will be enrolled in the higher education system. At present, the Open University is a central instrument in increasing access to higher education for those who have not completed the required studies for acceptance into university. However, in order to achieve such broad participation in higher education, the rate of eligibility for a matriculation certificate must increase every year by 1.75% beyond the natural increase rate of the relevant age group, without compromising standards of education and instruction.

We must promote a higher education system that ensures research excellence at the level of the world's best universities, offers universal accessibility, provides equal and fair opportunity for all, and allows the individual to make the most of his or her ability. This system will be built on a number of layers and a variety of institutions, which will enjoy broad administrative and academic freedom. It will be open and friendly to students' transfer between its tiers and will charge a fair tuition, while providing accessible tools for financial aid for those in need.

One of the most serious and dangerous phenomena Israel faces is the "brain drain", that is the result of globalization's effects on the one hand and the erosion of university and research budgets on the other. The government must allocate more resources to Israel's research institutions, for running research programs and bringing quality academic faculty back to Israel. The system will ensure research excellence of the standard of the world's best universities. Additional resources will be allocated for expanding existing research funds and creating new ones.

The growth objective for the national economy requires a significant increase in the number of students over the next twenty years, from about 250,000 expected to study in 2008 to 610,000 in the year 2028.

This plan details the organizational steps to be taken and the financial resources to be allocated in order to transform higher education and scientific research in Israel (see Chapter VIII).

12. Physical Infrastructures and Growth

Advanced physical infrastructures are an essential condition for maintaining a modern economy. Infrastructure development requires comprehensive strategic planning, due to the relatively long time periods involved in planning, licensing, funding and implementation. Strategic planning of physical infrastructures is also necessary due to the need to identify and keep open options for long-term development, while protecting the rights of future generations. Absence of long-term planning, absence of a national infrastructures strategy and the absence of an institution responsible for all infrastructure planning, impedes future growth, in view of the unrequited demands expected in these areas. Physical infrastructure

includes land transportation (roads and railways), air and seaports, energy, water, and an engineering manpower infrastructure in the construction and infrastructure sectors. **Making errors in the realm of infrastructure construction may create irreversible physical obstacles to planning options for future generations.** We must not leave future generations with a transportation/economic/social lag. We must create advanced infrastructures appropriate for a state that wishes to belong to the society of leading nations. A government body must be created for interdisciplinary strategic planning, with centralized authority for multi-annual resource allocation for planning and implementation. Development of infrastructures must be sustainable, that is, development that responds to environmental concerns and requirements.

The infrastructures sector is an economic sector in itself. It constitutes an accelerating factor in economic growth, but its planning must be broadly integrated with additional policy components. Transportation infrastructure is currently a bottleneck of economic growth. Judging by current trends, the situation will become even worse in the future. Land transportation plays a crucial role in driving the economy, determining quality of life and the welfare of the state's residents. Israel's motorization rate per thousand persons is among the lowest among developed nations. Density on the roads, however, is among the highest. High transportation density has a negative impact on humans and the environment. Development of transportation requires deciding between different types of land transportation and integrating them, and deciding on land use for transportation and other uses, including ensuring open spaces. Developing transportation according to national needs and priorities will require advance central planning of land use, professional training of manpower able to handle sophisticated transportation systems expected to be developed in the not too-distant future, and decision-making regarding the scope of public investment in transportation, among other questions.

Investments must be made in other infrastructures as well: ports, energy and water, in order to bring them up to standards of reliability, quality and efficiency appropriate for Israel's economy's participation in the global system and for the high standard of living that characterizes a leading economy. In each of these realms, we must assess our needs and the alternatives, employing a comprehensive systemic approach. Chapter XI discusses the required policy by a long-term perspective.

13. Environmental Quality and Sustainable Development

Continuous growth and the rapid increase in per capita income create increased pressure on Israel's natural resources. The characteristics of a modern economy - industrialization, increased electricity production, and increased motorization - are primary causes of environmental damage. The national objectives and the proposed strategy of rapid economic

growth, population growth, increased consumption and standard of living, increased industrialization and level of motorization, all present considerable challenges for Israeli society, which lives in a limited geographic region among the most densely-populated in the world. Unless appropriate environmental policy is set, the growth of the Israeli economy will come to a halt. Israel must be involved in the growing concern for the earth's ecological deterioration, and participate in actions to counter it. Ecological footprint analysis indicates that we are "overdrawn", at the expense of future generations. Integration into global processes requires more stringent standards and enforcement, vigorous implementation of environmental policy, and raising awareness and education regarding various environmental issues. Protection of public space in as densely-populated a country as Israel requires initiative for environmental consciousness-raising among the public. Awareness must also be developed in the urban space where most of Israel's residents are concentrated, as well as in rural areas and open spaces, that serve as recreational and vacation sites. The environmental protection objectives that Israel must set in order to gain improved quality of life are integrated in the global objectives set by international organizations, to which Israel belongs or aspires to belong, chiefly the OECD. The realm of environmental protection is one of the prominent areas in which there is a large gap between social and individual benefits; therefore there is a need for a clear public vision and active public policy to address the issue for the public good. Comprehensive environmental policy must be based on sustainable development, meaning internalizing environmental considerations as regards decision-making and setting national objectives across economic and social realms. This includes the issue of the necessary coordination between Israel and the Palestinians as regards water, land and air pollution prevention.

The required public policy encompasses numerous realms: provision of economic incentives for use of clean technologies and development of renewable energy; judicious use of infrastructures, protection of open spaces; adapting the taxation system to calculate external costs of sustainable transportation; national waste policy that emphasizes sustainable treatment of hazardous waste; efficient use of water resources and developing quantitative measures to measure changes over time on environmental issues.

14. Meeting Objectives and Public Sector Quality

A country's economic success is closely related to the quality and professionalism of its public administration that serves it. This is all the truer in present-day Israel, where government is required to plan and implement far-reaching economic and social changes, from schooling, higher education and physical infrastructure to productivity-encouraging industrial policy, all of which must be done in conditions of uncertainty, given a rapidly-changing international environment and security pressures. The success of public policy depends to a great extent

on the quality of public service personnel; the degree of professional knowledge at the disposal of public employees; the efficiency of decision-making processes; the follow-up and monitoring of implementation; and the quality of public service's communication with civilian, non-governmental agencies. In a years-long process, Israeli public administration has been weakened, its professional knowledge has dwindled and government has lost some of its powers. Some government functions have been transferred to civilian bodies that concentrated knowledge as well as deliberation, planning and implementing capabilities, which public service lacked. In these conditions, public administration needs to be strengthened, as does, in turn, the government's ability to successfully fulfill its complex tasks. Special attention is to be devoted to government decision-making processes and to the status of the headquarters staff of the Prime Minister's Office and of professional staff units in government ministries that assist the Prime Minister and the entire government in shaping policy and decision-making (see Chapter V).

Israel's ability to meet social, security and economic challenges will be affected by the overall functioning of Israel's institutional system: the political system, the governmental structure on integrative issues, technocrat professionalism and ongoing government processes. All of these affect the state's ability to promote long-term strategy. But even if changes are made in the political and governance systems, the public system's performance will not be adequately enhanced unless institutional changes are made in public service as well. Israel is among those countries that have not yet undergone all the institutional changes required for the global economic and social world of the 21st century.

As representatives of the state and its citizens, employees of the public service are responsible for being the leading professional force in the shaping of socio-economic policy. They serve as the system's backbone over time, in times of normalcy and especially in times of crisis. For the state to take back the reins and to properly fulfill its roles in managing the state's business, it is essential that the professionalism they enjoyed in the past, as well as recognition of this professionalism, be restored to public service employees.

Public service's primary objective today is the rehabilitation and strengthening the mechanisms of deliberation, planning, and institutional communication at the governmental-national level. For years, public service has undergone processes that have weakened and eroded its performance. The primary processes were reduction of public administration's realms of responsibility; decline in its knowledge and its employees' professionalism; weakening of its supervisory mechanisms; public service employees' hesitancy in taking initiative due to giving excessive weight to legal concerns; unsuitability of the service to the age of market economy, and more. These processes, as well as globalization's impact, have created the desire in Israel to institute reforms aiming "to create

a government that works better, costs less and achieves better results." To date, however, no such reform has been made in Israel.

The goal of the proposed changes is to enable the government and its leader to perform better given the challenges and the social and economic complexities expected for the coming years. The recommendations include institutional changes that will contribute to improved decision-making and implementation processes, as well as public service employee development.

The reform will take a process-oriented approach rather than isolated structural changes. It must be carried out in close cooperation with the public service employees, who should be engaged in restoring their knowledge and responsibility, in order to improve government performance and together with them to determine the appropriate content among the following recommendations. It should not be done by merely dictating definitive changes from above.

15. Governability: A Quality Economic and Social System is Based on an Efficient, Fair Government

Achievement of qualitative economic growth objectives must be accompanied by corresponding steps towards the high level of governability that characterizes the world's leading economies. A state that aspires to be counted among the leaders of the world economy must have at its disposal an excellent government system. It cannot accept a mediocre system, nor be complacent in the face of official corruption or breaches of the rule of law. While this plan does not address the political system, it cannot be denied that the system of governance is a significant factor in government shortcomings and in the existence of political corruption. Increasing soundness of government and preventing corruption will also require making changes in the system of governance and the political culture that the system has created.

There currently exists a gap between Israel's high economic capabilities and its numerous poor measures of governability. In order to keep Israel's macro-economic policy achievements and its economic stability, attention should be focused on issues of irregularity in government and unsatisfactory institutional performance as growth-impeding factors. In a global world, decisive treatment of these issues produces very high economic returns. An efficient, fair government must ensure law and order, prevent violence, prevent corruption, ensure transparency of government and the democratic process, and ensure equality in regulatory processes. Transparency in the government's work vis-à-vis citizens, business owners and investors is an important factor in increasing the effectiveness of government performance and economic performance in general. **A more efficient government will create conditions**

enabling stable, sustainable growth and will be able to achieve its social objectives more easily. A worthy government sets its system of national priorities in a clear, transparent manner.

In order for Israel to participate in the global process, and in particular, to join the OECD, it must adapt its legislation and rules of conduct on crucial issues, to what are customary in developed countries. This should be done, for example, as regards the struggle against bribery and corruption (which requires signing of the treaty against bribery); clearly defining "conflicts of interests" vis-à-vis public employees and elected officials, in order to establish citizens' trust in the integrity of those acting in their name and on their behalf; preventing nepotism in public appointments; reducing the number of political appointments in public service; regulating lobbying in the government and Knesset; and increasing transparency of information to the public regarding political donations. In various realms, transparency along with public auditing may substitute for regulation.

Bureaucracy is the foundation of government. It must be professional, while faithfully fulfilling government policy, and at the same time it must act in a transparent manner in order to ensure its fairness. This may at times be like walking a tightrope, but it is essential in order to attain the government's objectives. Israel has appropriate institutions for preventing corruption, and there is no reason to create new ones, but rather to strengthen existing institutions.

The citizen's quality of life and faith in the law and the rule of law are contingent upon the existence of an independent legal system, but also on courts' efficiency, reasonable timeliness in handing down court rulings, and effective law enforcement. An efficient, corruption-free and fair government is important first and foremost for ensuring citizens' quality of life, but also for the good of the country's business system and investments from abroad. Enhancing Israel's governability will raise its competitiveness ranking and boost the lure of its economy for investors.

Continuation of Current Trends

Threat to Realizing the Vision: Avoidance of General Education and the Low Labor Force Participation Rate

General education and the acquisition of soft skills that prepare an individual for the new job market in post-industrial society are key factors in the success of any outline for growth and reduction of social disparity. On this issue, which extends to the roots of the future of the economy and society, we face a difficult dilemma. The state must provide all those capable of doing so access to ascending the education ladder, through reform in higher education as well as the earlier stages of schooling. But this is not enough. The outline requires that 75% of the relevant age group have some kind of post-secondary education. Conspicuous opposite this challenging demand is the avoidance by two important groups of attaining general or higher education that prepares for high-paying jobs: ultra-Orthodox men and Arab women (these two groups currently make up about 35% of young people). Theirs is an ideological avoidance that comes from the desire for cultural separation. The ultra-Orthodox "learners' society" is based on avoiding work and contact with "secular" general education, an inclination that receives a significant push from the conditioning of release from military service upon studying at yeshiva and refraining from work. The Moslem Arab society perceives the home and childcare as the married woman's proper domain. This phenomenon restricts the resources of the labor force in the Arab sector.

There is another aspect to keeping an ultra-Orthodox "learner's society" at the state's expense, which is not directly budget-related. Israel's state education budget bears the education system's expenditures for kindergartens, elementary and secondary schools, higher education and research. It follows that the ongoing erosion of the investment in higher education and research can be viewed as a tax imposed on the education system and its employees, in order to fund educational institutions that do not provide their students with general education nor prepare them to make decent living by work. These are not direct taxes but rather a kind of "indirect tax" that has the same effect. When, for example, academic faculty's wages or the number of jobs in higher education institutions are frozen, or cuts are made in teaching hours in high schools, or basic research budgets are cut, not for education, research or social considerations, but due rather to constraints of the state budget, including the education budget, this is the equivalent of taxation of the higher education system and its employees in order to fund, among other items, the ultra-Orthodox education system.

Due to gaps in fertility rates, the proportion of Arabs and ultra-Orthodox is rapidly rising in the population. According to existing demographic trends (fertility rates), of three populations -- the majority group (almost all non-ultra-Orthodox Jews), Arabs, and the ultra-Orthodox -- the

proportion of Arabs and the ultra-Orthodox will reach about 40% of the total population in 2028, as opposed to less than 30% currently. The share of the two groups, Arabs and the ultra-Orthodox, among children under age 14 will reach about 55%. According to the population forecast and existing patterns of labor force participation for the three groups, the participation rate will decline from the current 56% to 53% in 2028. Perhaps this development may not be attained, as it would require each worker to support a larger number of people on average than currently. The working population will not accept this reality. However, the participation figures do not demonstrate the situation in all its gravity. Among the labor force (employed and unemployed), the proportion of uneducated and unskilled workers will rise, due to the higher birth rate among groups that refrain from attaining education that prepares for the job market. The large majority of these groups' members who do participate in the labor force are either low-wage earners or unemployed. Considering that the large part of state taxes comes from mid- to high-income earners (belonging to the upper three tenths), a significant increase in their tax burden will be required in order to finance public expenditures, including transfer payments to non-participants. This economic burden on the middle class, the major contributor to national output, will increase until it becomes socially intolerable. Add to this the inequity of the military service burden, and the socially, economically and nationally ruinous results of this development are clear. We must remember that the government is not the sole player in taxation and obtaining resources from its citizens. A global society does not allow excessive tax disparities on personal income from work or entrepreneurship among free nations. If the tax burden of educated and successful workers in Israel increases in order to fund another group, a growing share of which refrains from work and from education that prepares for work, many young, educated workers from high-demand fields and with high earnings potential will migrate to other countries in order to improve their personal situation.

It is possible, then, for economic collapse to occur as a result of creeping erosion (unless social pressure to change the situation produces results before the danger is fully realized). Some of these destructive processes have already been evidenced in the reduction of public funding of Israel's higher education institutions, cuts in research funding and the decline in high school teaching hours. This scenario is the primary threat looming over our vision's realization (as it is formulated in Chapter II). However, not only is it possible that our vision not be fulfilled, but we can even expect, in this case, regression in many of the achievements of recent years. We are currently at a critical juncture that offers two alternative routes: one leading towards economic and social progress, whose main ideas are outlined and proposed in this plan, and the other leading towards a standstill or even economic and national regression, and towards existential risk.

Israeli society has the right, even the obligation, to defend itself from this development and to protect its Jewish and democratic character through the education of its young generation. A

first step in the right direction was made when benefits for children were gradually decreased in 2003, such that the amount per child would no longer increase with the number of children in the family (children's benefits that increased as the number of children in the family increased, diverted many families' priorities towards non-participation in the labor force and refraining from education that prepares for work). On this issue, we must not turn back the clock. Another protective step that the state must take touches directly upon the education system. We should avoid public funding of educational institutions that do not impart to students a general education ("core curriculum") that prepares individuals with a suitable "tool kit" for work; do not provide basic knowledge regarding the society around them; and do not educate towards humanistic, democratic values. Educational institutions that do not teach these subjects nor educate in this spirit, do not provide their students with a real opportunity to integrate into society, and greatly decrease their chances of attaining post-secondary education if they so prefer.

Special supportive action should be taken as appropriate to each of the groups, the ultra-Orthodox and the Arab, as detailed in the chapter on Labor Policy (Chapter IX). The substance of this action is in removing barriers to integration into the labor force, in a way that respects each group's cultural differences and special needs. Israel's Arab citizens make up about a fifth of the state's population. Their absorption into the labor force should be intensified, by strengthening and expanding the middle class, through improvements in the educational system and reduction in the number of foreign workers. Utilizing this group's economic capabilities, along with anti-discrimination actions taken in other realms, will contribute a great deal to strengthening its sense of belonging to the state and to its economic growth.

Part II:
National Strategy –
Economic and Social Realms

Chapter IV: Israel and the Global Challenge

Introduction

In large part, Israel's accelerated process of integrating into the global world occurred simultaneously with - and even facilitated - its recuperation from the harsh economic crisis that peaked in the mid-1980s and continued into the 1990s. As a small nation lacking in natural resources, Israel took advantage of globalization's potential, enjoying the expansion of global openness and its newly-found access to large international markets.

The relatively small size of Israel's economy does not in itself preclude the benefits of the global economy. Israel's high-value-added products, based on knowledge, technology and innovation, have indeed earned strong returns in world markets.

Two basic themes lie at the foundation of globalization's development in Israel:

Since its inception, Israel's unique **geo-political position** has isolated it from its neighbors and prevented the forming of relations with the region's countries, while creating a continuous need for maintaining international economic relations with nations outside the region. Already in the 1960s, Israel began to venture into the world economy by initiating relations with the European Economic Community, which evolved into a free trade agreement in 1975. These connections later extended to other nations, chiefly the US. Israel's unique, close relations with the US produced the free trade agreement of 1985, which positioned Israel's foreign trade in an accelerated globalization mode. In its continued efforts to participate in the global economy, Israel unilaterally reduced tariffs in 1991, in order to make the economy more accessible to foreign trade.

The 1990s saw considerable acceleration of Israel's globalization process. Israel adopted a number of measures set by the international economic community. It bound its fiscal and monetary macro-economic policy to the principles of the Maastricht Treaty and the Washington Consensus. It instituted significant foreign currency reforms in order to make the shekel a tradable currency. Capital market reforms and the abolishment of controls over foreign currency laid the necessary groundwork for attracting foreign investors. The economy's competitiveness was continuously enhanced through minor and major structural changes, privatization and the development of primarily international high-tech industries, all of which shaped the Israeli economy's global identity from the end of the 1990s into the new millennium. One of the critical events in this regard was the Israeli government's entry into the credit rating system in 1995, a move that signified a willingness to be exposed to the international capital market and to international credit rating agencies. Political agreements, first with Egypt in the late 1970s, and most significantly in the 1990s with the Palestinians and Jordan, pushed the Israeli economy forward on the international front.

As a nation dispersed throughout the world for centuries, the Jewish people have been well-served by **Jewish tradition and heritage** over the years. In recent decades, the Jewish connection has been an influential factor in the global process; the Israeli expatriate community abroad has also contributed to this process.

All of these processes are at the foundation of the Israeli economy's growing force. The global process is gradual, continuous and ongoing and will continue in this direction in the future as well.

Globalization has penetrated many realms of Israeli economy and society, creating tensions between the ethos of a global, international, open and universal society, and the reality of Israel as a mobilized society still struggling with unique existential challenges.

The particular combination of the wish to continue to enjoy the global process with Israel's unique experience will continue to be pivotal over the next twenty years. Without taking a pessimistic stance regarding the political process in the region, it appears that even if significant progress is made in the peace process, we will not attain the complete calm that could free us completely of the burden of an embattled nation in a hostile region. Survival in this part of the world cannot rely solely on well-trained military strength. It requires a strong economy and a durable society as well. In the state of Israel, a strong economy that is able to support a durable society must include a substantial global element.

At the same time, we must consider a number of undesirable social phenomena that have accompanied Israel's integration into the global economy, especially as regards the labor market and other social issues.

Globalization has substantially altered the absolute and relative returns to education. In developed countries, the wage gap between educated and uneducated workers has grown significantly. In Israel as well, the wage/income gap has increased, due in large part to globalization's impact. This impact has been intensified by migration of workers to Israel and the growth of a large market of low-cost foreign workers employed at the bottom rung of the employment ladder, in conditions inferior to those of Israelis in the same occupations. The international migration of labor has increased globalization's contribution to the broadening of Israel's income gap. Large income gaps produce social gaps, undermine social cohesion and increase alienation and despair.

Globalization also carries the threat of a "brain drain". The economic and cultural changes involved in globalization threaten the anchors that connect Israelis with their homeland. On the other hand, the developed world encourages migration of an educated, skilled and entrepreneurial work force, and compensates well for these qualifications. This product is in high demand in a global world and there is competition for such workers. Israel has a relative abundance of people whose migration would be a considerable loss of human capital for the Israeli economy and society.

Therefore, complementary action must be taken now and in the future to decrease the risks posed by the processes of globalization, and to create the economic, social, cultural and personal conditions that will enhance Israel's appeal for its educated, skilled employees.

International Experience

In recent decades, a number of European and Asian nations similar to Israel in size, some of which had a lower economic standard than Israel in the 1970s, have made great strides in their economic performance. In the framework of preparing this plan, these countries' successes and achievements were studied, and their experience served us in reaching a number of important conclusions. Four key issues were identified, in the following areas:

1. Institutions

Institutions formulate and enforce the "rules of the game". Proper functioning of public institutions is imperative for building an efficient, modern economy. Israel lags behind in this respect. Following are listed a number of Israel's areas of weakness, according to the World Economic Forum's report (the rankings are arranged by area; following are Israel's rankings out of the 131 countries that were evaluated):

Reliability of police services - 53; public trust of politicians - 42; wastefulness of government spending - 38; organized crime - 36; diversion of public funds - 33; favoritism in decisions of government officials - 32; burden of government regulation - 31; firms' ethical conduct - 31.

Many of the areas indicated above have to do with corruption and ethics. According to the "Transparency International" organization, Israel has declined in these areas in recent years. This constitutes an immediate, real threat. Investors steer clear of corrupt nations. We have found that the world leader in freedom from corruption is Finland, where a politician caught in a relatively minor ethical transgression is forced to resign.

2. Infrastructure

Israel's infrastructure standards are poor. Its land transportation density (roads and railways) is high. At Israel's ports, the cost of handling a single container is \$2000, three times the average of competitive nations. For a country whose engine of growth is exports, and which is significantly dependent upon import, the state of its ports impair economic success. Following are Israel's rankings as regards a number of its weaker infrastructure-related areas (out of 131 countries):

Quality of port infrastructure - 37; quality of railroad infrastructure - 36; quality of roads - 30.

3. Education

Israel's teachers are underpaid, underappreciated, and struggle with classes of 30-40 students (In Finland, for example, which ranks very high on competitive rankings, teachers have a Masters' degree, are held in high esteem and are well-paid. The number of students per class is twenty.). Israel's national expenditure on education does not reduce inequalities; rather, it increases gaps. The national expenditure per student is one of the lowest among developed nations. At the same time, the ratio of public expenditure for educational administration and management vs. allocation to schools and students is greater than in developed countries. The scope of expenditure per student and the structure of expenditure on education impair the effectiveness of education and teaching in Israel.

Due to the freezing of jobs offered at higher education institutions and cuts in research budgets, there is a brain drain; in a country that bases its competitive advantage on knowledge-intensive industries, this is a serious deficiency.

Following are Israel's rankings on education issues (out of 131 countries):

Quality of primary education – 30; quality of math and science education – 31; quality of the school system – 25.

4. Business Environment

Israel is perceived as a country in which it is difficult to do business. Taxes are high, bureaucracy is complicated, and the financial sector is backward and lacks sufficient foreign presence. Following are some of Israel's rankings in the more problematic areas pertaining to the business environment, out of 131 countries:

Extent and effect of taxation - 68; time required to start a business - 67; total tax rate - 42; cost of firing a worker - 107; flexibility of wages - 65; rigidity of employment - 30; cooperation in labor-employer relations - 30; brain drain - 26; regulation of securities exchanges - 29; soundness of banks - 27; restriction on capital flows - 25.

According to the World Bank's "Ease of Doing Business" indexes for 178 countries, Israel ranks only 109 in "dealing with licenses"; 87 in "ease of employing workers"; 152 in "registering property" (at the Land Registry Bureau); 69 in "ease of paying taxes"; 102 in "ease of enforcing contracts"; and 40 in "ease of closing a business". None of these defects is necessary. Singapore, for example, ranks at or near the top in all these areas. But in Israel complacency reigns, and businesses have learned to deal with impediments to efficiency, rather than attempt to change them.

In today's global marketplace, Israel competes with some 200 other countries for capital, exports, jobs and technology. Many of these countries are small, agile, focused, and have business environments that welcome foreign capital and corporations and they are improving. If Israel fails to resolve its problems noted above, there is a real risk that it will quickly fall behind its rapidly-improving competitors.

The World Economic Forum asked a sample of Israeli managers and businesspersons to list the most problematic factors that hinder them in doing business. A list of 14 factors was presented, and respondents were asked to select the five most problematic factors for doing business. The three issues selected as most problematic were inefficient government bureaucracy, high tax rates and political instability.

Taxes and bureaucracy ranked high, and both are relatively straightforward to solve. Estonia, for instance, implemented a flat-tax system: 22 % on income, without exemptions or deductions, and zero percent on corporate profits, as long as they are retained in the business. Can Israel adopt and adapt solutions to problems developed in small, wealthy, competitive countries, by adapting solutions to its own needs and situation? Such solutions are possible **if a global benchmarking mindset is cultivated, at the policy decision-making level. Israel accepts waste, inefficiency, bureaucracy, corruption and delays as facts of life, rather than as challenges that can be successfully addressed.**

The chapters of this plan address each of the abovementioned areas, and make recommendations for policy change, in order to bring about significant improvements in the economy's and society's performance and to enhance social cohesion.

Vision and Strategy

We envision an Israeli economy that ranks among the 10-15 leading countries of the world, ten rankings higher than its current standing. This is not a simple or easy objective, but one that will necessitate proactive Israeli policy in all economic, social, cultural and governmental areas, in order for Israel to become well-integrated in the global realm, while taking into consideration the small size of Israel's domestic market and its limited ability to participate in the regional economy. Increasing Israel's GDP per capita to over \$50,000 (in 2007 terms), as compared with about \$23,000 in 2007, necessitates proactive policy to integrate Israel into the global process.

Israel's participation in the global process requires providing skills to more people, businesses and organizations in Israel in order to adapt to and contend with the global world. In this complex reality, Israel must adopt a comprehensive strategy of excellence, in order to enable it strong survival ability and success in a competitive world. Excellence requires adopting standards of quality in various realms, and employing innovation in varied realms, not exclusively in

technological or knowledge-based industries. It must be broad and comprehensive, and include government and the entire business sector. Knowledge-based industries are the driving force of the economic world. Israel must continue strengthening this element in its economy in all interfacing fields: education, higher education, academic research, research and development and technology. The required conditions for realizing this comprehensive strategy are the existence of a quality competitive business system, quality government and public administration, social equality, modern infrastructures, satisfactory governability and an economic environment that supports initiative.

Principles of Policy for Integrating into the Global World

This plan has identified a number of basic principles for policy, based on international experience as well as Israel's experience over the past twenty years. These principles are necessary for participation in globalization and producing the benefits of the global process, and are common to all successful nations that have reaped the full returns of globalization:

1. A strong capacity for **economic competitiveness** that relies on high productivity. A high level of competitiveness is key for maintaining a strong, functional economy. The Israeli economy must be highly competitive in foreign as well as **domestic** markets. Israeli products must compete in world markets while maintaining competitiveness vis-à-vis international competitors in domestic markets. Maintaining competitiveness is of vital importance to the economy, comparable to maintaining deterrence capability and military capacity.
2. Implementing stable **macro-economic policy** that requires maintaining the central macro-economic parameters: price stability, exchange rate stability, keeping a balanced or near-balanced budget, and reducing public **debt** to a low level. Fiscal and monetary responsibility is a basic condition for maintaining a functioning economy under globalization.
3. Maintaining a **high level of governability**. The global world gives high marks to effective, non-corrupt governments. An effective government is a transparent government with clear, non-arbitrary regulations; effective public services run in a consumer-friendly manner; a reliable legal system that strictly safeguards the rules of private property; a complete range of economic and social rights; and an egalitarian law enforcement system that stands for reward and punishment.
4. Maintaining **reliable, accessible physical national infrastructures**. Transportation systems must be highly efficient and reliable; the infrastructure system must be modern; infrastructure services connecting the Israeli economy to the world such as sea and air ports must be open and accessible; communication services (telephone, internet, cellular, etc.) must be effective and consistent with the acceptable standards of the most developed nations; basic infrastructure systems of electricity, water, energy and gas must be reliable and accessible to all consumers.

Recommendations

The globalization process lends itself to ongoing benchmarking between nations of the world. This comparative process has been employed continuously and intensively in various fields for a number of years. It is difficult to compare Israel with another, seemingly similar economy, just as there will almost always be differences between Israel's fundamental political and cultural situation and that of other countries. Nonetheless, the comparative process is a very established, even central, practice as regards globalization, and Israel must continually and comprehensively engage in benchmarking. The various measures published by international groups such as the International Economic Forum and the IMD, or international institutions such as the International Monetary Fund and the World Bank, allow Israel to be ranked in the various categories, and particularly call the attention of Israeli policy-makers to the weaker points of Israeli economy, government or society. If, for example, various measures indicate a decrease in Israel's visibility in the realm of quality of government, rule of law, government stability and the fight against corruption, Israel's image suffers vis-à-vis foreign investors and financial markets.

The plan makes several key recommendations for Israel on the basis of analyses of the cumulative knowledge of countries with economies somewhat similar to that of Israel. These economies – including Ireland, Finland, Denmark, Sweden, Singapore, Estonia and Taiwan - have shown rapid growth over time and sound global integration. The analysis included numerous parameters that extended beyond the narrow economic perspective, to include administration, education, culture, law, etc., certain primary conclusions were reached that should be adopted in Israel.

The major conclusion is that some of the successful nations of the last two decades have adopted strategic plans that define a complete, appropriate, and comprehensive strategy for each country, which integrates objectives, takes into account countries' limitations, and incorporates far-reaching and comprehensive economic and social policies in many realms, while building the appropriate institutional systems through which to implement them.

Establishing institutions is an essential step that is based on political partnerships between the economy's various players, primarily the government, the business sector and workers, and the development of the professional capabilities required for the global process. The building of institutions and processes appropriate for the needs of the future requires a great effort, as it involves both building for the future and changing past practices.

Following is a summary of the key recommendations for successful integration into the world economy. The first three recommendations relate to the institutional structures required for realizing globalization and the other objectives recommended by the task force (see also Chapter V).

1. As strong domestic and foreign competitiveness capability is critical for global success, an appropriate institutional system must be established to ensure the maintenance of this advantage over time. It is recommended to establish a **National Council for Competitiveness**

and Globalization adjacent to the Ministry of Industry, Trade and Labor, which will release an annual report on the state of competitiveness, to be debated in government at least once a year. The Council must comprise both a professional tier and a public tier, and include economic and business representatives. The government must be represented by professional employees and ministers.

2. The **National Council on Economy and Society** located in the Prime Minister's office must be the focal point for assessing Israel's progress in the various economic areas (growth, unemployment, investments, and balance of payments) as well as social areas (income disparities and the standard of public services). One of the Council's main responsibilities is to lead the necessary reforms, along with the Finance Ministry, aimed at attaining a reasonable level of flexibility in the Israeli economy, as well as to closely follow the progress of the economy and society in achieving the objectives set by the government.
3. A **National Science and Technology Council** is to be established, to assess science/technology and higher education policies on an ongoing basis, as regards "supply" aspects of educated and skilled manpower for Israel for the long term, employing a systemic view at the levels of government and business. It will evaluate and recommend specific priority areas requiring attention (see Chapter VI). The Chief Scientist in the Ministry of Industry, Trade and Labor will continue in the future to serve as the agent for implementing and developing policy on a day-to-day basis and advancing knowledge-based industries using the assistance tools at his disposal.
4. The abovementioned Councils are distinct yet complementary. Their work will be **coordinated** by the Prime Minister's Office. Coordination meetings of the Councils' heads and bodies involved in policy and implementation, such as the Budget Department in the Finance Ministry, should be held once monthly. As implementing bodies, the Investment Center and the Foreign Trade Administration in the Ministry of Industry, Trade and Labor, must adapt to the policies and objectives set by the National Council for Competitiveness and Globalization, the National Council on Economy and Society and the National Science and Technology Council.
5. The **Bank of Israel** must maintain its **independent status** in its traditional monetary roles as regards the maintenance of price stability. The existence of a well-functioning central bank is an important consideration for foreign investors. The central bank must, however, also be attentive to the market's needs in the areas of growth and employment.
6. The state's physical **national infrastructures** mentioned above, as an essential condition for successful integration into globalization, must be coordinated through a functional government planning system with respect to all physical infrastructures (see recommendations in Chapter XI).

- 7. Flexible employment policy** is essential in order to attain social and economic achievements. This policy will be led by the Ministry of Labor in its new format, which will replace the Ministry of Industry, Trade and Labor, in coordination with the National Council on Economy and Society. The labor market, regarding which recommendations are made in Chapter IX, is of great importance under extensive globalization, as rapid changes affect many of the economy's workers and their ability to integrate properly into the labor market. In this realm, special attention should be directed to two groups that are not adequately integrated in the labor market – Arab women and ultra-Orthodox men. The labor market is an important, central framework that facilitates the participation of the general citizenry in economic and social objectives.
- 8.** Success in the international arena depends upon sound, efficient utilization of manpower in economy and society, and upon the existence of an education system that provides broad education and prepares its students for the higher tiers of the labor market. In order to achieve this essential goal, we must define shared **core studies** for all schools in Israel, in which students will learn Hebrew, math, social studies, English and sciences. The basic curriculum is essential for creating a shared social/national basis and providing skills that facilitate integration into the labor market.
- 9.** Long-term forecasts must be constructed to **map the skills** required for the future, in order to update curricula at relevant levels of education accordingly, to ensure the existence of appropriate future manpower for economic and social needs, in view of the extended training and adjustment periods.
- 10. Openness to the world and close cooperation with world players** are important conditions for adapting to the global process. Israel's higher education will profit if Israel brings in students from around the world to study in Israel; doctoral students who come to study in Israel will greatly benefit higher education and the culture of openness so crucial for globalization. Economic and social openness is also exemplified by consulting with executives and experts from abroad.
- 11.** Israel's **tax policy** must adapt to the trends in the tax systems of nations competing with Israel in the international capital market, especially as regards corporate taxes. Lower corporate taxes are preferable to special tax benefits given to favored sectors. Tax policy is measured not only by its tax rates, but also by its simplicity and efficiency.
- 12.** We must adopt a permanent strategy of a **balance of payments surplus**. This is customary strategy in small countries that rely on a well-developed, competitive export sector. Thus the Israeli economy will be better protected from fluctuations in the international capital market, and fiscal stability along with economic stability will be better maintained.

13. Israel's success in the field of knowledge-based industries and technology requires the continued creation of large, export oriented **Israeli global companies** (see more below). Thus high added economic value will be created, as will employment opportunities for a broader range of employees, over a longer time period.

Developments in World Markets

For nearly twenty years, the global economic world has been undergoing significant changes. The growth of new economies in Asia is becoming a significant economic event, affecting Israel's economy as well. In terms of historical processes, globalization is relatively rapid. As a small market in the world arena, Israel must adapt to world developments and set a policy of worldwide risk-dispersal. Nevertheless, because of its relatively small size in world trade, Israel can choose in which markets to specialize, as each market in itself can serve as a base for growth. The Israeli economy currently makes up 0.4% of the world product. Even if we improve our performance we will still be at the level of 0.5-0.6% of the world product, allowing us adequate flexibility to integrate into the large economies. This presupposes that the Israeli economy maintains a high competitiveness capability in the coming years. Business choices at both the national and the business levels must be informed by a good understanding of world economic developments, which are based not only on the ability to predict macro-economic trends indicating the rise of countries such as China and India, but also on a grasp of countries' or blocs' sectoral processes and national strategies, as well as international trends.

The relatively rapid changes occurring at international centers of gravity are creating a chain reaction in additional circles of the global world. The rapid growth, especially in Asia, has created a growing demand for raw materials and natural resources. It also apparently impacts indirectly upon global warming. Climate change has far-reaching economic implications. Among other things, global warming causes a rise in the cost of food staples, which is already being evidenced. The expected outcome for the coming years is a trend of increased cost for raw materials, food and energy, which will impact upon Israel's economy by making these components of foreign trade more expensive. To compensate for the worsening in trade conditions, greater efforts will have to be made to export high-value-added products. While Israel can tolerate this burden, it needs to prepare by adopting an economizing policy and by finding inexpensive alternatives, from alternative energy sources through energy-efficient production methods (for more on infrastructure and the environment, see Chapters X and XI).

In twenty years, Asia will have over 40% of the world product, as compared with under 20% today. The relative growth in Asia's economic activity is not merely quantitative but also involves qualitative production aspects. Understanding these processes is important. The potential risks posed by globalization may be considerable, including the entry of new players, but also offer new opportunities for the Israeli economy.

The architecture of the world economy is poised for change as regards economic power centers, changes in social norms and the reshaping of relations between countries, markets, companies and consumers. Globalization produces great benefits to the citizens of poor, developing countries by facilitating growth and increasing income. However, the opponents of globalization are the poor and even some of the middle-class in the developed world, who see this process as threatening their status. These changes will produce shifts in the world order as India, China, Brazil and Russia become more significant. Despite the high economic growth of Asian countries, the West will apparently maintain its economic hegemony over the next two decades. During this time period, the emerging economies' high growth rates will not afford them the economic maturity needed to become international economic leaders. Such leadership requires well-developed capital markets, high-standard legal systems and governability, and sufficient control over raw material and energy markets. These developments are likely to occur in subsequent years. Nonetheless, the US and Europe cannot ignore the new challenges they face, particularly in the financial realm. Nor can Israel remain unprepared.

Israel in a Global World

The central question facing Israel's economy will be, "What are Israel's comparative advantages in a rapidly-developing and changing world?" In recent years, Asia has established a business structure in which leading countries specialize in leading sectoral focal points: Japan specializes in consumer goods, Taiwan in device production, China in assembly and India in outsourcing of various technical services. There is no doubt that these specializations will change over the next twenty years. In any case, Israel will not be able to compete with any of these specializations. Israel has limited manpower and cannot compete with Asia's large populated countries: China, India, Pakistan, Japan, Bangladesh, and Indonesia make up about half of the world's population. Israel's policy needs to be to maintain an economic foothold and cooperate with all the large developing economic blocs. **Israel should strengthen its Asian connections, particularly with the two large growth economies -- India and China.** China, whose rapidly-growing economy is a significant market for Israeli products, aspires to attain leading economic and political status in the world, and is an important economic target for Israel. Despite cultural and language barriers and other challenges, the efforts that have begun should be intensified to create close cooperation with this country. Economic relations should also be strengthened with India, a rapidly-growing economy in which Israel has already established an impressive presence. The current potential for continued development of economic relations with India is based on that country's relative affinity to the democratic tradition, its large middle-class of 300 million people, its spoken English and the stability and clarity of its economic system.

The recommended policy for strengthening Israel's economic ties with the Asian continent will not compromise the nurturing of the close relations Israel has created over the years

with the US and Europe. The Western nations' (US and Europe) maturity and achievements continue to give them a considerable advantage in world competition. Relations with Europe and the US are an important asset of Israel's economy, and are currently the basis for globalization's rise in Israel. The economically-united Europe is a relatively close market geographically. Israel's close relationship with the European Union's institutions must continue. Israel's economic relations with the US are very advanced and offer many economic as well as political and cultural advantages. The US will probably remain the leading economic force over the next twenty years, despite the growth of countries in Asia and elsewhere. Israel's continued economic development of knowledge- and technology-based industries will provide a basis for future cooperation with the US economy. For many years, the US has shown outstanding resiliency under changing circumstances, allowing it to maintain economic dominance in the world economy. It can be assumed that this capacity will continue to serve the US in the future, and therefore the very close economic relations between both economies will benefit Israeli growth and development. Developing relations with the US and Europe requires close emulation of the high standards they will create, in order to **avoid lagging behind in implementing these standards** given the Israeli conditions, as the global process requires.

One of the dangers of the global process is that of counter-reaction ("economic protectionism") by developed countries that are concerned about the competition posed by developing countries' inexpensive products and services. It is in Israel's great interest to maintain open international trade. It must oppose protectionist policies restricting world trade, as they do not serve the Israeli interest, which is based on good accessibility of all world markets. Israeli policymakers **must not retreat from the Israeli market's current openness**, regardless of short-term considerations.

Israel must **specialize and focus on innovative and creative activity**, which should include creating intellectual properties on the one hand, and innovative and creative business models for services and traditional industries on the other. Cooperation with the large new economic forces will be an important source of growth and high added value for the economy. In the future, we must strengthen the overall systemic impact of the research stage, and combine it with development, aiming to expand the base of Israel's economy.

The rapid growth of emerging economies alongside the growth of established economies and acceleration of the global process carry with them the dangerous phenomenon of global warming. According to the 4th report of the Intergovernmental Panel on Climate Change, solid scientific analysis projects that this development will continue over the coming years, primarily as a result of greenhouse gas emissions caused by humans. Like the rest of the world's countries, Israel will be negatively affected by global warming, and as part of the global world, Israel must join the international efforts to address these worrisome developments. Israel's ability to join international

organizations will depend on its ability to meet stringent conditions, such as those required by the OECD. These requirements involve an increased public and private economic burden (see Chapter X); nonetheless, Israel can leverage this field for economic and technological growth, by taking advantage as in the past Israeli research and development and knowledge that may create productive business activity.

The Need to Create Global Companies in Israel

The international economic system encourages the creation of large companies whose arena is the entire world, or even relatively small companies that are established from the outset as global companies. Israel's economic strategy for the next twenty years must place an emphasis on the need to create large and medium-sized companies that can succeed globally, in the 21st century's arena of world competition. The Jewish Diaspora and the increased presence of Israelis in the world's large corporations may help create connections for building global Israeli companies.

Creating large global companies whose management headquarters are based in Israel is important, because of the diversity of the jobs they can offer in Israel, extending beyond the technological occupations. Offering a wide range of quality jobs is important because it can provide employment for the entire range of abilities and desires of Israeli workers. The job supply will extend beyond employment in the global company itself, to all the services and products the company purchases in Israel. This is in fact a complete model of a post-industrial society that maintains a high per capita income level. It characterizes all the developed countries that were industrial nations up until 20-30 years ago and whose economies were eventually driven by the high-value-added services sector.

The recruitment capabilities of large Israeli companies wishing to integrate into the global economy are concentrated in the capital market – the most global market, the market of all markets, and a major driving force in the world's global process. Competition over international capital will certainly require that companies be of high quality and meet high international standards, as well as the existence of a quality governmental system that earns the trust of the financial markets.

Some 15 Israeli industrial companies currently operate whose sales exceed over \$1 billion a year; these companies have prominent global characteristics. Another some 15 services companies also have the potential to integrate into the global corporate world (especially in the fields of communications, transport and energy), with sales exceeding \$1 billion per year. Only one Israeli company (Teva) has global sales of over \$5 billion (in fact, Teva is currently approaching \$10 billion in sales); it also fulfills global criteria. This plan presents the economy with an ambitious but crucial goal for integration into the global process: the creation of at least one new company

a year with sales of over \$1 billion, and the creation of three global companies every ten years with sales exceeding \$2.5 billion, whose business headquarters are based in Israel. Ultimately, the aim is to create, over the next twenty years, at least three Israeli companies whose business center is in Israel and whose sales exceed \$5 billion a year, one of which will reach \$10 billion. The global Israeli companies will not necessarily be from the advanced knowledge industry; they may come from a wide variety of sectors. World-wide, even companies with sales of a few billion dollars are not considered to be large global companies, but for Israel, the absence of a group of large companies will render Israel's participation inadequate, even imperceptible, in international markets. Creation of global Israeli companies will bring Israel closer to the objective of successful integration in the global process and its positioning among the top 10-15 economies in the world.

Business models for global integration are not based on one single route. We envision three primary routes for firms' global integration:

- Growth of an Israeli company which controls international operational systems that has its business center, central functions and management headquarters are in Israel.
- Integration of an Israeli company into global companies while continuing to carry out focused, defined activity, first and foremost management in Israel.
- Purchasing of advanced global-standard knowledge in the field of products or services by an Israeli company that sells to both foreign and domestic markets.

These are feasible and acceptable models for global companies, drawn from international business experience. Each route involves the "upward pull" of productivity and competitiveness that enable the growth of such companies, as necessitated by process of integration of Israeli companies into the global business landscape.

Potential and Objectives for Creating Global Companies

Beyond the 15 industrial companies that are already integrating in the global process to various degrees of success, about 75 others have been identified that have current sales of over \$100 million a year, a large export component and the foundations for a global management outlook. Twenty-five of them already have sales in excess of \$250 million. This reservoir of companies lays the foundations for Israel's future global companies. Of course, over the next twenty years, companies may develop from outside of the reservoir of currently-existing large companies.

Over the past twenty years, Israel has shown an impressive ability to create knowledge- and technology-based companies that are the product of original Israeli research and development. Only a few have established a broad industrial base with Israeli business headquarters whose aim is to create an international global company. In Israel's economic conditions of the past

twenty years, the strategy of selling companies abroad made sense, in view of the absence of management and marketing experience and the lack of convenient funding arrangements. Selling companies in their early stages was an important phase in the development of the Israeli economy, bringing in considerable sums of foreign currency, which substantially improved Israel's balance of payments over the last decade.

The great challenge for the coming years will be creating a formula for the creation of companies, instead of selling them abroad. Maturation of the Israeli economy, various reforms and overall growth have all improved conditions for the development of Israeli companies based on entrepreneurship, knowledge and technology, whose center of activity is in Israel and which will be capable of adopting one or more of the existing business models for establishing a global Israeli company. The success of companies that transferred their business centers abroad indicates the soundness of their business models. Assuming that improvements will be made in background conditions and Israeli business culture, it will be possible to realize this potential in Israel as well. All factors involved in past successes must now be integrated and applied in Israel. The shift to building larger companies will require changes in venture capital fund policy, as well as additional mechanisms for later-stage funding. As Israel's management tradition is developing slowly, it may be wise to consider taking on skilled executives from abroad to help improve management. Maturation of the technology industry and venture capital policy may produce more experienced executives, who will help to establish the growth of large global companies. Appropriate incentives should be put in place to encourage this course of development.

The future global companies and the Israeli government will have to contend with a number of challenges in order to assure these companies' successful growth to Israel's greatest advantage:

1. As stated, these new growth companies must be based in Israel. Their products or services must have excellent competitiveness capability that will "capture the world" by virtue of an excellent business model. These companies may emulate and seek the assistance of companies that have already done this.
2. In some cases, **mergers** between Israeli companies involved in related fields may create a critical mass in the areas of management, production, marketing and funding and bring the firms into the global international market. This route may create large companies (in security industries or water-related agricultural equipment industries, for example). It will be necessary to assess antitrust aspects in the global economic context, and to make arrangements that take into consideration the merger's overall contribution to the Israeli economy, on a case by case basis.
3. Israeli companies entering the global markets in the future must be **prepared for tough, even cruel, competition** vis-à-vis global companies that operate in these markets. We

must build appropriate capabilities in order to contend appropriately and successfully. Part of the success of future companies will depend upon the **conditions of the economic environment** serving as the business sector's "economic home front". Israeli infrastructure must be of a high standard as regards all its components beyond physical infrastructures, including the capital market, a quality banking system, a high level of business services and quality manpower.

4. Due to the small size of Israel's economy and domestic market, the success of Israeli companies **cannot be founded on a large, developed domestic market** that serves as a protected "home port" and provides companies with a competitive advantage before they venture into international markets. We must, however, take advantage of domestic markets such as the security and medical markets, whose sophisticated local clients make them a worthy base for creating a competitive advantage.
5. With the exception of Israel Chemicals, Israel does not have the option of growing large companies based on economic returns from natural resources. **The future global companies will all be based on knowledge, technology and innovation.**
6. Companies whose growth may place them in the global arena will be based on one of the following three basic processes: business **innovation** based on technology/engineering; international **leadership** in specific products or services; creation and distribution of a **new business model**. These strategies involve abundant sophisticated and skilled management, and integrate clear business discipline and boldness.
 - 6.1. In the past, the strategy of **business innovation** based on technology/engineering generated considerable business enterprise activity, especially at the stage of research and development, on the basis of leadership in a world category. Conditions should be created in the future that support business development and the creation of large companies that are based on manufacturing and marketing for export as well.
 - 6.2. The strategy of **world leadership** in a products or services category requires focusing on government support, which will set business objectives for the company: attaining high ranking in its field within a given number of years. This will involve presentation of a clear business model and a controlled, milestone-driven strategy, upon which assistance and encouragement will be based.
 - 6.3. The strategy of creating a **new business model** and distributing it to a number of target countries simultaneously requires business development, complex transaction management, integrating forces in regional enterprises in multiple countries, and marketing capabilities.

7. Global companies require good executives who understand how to operate in global markets. **Executive Education** of the required standard may be attained via a number of routes: gradual maturation in the Israeli business world; growth of Israeli managers in international corporations; or studying in management schools in Israel and abroad. When training executives in Israel, programs should integrate international content and English language in the curriculum.

At this stage, we must locate companies that are candidates for rapid growth and identify an appropriate **strategic model** for each, after assessing external benefits to the economy and in certain cases, evaluating a designated support track.

Successful establishment of global companies during the initial years of the plan's implementation will in turn increase the number of companies that are developed, expanding the reservoir of companies with global potential. If there are currently about 75 potentially global companies, we may assume a doubling of this figure within 5-7 years. The reservoir of companies will produce a natural pyramid, which will fulfill the objective of creating at least one global company per year with sales exceeding \$1 billion, three every decade with sales exceeding \$2.5 billion and at least three over a period of 20 years with sales over \$5 billion, including one with sales of at least \$10 billion. Creating global companies has already become a regular feature of the "small" economies of Ireland, Finland, Singapore, Sweden, and Taiwan and has enabled them to maintain high growth and a high standard of living for their residents.

Chapter V: Institutional Changes in Public Service

Introduction

Israeli society faces many diverse challenges, particularly at the interface of economy and society. Addressing these challenges requires creating an ethos of a strong public service that is able to contend with a complex, dynamic reality. Israel's government system, however, contains obstacles to long-term strategic deliberation and implementation, including political instability, absence of an established culture of debate and significant dependency on personal obligation for promoting and carrying out decisions. Therefore, besides shaping the content of Israel's economic strategy, **it will be very important to develop institutional mechanisms that enable continued deliberation, debate and implementation of strategy for the coming years.** These mechanisms will facilitate coping with political, economic and social challenges and promotion of long-term strategy. Israel's ability to successfully deal with these challenges will certainly be affected by the overall functioning of its institutional system, as regards the political system, the structure of government on integrative issues, the degree of functionaries' professionalism, and ongoing government processes. All of these affect the state's ability to promote long-term strategy. But even if changes are made in these areas, it will still not be feasible to attain optimal performance unless institutional improvements are made in the public service.

Rather than leading public debate and policy-making, Israel's government currently finds itself trailing behind the business and third sectors in many areas. In comparison with countries that have been successful over the past two decades (e.g., Ireland, Finland, Sweden and Canada), Israel lags behind significantly in state mechanisms' policy-shaping performance. Israel is one of the countries that have not yet undergone all of the institutional changes required in the global economic and social world of the 21st century. The natural place for these mechanisms is public service, which is subordinate to the ministerial echelon, and which must act with professionalism and creativity in order to equip ministerial echelon with the best alternatives and to assess them in terms of the overall public interest. Even those in public service who are highly professional in creating knowledge and developing citizen services, lack public recognition of their professionalism and expertise, particularly as compared with the other players in the public arena. As representatives of the state and its citizens, entrusted with being the leading professional force in shaping social policy, public service employees are the backbone of the service system over the long term, in normal times and during crises. **In order to enable the state to retrieve the reins, it is crucial to restore public employees' professionalism as well as public recognition of this professionalism.** One of the most significant factors affecting professionalism and its recognition is that of supervision in public service. This realm receives considerable attention in major reforms worldwide and in this plan as well.

There is a positive correlation between countries' economic success over time and their ability to develop institutional mechanisms that support policy-makers. If we do not improve public service institutions, we cannot expect the economy to function properly. Liberation from the negative shackles of classical public bureaucracy is considered to be a significant step on the way to economic growth. (One early sign of beginning this process in public service to freeing bureaucracy is the reduction in the number of laws restricting the activity of public service organizations and of participants in public policy implementation.) In exchange for liberation from the fetters of bureaucracy, implementers of policy around the world have been required to demonstrate results, according to objectives set by legitimately authorized policy-makers. Various supervisory units have been developed in these countries to oversee policy implementation and assess its quality. There is a strong correlation between the degree of citizens' trust in public service and the manner in which these institutional mechanisms operate. The complexity of the policy-making arena, as well as the large number of partners in the process (political and professional echelons, interested parties and so on), necessitate the creation of shared arenas and enhancement of tools for improving policy-making and implementation.

In summary, it appears that the primary objective facing public service today is rehabilitation and strengthening of the **institutional mechanisms of deliberation, planning and debate** at the governmental/national level. Some of these mechanisms have collapsed; some have been drained of their content, (due primarily to frequent replacement of ministers, given the political instability of Israeli governments and the Finance Ministry's centralized control over other ministries which increased after the severe economic crisis of the mid-1980s); and others did not adjust to a modern economy that involves issues of a complex global nature. The great challenge for the coming years will be to create institutional mechanisms that improve decision-making and implementation processes. We can confront this challenge with the help of institutional reform in public service, which will enable public service employees to address **complex issues in changing conditions**. It is important to remember that we propose improving the functioning of Israel's public sector **while significantly reducing the government's role in the economy**. Enhanced performance of the public sector will enable implementation of the vision with the help of a smaller government. Much can be learned from the experience of successful economies in the world about the importance of the structure and quality of the public sector in achieving rapid growth and increasing competitiveness.

Vision and Strategy

The proposed institutional reforms focus on creating an "enabling" public service that is able to act according to government objectives and the needs of the population it serves, and to fulfill the three functions described above.

A properly-functioning public service is able to respond to changing needs in a complex, dynamic reality. In other words, public mechanisms will not seek to create a stable reality in a changing world, but will rather attain new tools and skills to deal with the challenges characterizing the work environment in which they operate: a global age in an rapidly changing world, a post-industrial society given to rapid economic changes, a multicultural society, and the context in which they operate. The functional capabilities of public service should be constructed independently of the elected government and of the system of government that is instituted.

Such a public service will be built up by means of **strengthening its professional backbone** and enabling its **functional flexibility**, so that political, economic and social changes that occur from time to time do not compromise the quality of its work. The public service will be strengthened by means of three primary undertakings: **cultivating quality leadership and professional management** from among the senior and middle echelons currently employed in the various ministries, to serve as a pivot for mobilizing the desired change in public service; **creating policy-making and policy management units in the Prime Minister's office and the government ministries themselves**; and **instituting means for developing an Ethos of Professionalism**, through employee training programs, knowledge management within and outside of the ministries, research development, investment in quality manpower and development of supervisory functions and tools. These steps will facilitate the strengthening of public service, by creating a professional, quality service that sets its objectives and is capable of assessing outcomes wisely. Such a system will facilitate promotion of shared goals between the government and economic and social sectors and to enhance decision-making both within the organization and among organizations from the various sectors.

Dilemmas and Challenges

Israel's public sector suffers from significant weaknesses. In some areas, it cannot adequately support the proper management of state matters. This weakness results from a number of processes that have occurred over the years:

1. **Diminished spheres of responsibility:** Over the years, fewer and fewer tasks are being performed directly by public service employees. Following the appearance of players from the third sector and business sectors, and the weakening of planning and deliberating bodies, the public sector has ceased to be a significant player in policy-making and implementation on various issues. One of the objectives of our task force is to recommend to the government that it adopt the proposed changes, in order to provide government ministries with the necessary capabilities in setting policy and supervision of its implementation
2. **Loss of professionalism and decline of knowledge:** As long-term deliberation and planning processes in government agencies have deteriorated, public service has lost what served

for many years as the basis of its authority: its knowledge. The disintegration of deliberating and planning bodies and the reduction in operations carried out directly by public service employees, have led to the gradual erosion of state employees' professional authority in the realms for which they are responsible. Alongside this process, and to a large extent because of it, neither a professional identity and ethos, nor knowledge-management tools have been developed. Many countries in the world, including England, Ireland and Canada, have learned that only through the development and management of knowledge among policy-makers and public service employees will it be possible to successfully manage a modern state and a modern economy.

- 3. Loss of relevancy of public administration's mechanisms of supervision, administrative monitoring and feedback:** Supervision and monitoring carried out by the public service itself over its own functioning and operations, serve as a central tool for the state to ascertain the implementation of policy and the enforcement of laws and regulations. One of the functions of this tool is to help public systems that provide services to citizens, to transmit information vertically, from policy-makers to the service providers themselves. The existing tension between policy-makers and service providers results from the conflict between a hierarchical approach and one that attempts to create trusting work partnerships conducive to learning, consultation and training. The attempt to create a hierarchical system in which knowledge is transferred downwards and information is absorbed upwards encounters obstacles for a variety of reasons. First, it is recognized that knowledge transferred through the hierarchical ranks may be altered at every echelon, for various reasons, from inaccuracies in encoding and translating messages, to purposeful distortion. Second, knowledge from the field often does not suffice for solving social problems. In addition to these challenges, the environment in which policy is made and implemented and in which the supervisory role is created, has changed: in the new environment, agents in the field hold most of the professional knowledge. Gaps between policy that is based on limited knowledge, and the position of employees on the ground, who are equipped with considerable knowledge, along with the existence of a supervisory system insensitive to knowledge in the field, have rendered supervision largely irrelevant. Thus, its conclusions do not truly contribute either to policy-making or to knowledge of events in the field. As the arena of public service work (including supervision) has become saturated with players, such as third sector organizations, civil society and private organizations, all of whom are partners in the provision of services to citizens, a new dimension is created where, in practice, policy on many issues is set.
- 4. Retarded professional development among senior staff:** One of the various proposals raised over the years for improving the public sector has been to create a core group of high-quality professionals, to assist in policy-making in all government ministries on a rotating basis. In order to do so, it has been argued that high-level knowledge needs to be provided to

the senior staff. This goal can be achieved by establishing a college for training senior staff, or by contracting with a higher education institution to construct an appropriate curriculum for public administration. Training of professional echelons is currently done mostly by external bodies, without preliminary planning or a clear concept of what the desired comprehensive public service development and training program in Israel should be.

5. **"Over-legalization" of the public service:** Excess legislation and restrictions imposed on public service employees in the course of fulfilling their tasks, and the encouragement of this trend in the name of public responsibility, have burdened public organizations to the extent that they cannot perform their missions. Many state employees appear to be more focused on procedure than on substance.
6. **Lack of structured approach to the substance and functions of public service in the market economy age:** Over the years, government ministries have been asked to increase their efficiency, with the goal of improving administrative procedures and enhancing their performance and achievements. These demands on the public sector occurred against the backdrop of the wish to reduce its size, while relying on the business and third sectors. Israel embarked upon globalization and a market economy without formulating a comprehensive approach to the place and status of public service. In some areas, the combination of the public sector and business and third sectors was ultimately successful; in others the combination was eclectic and unproductive. In many cases, it led to a failure, rather than improvement, of public service operations. The various efficiency-increasing programs were especially detrimental to long-term deliberation and planning processes, learning processes and various overlapping areas intended to create a more reliable foundation for public service decision-making and action.
7. **Inadequate discourse on government-related issues:** Public discourse regarding the quality of government is poor, and does not address the issue of boundaries of the realms of public service. The debate over government functions, particularly on social issues, is not systematic. It is conducted primarily in times of crisis or following events receiving media attention. As a result, public discourse on social issues and the debate on quality of service, including services provided to weaker classes, do not fulfill the role of public criticism in a democratic society.
8. **Political fluctuations and their implications on the size of public service:** Over the past decades, the public system has experienced instability resulting from counter-reactions, between the economic right and the social left. Economic changes in welfare policy intended to benefit society's weaker strata, and deep government involvement in the economy, constituted the foundations for "large government". However, the decline in Israel's economy along with the globalization trend produced reforms, some of which

benefited the more established parts of Israeli society, thus swinging the pendulum towards the counter-approach of "small government".

Outcomes and Implications of these Processes

1. To a great extent, public service has ceased to serve as a balancing element vis-à-vis the political echelon; it lacks long-term perspective, and state employees lack a proper professional place in the decision-making process.
2. Over the years, government ministries' ability to conduct strategic planning and deliberation has gradually declined.
3. Government ministries have lost a great deal of their knowledge of their respective fields, upon which they wish to make an impact, and to a large degree, have ceased understanding the reality in which they operate. Policy-makers have lost some of their control over the areas under their responsibility, and have had difficulty managing policy they have set, or are no longer setting policy though they continue to be responsible for it. Thus they have become dependent on policy implementers, and have had difficulty assessing the implemented policy.

Primary Developments

World Processes

The troubles ailing public service gave rise to demands to institute far-reaching reforms. Over the years, various reforms, known outside of the US as New Public Management (NPM), have swept across most of the world's developed countries, and the political platforms of all political persuasions have adopted their fundamentals. While government reform in the US is identified with the Reagan administration of the 1980s, the Democrats ran a similar reform under the name "Reinventing Government". In Britain, despite being firmly associated with PM Margaret Thatcher, the basic principles of government reform were also adopted by the Labor Party, which during its tenure carried out far-reaching changes in the public sector. The changes adopted by the various countries led on the one side to rigorous examination of the actions assumed by the state, and on the other, to the introduction of significant changes in the modes of action taken by the executive branch, the public service.

The problematic aspects of public service organizations created fertile ground for the claims of those who opposed broad government intervention in economic and social issues, that is, the supporters of the economic right, that public service does not justify its high maintenance costs, especially in the absence of efficient management. These aspects also facilitated attacks by the economic left, which was dissatisfied with the outcomes of social intervention. At the

beginning of the process, doubts were cast regarding the future of the reforms. At the core of these reservations stood two primary questions: First and foremost was the question of whether this was not just another fashionable management method that would soon disappear. The second asked whether these changes were a product of the conservative ideology that dominated in countries such as the US and Britain. Over the years, it became clear that, despite the various critiques against the basic principles of the proposed changes, these were indeed significant changes that were not going to be abolished in the foreseeable future. The reforms also provided a response to the work burden imposed on public organizations; the economic burden involved in their operations; the deep deficits in the state budget; the inadequate service that consumers felt they were receiving from these organizations (particularly as compared with analogous services provided by other sectors); and integration into the global process.

Processes in Israel

The State of Israel has yet to take part in the world trends of public service reforms in a well-informed, significant manner. Despite the number of commissions that have been appointed and the deliberation processes that have been conducted, the state's leaders have chosen not to take a significant decision on the nature and image of public service. As a result, the random changes that have been made have not succeeded in improving the functioning of public service, but have only altered its scope in certain areas.

The public service was established in 1948, on the basis of the mechanisms of the Jewish Agency and the British Mandate government, and was founded on the British model. Though this model was proposed as only temporary, no alternative administrative culture has been shaped since, that better fits the Israeli reality. Over the years, various changes have been made in the initial public service model, primarily additions that were not based on a comprehensive approach. As a result, hundreds of laws, regulations, guidelines and rules have accumulated. Intended to regulate public administration, only a few understand them. Most of the attempts to make changes and improvements in the service have remained grounded in the same old management paradigms.

Beginning in the 1980s, as the accelerated globalization process began to capture a central place in the economic world, a wave of reforms swept across the public sectors of most of the world's developed nations. Despite the many differences between the various reforms, they share a number of features: creating a small public service; adopting management methods from the business sector; making the public service more flexible; and instituting processes to enhance its response to the demands of its clients, the citizenry. The various reforms increased as a response to negative phenomena that many identified with the public bureaucracies:

- Public sector organizations were perceived as burdensome, wasteful and ineffective.
- Public bureaucratic organizations grew to such large proportions that they could not function optimally.
- Public bureaucratic organizations began focusing on short-term policy and lost their ability for long-term thinking.
- Public service organizations did not invest efforts in developing their employees and attaining the best results possible.
- Public service organizations suffered from a negative image, and citizens expressed their dissatisfaction with the services they were receiving.

In **1984**, the **Kubersky Commission** submitted a report proposing the most comprehensive reform in the history of Israel's public sector. The Kubersky report purported to make a fundamental change and to do away with the policy of patchwork revisions. The report's recommendations fit the spirit of the times, and correspond with many of the proposed reforms that began to gain momentum in those years, including reduction of the size of the public sector; improving service to the citizen; transferring routine tasks from government administration to other bodies, etc. While various steps were taken in support of implementation of reform, **most of its recommendations were not implemented.** Non-implementation of the proposed reforms during the 1980s and 1990s was due primarily to the serious economic crisis that Israel experienced in the 1980s, followed by the diverting of attention to the subsequent recovery plans.

In **1994**, an attempt was made to institute public service reform, known as "**Model Ministries**". In contrast to the Kubersky Commission's comprehensive reform approach, this reform aimed for controlled implementation of changes in the margins, intended to cause a snowball effect and ultimately to shape a new public service management approach. This reform had two central objectives: 1. Changing the role of the Civil Service Commission, by turning it into a professional staff unit focused on setting human resources policy in the public service and monitoring its implementation; and 2. Strengthening the autonomous status of the government ministries by enabling them to independently manage their resources and giving them the authority to decide how to achieve their objectives.

Despite the reform's partial success, manifested by the response of 11 ministries and support units, **this reform did not produce the desired change.**

In **1999**, another attempt was made to institute reforms in the spirit described above. The proposals included separating policy-making from policy-implementing units; making changes in the process of government planning and budgeting; delegating powers to various ministries,

in return for their assuming of responsibility and meeting achievement measures; making changes in the Knesset's involvement and supervision; and making fundamental changes in human resources. **This attempt was also unsuccessful.**

Finally, during Ariel Sharon's tenure as Prime Minister, Finance Minister Benjamin Netanyahu took various steps in the spirit of the reforms presented above, without any accompanying management reforms to support them. The subsequent finance ministers have reinforced the trend to reduce the size of public service, without attempting to assess these measures' implications on government structure, functioning and image. As these changes were not supported by public service management reforms, public service organizations could not operate satisfactorily, thus further intensifying the wish to privatize many functions that were previously executed directly by the state. Alongside changes touching directly upon public service, various recommendations were proposed and implemented to improve the functioning of government ministries and related processes. **However, the hoped-for change in public service did not materialize.**

Israel's public service suffers from the same maladies as its counterparts abroad. The list of complaints detailed above is heard elsewhere as well. Furthermore, the conditions that activated change around the world have matured here as well, and have even begun to direct processes in Israel. Public service's heavy budget burden, the mediocre quality of its services, the over-centralization of government branches, and the splitting-up of the handling of one topic into different government organizations, along with other failings, all characterize public service today. However, unlike other countries, comprehensive reform has not yet been instituted in Israel's public sector, and a comprehensive approach has not yet been outlined for its work.

Recommendations

The goal of the recommendations below is to enable the state and its leaders to deal better with the challenges and complexities of our economic and social life, which are characteristic of the present age and expected to continue in the future. The recommendations include institutional changes that will contribute to improving decision-making and implementation processes, as well as public service employee development.

The proposed reforms will be implemented by a process-oriented approach rather than by one-time structural changes. They entail close cooperation with public service employees, who should be committed to the idea of reinstating knowledge and responsibility to public service in order to strengthen the entire government and the Prime Minister, and to restore the Ethos of Professionalism to public service employees. With employees' input, appropriate content should be formulated for the following recommendations. Recommendations should not be dictated from above in a cut-and-dried fashion; instead, we must strive for cooperation.

Summary of Recommendations

1. **Institutionalize a unit to formulate and manage systemic policy in the Prime Minister's office**, to include a unit for economic and social issues; a unit for security and political issues (the National Security Council); a unit for science, technology and higher education issues; and a unit for special issues requiring attention on an *ad hoc* basis.
2. **Institutionalize an innovative model for policy formulation and management units in all government ministries**, to maintain close work relations within ministries.
3. **Establish a National Council for Competitiveness and Globalization** that takes its inspiration from the Ministry of Industry, Trade and Labor, and which is subordinate to its Minister.
4. Institute a functional **Ethos of Professionalism** in public service.

Recommendations in Detail

1. We propose to establish a new professional council and a unit for ad-hoc issues in the Prime Minister's office, and to strengthen the two existing ones: the National Security Council and the National Economic Council. All the councils will serve the Prime Minister in his role as integrator/administrator of government policy.

- **National Security Council**

The National Security Council, established in 1999, will serve as the Prime Minister's deliberating unit and staff on foreign affairs and security issues. It will be reinforced by principles formulated in 2007 by two commissions: the Winograd Commission and the Lipkin-Shahak Commission. The head of the National Security Council will also serve as National Security Advisor to the Prime Minister.

- **National Council on Economy and Society**

The Economic Council was established in 2006 with the goal of strengthening the Prime Minister and his decision-making process. The Council operates as a center for economic policy development, with a systemic/strategic orientation. Its realm of activity should be formally expanded to include social issues as well. The head of the Council will also serve as Economic and Social Advisor to the Prime Minister and will chair a public advisory council made up of representatives of various economic and social sectors.

- **National Science and Technology Council**

This plan proposes to establish a new council, designated to enable the Prime Minister to shape and formulate policy in the fields of science, technology and higher education,

which will serve as the foundation for maintaining Israel's qualitative advantage for the coming years. The council will be made up of public staff and public representatives from different fields. The head of the Council will also serve as the Prime Minister's Science and Technology Advisor. As this is a new council, we shall describe its role in brief:

The council creates a forum for setting strategic policy in the fields of science, technology and higher education. In light of the vast implications of education, basic scientific research, technological R&D and dispersion of the new technologies across broad industry sectors and the economy as a whole, we propose the establishment of a special senior forum that transects all relevant government ministries and bodies. The forum will set priorities for outlining policy, and will coordinate all publicly-funded measures executed according to these priorities. It will enable ongoing, fixed activity at the strategic (not operational) policy level. The forum will be affiliated with the Prime Minister's office. Similar to the South Korean model, it will strive to receive the PM's prior approval for the overall budget in the fields of science, R&D and higher education. The forum will also be linked to the Office of the Chief Scientist, as operational experience and developments on the ground are central to the identification of new strategic priorities and their translation into new policy guidelines or programs. Nevertheless, the forum must be independent of the Office of the Chief Scientist as it proposes new priorities, new programs and re-assessment of prior policy guidelines (currently carried out by the operational units themselves). For further detail see Chapter VI, Leveraging Scientific/Technological R&D.

- **Unit for *Ad-Hoc* Issues**

The Unit will provide consultation and support for the Prime Minister and his office on issues of systemic importance, on any matter that is deemed necessary. The Unit will address short- or long-term issues that may help in the process of shaping and implementing government policy. Issues not under the authority of any of the three designated councils, which require systemic action on the part of the Prime Minister, will be addressed by the Unit for *Ad-Hoc* Issues, which will be subordinate to the director-general of the Prime Minister's office or his chief of staff.

All the councils will deal with management of long-term deliberation, management of internal and external research, and management and assessment of government ministries. Public committees will be established adjacent to each of the professional councils, so that the public aspects accompany the professional considerations. Each such public committee will be appointed according to the council's areas of activity, so that appropriate representation will be given to relevant bodies related to the issue.

2. We propose to institutionalize an innovative model of policy analysis/management units in government ministries. The goal of these units is to assist policy-makers and implementers

at all the organization's echelons in understanding challenges and acting effectively. The units will concentrate planning, research, policy analysis and evaluation in each government ministry. They will be subordinate to a senior deputy to the director-general in each ministry, who will focus on policy and implementation issues, and will address the following subjects:

- Conducting policy analysis on central dilemmas.
 - Determining assessment processes for the ministry's activity, using measures of achievement or other means.
 - Establishing a center for knowledge management for the ministry's areas of activity, to support the various units.
 - Promoting processes of infrastructural change in the ministry's operational patterns.
 - Connecting and combining policy issues under the ministry's authority with overall national policy, by interacting with the unit for policy-making and management in the Prime Minister's office.
 - The units will serve as agents of change and a catalyst for a quality revolution in public service as regards policy-making and implementation.
 - This model will enable each government ministry and its leaders, the director-general and management, to fulfill an initiating leadership role vis-à-vis the sectors under the ministry's responsibility.
 - Implementing the proposed model will ensure organizational memory, learning and continuity of public policy in each of the ministry's areas of activity, and will deepen consciousness of quality in the relevant fields.
3. Creation of a National Council for Competitiveness and Globalization adjacent to the Ministry of Industry, Trade and Labor. This council will provide a platform for professional and public debate on the policy measures required for utilizing Israel's full economic potential and deepening its international competitive capability based on business innovation. It will be a designated body affiliated with the Ministry of Industry, Trade and Labor, and partly affiliated with the government, enabling its research independence and long-term vision, free of short-term constraints. Among the considerations for appointing the council, which will be responsible for shaping national industrial/competitive policy and integrating Israel into the global processes, priority will be given to research ability and unbiased professionalism.

The long-term integrative policy for increasing Israel's competitiveness will be augmented through this professional body, which will bring together implementing bodies that deal

with local business development, encouragement of foreign investment and promotion of research and development (functions that already exist in the Ministry of Industry, Trade and Labor).

4. Institutionalizing a functional Ethos of Professionalism in public service:

- Strengthening public service's backbone: senior and middle echelon employees.
- Strengthening public recognition of employees' professionalism and expertise as compared with the other players in the public arena.
- Changing fixed, uniform training processes, given the dynamic reality and the need to improve public service employees' flexibility and adaptability to changing conditions. The following guidelines should be followed:
 - Setting minimum requirements for entering public service employment. In a number of central management positions, an academic degree in management will be required.
 - Setting on-the-job training processes appropriate to the public service employee's professional development needs. Today, most of the training programs in public service are determined haphazardly, and are not relevant to the employee's job (as the goal of training is typically increasing salaries, rather than improving professional standards). Public service employees are currently allowed to choose topics of study from an almost unlimited list, determined by the supply of courses and advanced study programs available on the market and irrespective of the employee's professional needs or development track. We recommend that the strategic deliberation units, in cooperation with the employees themselves, propose the fields of study they require in order to improve their professional standard and functioning.
 - Setting flexible, creative learning formats for the multi-dimensional professional development of public service employees. The passive "teacher-student" learning model is currently perceived as the only legitimate training model. As part of the trend of flattening out the organizational pyramid and instituting flexible learning processes, *ad hoc* learning communities should be created on central topics pertaining to the work of public service employees. These communities will include employees of the public service organization as well as employees of organizations outside the government ministry. For this kind of learning as well, employees will receive the customary compensation for study.
 - A crucial condition for developing a planning and deliberation process in public service is the formulation of objectives. Formulation of objectives is essential primarily in order to institutionalize an assessment process for organizations' performance and a process of regulating the supervision of public service. Besides formulating objectives, the organization's mandate should be detailed, as should the essential factors taking part

in the implementation process. The advantage of this kind of thinking is the enhanced ability to predict outcomes of the attempt to realize objectives, in a given organizational constellation.

- Redefining supervisory goals and operations. Supervision should be a responsive, flexible two-way tool. Those involved in supervision must have multi-disciplinary knowledge, and an ability to initiate service development of services in conditions of uncertainty, in response to new needs. Work patterns should be created enabling the state to maintain control over areas it chooses. Professional development of public service employees should be combined with the adoption of cooperative supervisory approaches, in order to improve abilities and increase the responsibility of the various partners in the process. Thus most of the efforts should be invested in developing supervisors' and professionals' shared knowledge, investing resources in life-long learning and professional development, and improving the organization and preservation of the knowledge accumulated in public systems.

Professional development, combined with the various powers and options provided by the strategic deliberation units to public service employees will build leadership and advance the public service. Public service will draw high-quality forces that seek to be part of a unique, select team able to lead the public service forward and to create a well-functioning government.

Outcomes and Implications

1. **Instituting changes in work and learning processes will mobilize the organizational change that until now has only been imposed, unsuccessfully from above.** This change will promote a process of increasing the organization's flexibility, broadening professionalism and turning attention to substance over procedure.
2. **Change in the work process will create a public service ethos:** Change in the work process and giving knowledge a central place will affect employees' **attitudes** toward the organization and its goals, as well as their attitudes toward other sectors' organizations.
3. **Change in these processes will mobilize a change in the relationship between the public service and other organizations, and the citizens in need of its services. The change will:**
 - Create greater mutual attention.
 - Decrease alienation from and disdain towards public service.
 - Facilitate cooperation between the state and the various organizations that are able to contribute to policy implementation (and actually do so).

Chapter VI: Leveraging Scientific/Technological R&D

Chapter Summary

While Israel is currently among the world's ten most advanced countries in scientific/technological research, with high-tech sectors that are among the world's most developed, there is a concern that the absence of public policy on R&D, along with the intensification of global competition in many R&D fields, may undermine the historic basis of Israel's current position. To maintain its leading technological status in the world, Israel must act towards achieving the following objectives:

- Ensuring the availability of a labor force that has appropriate technological training and is able to assimilate and implement advanced technologies in numerous realms of life in the state: economic sectors, education, health, the environment, etc.
- Creating a competitive, free business environment, shaping clear, transparent, and stable public policy that supports R&D, and building modern infrastructures that will attract multi-national high-tech corporations to Israel.
- Nurturing basic and applied research at universities and transferring the results to the business sector, as a basis for creating new scientific/technological knowledge, an appropriately-trained labor force, and the coming generations of researchers.
- Appointing a Science and Technology Advisor to the Prime Minister and creating a **National Science and Technology Council** to coordinate between the numerous government agencies that impact upon achievement of these goals, and to delineate strategic priorities and a plan of action for their realization.

Introduction

Over the past decades, Israel has enjoyed international status as a thriving technological incubator with an economy that has developed an impressive industrial sector based on advanced knowledge and technology. This was achieved through strong entrepreneurship and an ability to take advantage of business opportunities in a developing international high-tech world. Israel was one of the first countries to adopt technology-based economic growth. This was done initially without comprehensive deliberation or a complete, carefully-delineated strategy. After a few tentative years, a consistent and comprehensive policy was formulated, at its center stood the Office of the Chief Scientist. This policy relied on an appropriate human infrastructure, made up of university graduates in the sciences and former defense system and IDF personnel, who successfully realized advanced technology's practical and commercial potential. Bold in its technological innovation, the defense establishment allocated significant resources to R&D

and technological applications, and served as a major catalyst for the development of Israel's knowledge-based industries. The domestic supply of skilled employees and the abundance of educated, motivated new immigrants in the 1990s also made a significant contribution towards accelerating this industry's progress. Beginning in the 1980s, government policy also played a significant role in creating the venture capital industry, which was crucial in promoting technological entrepreneurship. To this day, this model is emulated in numerous countries. These factors, along with the policy delineated for supporting business entrepreneurship and civilian R&D, promoted Israel's leading status world-wide in high-tech enterprise and produced a flow of foreign investment directly into scientific and technological innovation. The timing of Israel's advanced technology developments corresponded with the world business cycle, facilitating attainment of these achievements.

World-wide, development of these industries gathered speed. International demand for new technologies was not satiated: on the contrary, new inventions produced new demand, creating non-linear growth in the advanced technology markets. Israel has a competitive advantage in supplying these technologies, whether through cultivation of new companies, or as a global sub-contractor of new inventions and technologies that develops and sells technologies to existing companies. One manifestation of the success of the business model of Israel's high-tech sector, which combines science and technology with enterprise, is Israel's ranking second in the number of technology companies traded on US capital markets. As long as Israel continues to protect its leading status in science and technology fields, this model will succeed and even expand beyond technology producers to sectors that use these technologies. In the field of ICT (information communication technologies), Israeli excellence is especially prominent, with extensive production by Israeli companies in Israel and abroad. Maintaining and promoting Israel's comparative advantage in advanced technologies will require Israel's increasing support for scientific research and technological development, and employing new tools that are appropriate to changing conditions.

In order to enable economic growth rates of over 6% real annual growth for the coming years, Israel's success as a focal point of high-tech industries must be maintained and even augmented, on the basis of leveraging R&D and technology: deepening and further expanding the utilization of their gains in existing areas, and dispersing their benefits across new realms.

High-tech sectors have made a very substantial contribution to Israeli export (high-tech exports currently comprise about 40% of the total export), which has been almost exclusively responsible for solving the problem of the economy's balance of payments in recent years. However, in the future the economy will not be able to be based solely on a single growth engine. High-tech sectors produce about 9% of Israel's business sector's output, and employ, by the broadest definition, only 6-7% of Israel's civilian labor force (see list of high-tech sectors in Table 1 in the

appendix to Chapter VII). Achieving balanced, sustainable economic growth of 6% a year overall will require making balanced, concerted efforts in other channels as well – those of traditional and service sectors (see elaboration in Chapter VII). Given Asian countries' rapid technological development, Israel must promote innovation and creativity in order to maintain its leading position in advanced technology sectors and their applications.

Policy measures must be adapted to the objectives for the coming years, and new tools must be constructed that are appropriate and effective for high-tech sectors. These include providing infrastructure and training manpower, which involve considerable public investment (see discussion in Chapter VIII on higher education and scientific research and Chapter XI on national infrastructures). Instruments of support and encouragement, and new or amended incentives must be created to promote the use of the economy's existing resources and abilities, in order to create and utilize new business opportunities at home and abroad. In a 2006 study conducted by the RAND Corporation for the US National Intelligence Council, a forecast was constructed of 16 most promising applied advanced technology fields to the year 2020 (in the fields of bio-technology, nano-technology, materials and information technologies).⁷ The study also assessed the capability of 29 different countries to develop and assimilate applications in these fields, based on numerous characteristics, including scientific and technological capabilities, availability of funding sources, support for innovation, ability to absorb advanced technology, and other measures from the realms of government, society and economy. Israel is among the most advanced countries that were assessed, along with the US, Canada, Germany, Japan and Korea. However, this positive assessment, based on the state's past achievements, requires nurturing of Israel's scientific/technological research and education capabilities.

The following five most influential factors in terms of promoting economic growth and productivity arise from many other studies that have been conducted throughout the world⁸:

1. **Strengthening human capital and realizing its potential.** Ensuring a regular supply of scientific, technological and engineering manpower on a large scale and of the current standard; increasing higher education's quality and technological relevancy; providing incentives for ongoing training and life-long learning; cultivating and managing organizations based on entrepreneurial knowledge. The IDF is one of the primary sources of human capital for ICT in Israel.
2. **Maintaining the advantages of ICT** in which impressive achievements have been made in recent years, and developing ICT skills; encouraging competition in the communications markets; expanding the use of computers and communications to additional areas; developing digital content and reducing the local "digital divide" in the population.

7 The list of technological application fields identified in the study as having substantial potential can be found in Table VI-1 in this chapter's appendix.

8 See for example: Going for Growth, OECD 2007; and Micro-Policies for Growth and Productivity, OECD 2007.

- 3. Creating close cooperation between science and technology.** Improving the quality of publicly-funded university research; encouraging the relationship between industry and academia; encouraging the demand for new technology intensive products, processes and services.
- 4. Building new science-intensive areas with business potential** in fields beyond the information and telecommunications industry, in which Israel has specialized so well in recent years. Examples: bio-technology, chemistry, materials, molecular biology, etc.
- 5. Promoting the creation of new companies, entrepreneurship and innovation.** Increasing access to venture capital; training for innovation management in various areas. Technological and scientific innovation will continue to serve as the base for maintaining Israel's comparative advantage in the future. Chapter IV, Israel and the Global Challenge, expands on the issue of creating global companies. However, given the rapid economic/ technological development of economies in Asia and elsewhere, Israel must enhance its advantages in creativity and scientific/ technological innovation in order to maintain its leading position.

Vision and Strategy

The prosperity and growth that Israel has experienced in recent years must be cultivated and intensified, through the formation of a science- and technology-intensive industry cluster that includes a variety of influential leading industries, while creating new areas of innovation and excellence. To this end, the establishment of new enterprises must be promoted in an extensive, comprehensive manner, and large, globally-influential companies must be nurtured and efficiently utilized, through directed economic development processes. Economic development processes, especially those relating to knowledge-based industries involving skilled, educated manpower, combined with social assurance to low wage earners and traditional sectors, may ultimately lead to: improved efficiency; attracting young people to science/technology studies; more balanced growth among the various sectors; employment opportunities for all; a greater degree of equality in income distribution and reduction in poverty; the adoption of modern technologies in various sectors; continued promotion of basic and applied research; improved transfer of technologies from universities to industries; and a dynamic policy attentive and adaptable to the needs of a frequently changing, competitive world.

Government's Role in Technological Development and Research

Government activity in various areas can critically impact upon the economy's technological development and research activity. R&D is defined as a systematic, original activity designated to add new scientific or technological knowledge, or to develop a new application on the basis of existing scientific or technological knowledge.

The following survey of these effects underscores achievements and future needs for government support.

1. Basic Research and Creating a Research Infrastructure vs. Business R&D

For a number of years, Israel's R&D expenditure (4.5-4.7% of the GDP in recent years) has been the highest in the world, first by international measures. Even in terms of R&D expenditure per capita, it is higher than that of other industrialized countries, about \$1100 per capita for civilian R&D (comparable to the highest among OECD countries, including Sweden). However, in recent years substantial changes have occurred in R&D funding: a significant reduction in government funding, and a significant increase in business sector funding. Business R&D is directed toward short-term results, not towards ensuring knowledge and human capital infrastructures for the long term. This development is two-sided. On the one hand, relatively decreased government funding for R&D demonstrates the maturity of Israel's business sector, which has taken upon itself a larger share of investment and risk. On the other hand, the business sector prefers less risky R&D investments. Thus the economy foregoes investments involving a larger degree of basic research and innovation. Typically not directed toward one product or process, these investments bear fruit in the longer term. By their nature, they are riskier, but have greater external advantages. Therefore, government support must focus primarily on basic research and basic development, in which the business sector invests less, while less-risky applied development will be under the responsibility of business.

2. Promoting Technologies and R&D – Direct Impact

Government programs dedicated to the promotion of technology and R&D fulfill an important role in encouraging innovation and R&D activity, both directly and indirectly. Due to market failures stemming from the difficulty in imposing a price on all sectors that enjoy the fruits of R&D spillovers, relying exclusively upon private funding will produce an insufficient scope of R&D activity in the economy, particularly in fields of high scientific-technological uncertainty, that involve finding breakthrough solutions. In the past, Israel's governments contributed significantly to the shaping of R&D and the high-tech industry in Israel, including taking the role of leading user/client/developer of advanced military technologies; establishment of the Office of the Chief Scientist in the Ministry of Industry, Trade and Labor; and establishing the Israeli venture capital fund industry. It is important that government continue to contribute to future technological advancement and support R&D, but in new ways.

3. Promoting Technologies and R&D – Indirect Impact

There are a number of government support programs for capital investment in various fields and geographical areas, which encourage creation, dispersion and assimilation of advanced technologies. Not specifically geared toward R&D or innovation, or even considered an R&D expenditure, these programs do in fact support these issues, at times significantly:

- **National geographical priority areas:** The Law for Encouragement of Capital Investments allows companies to receive generous government grants in return for investment in development areas in Israel (for example, Intel in Kiryat Gat). In 2004, subsidization for these and other programs came to about NIS 1,400 million. Opinions are divided as to the advantages of the Law for Encouragement of Capital Investments. Studies conducted on this issue do not support the premise that providing grants increases employment and output in development areas. The benefit to technological advancement is even more dubious. Use of this support tool should be focused only on needy communities that can produce proven benefit.
- **Tax incentives:** Israel offers various tax incentives for capital investment, including for moving one's domicile or business to development areas, which gives "approved enterprise" status that entitles to forgoing of VAT and income tax. This is not considered a direct expenditure in the government budget (although a budget estimate is published every year along with the state budget by the State Revenue Administration). Thus for example, in 2006, the scope of tax benefits under the Law for Encouragement of Capital Investments totaled an estimated NIS 2.4 billion, some of which contributed to technological development and job creation in advanced and mixed/advanced technology. Tax benefits for R&D were estimated at about NIS 1 billion. It is difficult to assess the contribution to promoting R&D and technological development in Israel. In the case of encouragement through tax benefits as well, use of the tool should be examined on the basis of a clear cost-benefit approach.
- **Funding of higher education institutions:** Another subsidy that is not directly taken into consideration as support for innovation and R&D activities includes the funding of seven universities (two-thirds of the higher education budget) and of "public" college budgets. This amounts to approximately NIS 3.5 billion for universities, beyond research fund grants. Of the national expenditure on R&D, only 40% of the Planning and Budgeting Committee's contribution to universities' budgets is considered a direct R&D expenditure. This percentage was determined by an (historic) employment survey of researchers at Israeli universities, according to the guidelines of the Frascati manual for compiling R&D expenditure data, which is used by the OECD countries.

4. Promoting Technologies and R&D – Impact of Government Investment on Private Investment

Experience shows that government investments can potentially impact significantly on business sector investments supporting innovation and creation of new industrial clusters. For example, since 1991, the Chief Scientist has invested about \$30 million a year to support 24 technology incubators and hundreds of projects operating within them. Only some

years after this investment was initiated did the business sector begin to understand its hidden business potential. In the late 1990s, private investors began to invest in incubators; this investment has increased significantly in recent years. In 2006, private investment in technological incubators and the projects operating within them was four times greater than that made by the Chief Scientist. This is an example of government intervening where there was previously a market failure, creating a business field that subsequently matured and gained legitimacy, similar to the process that occurred in the 1990s in the field of venture capital funds. These examples illustrate the importance of government activity in developing new technological/economic realms in the future as well.

5. Ensuring a Competitive, Open Environment for Doing Business in Israel

The World Bank publishes a yearly international report on the Ease of Doing Business, in which countries are ranked according to ten equally weighted topics⁹. In 2007, Israel was ranked 26th out of 175 countries. Israel must improve its business environment in order to attract foreign multinational companies and companies established in Israel, to develop advanced technology and create global companies. Israel's weaknesses are primarily in obtaining licenses, employing workers, registering property, paying taxes and enforcing contracts. Other rankings, such as the World Economic Forum's Global Competitive Report, also indicate the need for improving many aspects of Israel's business environment, especially those affected by the size of the public sector, public institutions, and public policy. Having a technologically-skilled labor force will not suffice in order to make Israel a magnet for multinational high-tech companies. Its distance from markets, as well as the diminishing human capital and wage gaps for skilled employees in Israel versus other developing countries, reduce Israel's comparative advantage and necessitate improvements in additional areas.

Dilemmas and Problems

Israel's thriving entrepreneurial high-tech sector enjoys leading status in the world, especially in ICT. It conducts excellent academic research in many areas. This notwithstanding, we must remember that today's achievements are the fruits of yesterday's investments in research and wise government policy, along with external factors and circumstances that will not necessarily recur. Concerns regarding Israel's future status intensify in view of the following threats:

⁹ The World Bank and other bodies such as the World Economic Forum, publish measures for ranking competitiveness and quality of the business environment in different countries in the world. These measures are influenced in part by the quality and efficiency of government, and in part depend upon the business sector's development. The measures are based on data regarding the bureaucracy involved in starting and closing a business, employment and dismissal regulations, the ease of achieving authorization and permits, registration of ownership of assets and intellectual property, achieving credit, protecting investors and stockholders, taxation, foreign currency regulations and international trade, and so on.

- 1. The risk of deterioration in Israel's future scientific abilities** due to **universities' weaknesses**, a thinning of academic faculty and a "brain drain". In the past, these very factors were the secret of success of Israel's knowledge industry.
- 2. Cuts in Israel's scientific research** in recent years, cumulatively totaling about 20% in university budgets (despite the doubling of the number of graduates), and inadequate budgeting for research and designated support programs in science-based industries, such as biotechnology, agriculture, space, alternative energy and more.
- 3. Diminishing of Israel's comparative advantages versus EU and Eastern Asian countries**, which are currently making giant steps towards developing their own high-tech sectors, some of them employing characteristics of government R&D policy that was taken by Israel for years.
- 4. The challenges of globalization and maintaining Israel's competitiveness in the new competitive world** will require altering the formula for non-industrial R&D activities. Compared with many other countries, Israel's government expenditure on R&D objectives for public welfare, especially in areas such as agriculture, the environment, and public health, is very low. Also, support for university R&D is based on historical costs by various fields of knowledge, in accordance with development programs set by the higher education institutions, and does not adequately reflect national strategic objectives for scientific/technological development. See Table 2.
- 5. Incompatibility between state priorities and a dynamic world of global competitiveness** in the technology, capital and R&D markets. For example, the priority given to allocation of public resources for defense purposes over civilian or social purposes; the emphasis placed in industrial policy on developing manufacturing products and technologies, while ignoring innovation in its broad sense and the services sector; the low priority given to investment in public welfare, the environment, and development for future generations.
6. The direct government expenditure on civilian R&D and support for R&D totals about NIS 4 billion (0.8% of the GDP), so that the government's direct share in civilian R&D activity in Israel is about 17%¹⁰. Other support programs (the Law for Encouragement of Capital Investment, support for development areas, support for all levels of education, etc.) add about NIS 6 billion, some of which supports investment in innovation and attaining education. Allocating and managing these considerable sums is not necessarily compatible with the great challenges facing the Israeli economy. Policy-makers have not set clear explicit goals that withstand the test of benefiting public welfare and the foundation for future scientific/technological capabilities. The overall systemic view of the total support for science and

¹⁰ Israel's R&D accounts for about 4.7% of the GDP; the government's share through direct funding is about 0.8% of the GDP, or 17% of civilian R&D (0.8 divided by 4.7).

technology, which is currently dispersed among various branches of government, is inadequate. A long-term view is needed, that integrates the issues of investment in basic research, training of researchers, training of academic and engineering manpower, and coordination between government branches (the Chief Scientist and the Investment Center in the Ministry of Industry Trade & Labor, the Ministry of Science, the Ministry of Education, the Council for Higher Education-Committee for Planning and Budgeting, the Ministry of Housing, the Ministry of Finance, the National Council for R&D, etc.).

- 7. Most of the government expenditure on R&D is focused on supporting R&D in technological industrial sectors and universities.** About 30% of the government expenditure for civilian R&D, about NIS 1.2 billion in 2005, is directed towards supporting industrial R&D (of which over 60% goes to ICT sectors), and about 49% towards supporting university research (the Planning and Budgeting Committee's support for universities in the framework of the "research model" – about NIS 2 billion in 2005). **This is despite the fact that all manufacturing sectors together produce only about 22% of the business product** in Israel. **The government's limited support for R&D outside of the advanced technology manufacturing sectors diminishes the possibility for developing the majority of business sector industries** and increases the risk involved in these sectors' growing share in the economy, given the intensifying international competition (see expansion in Chapter IX). Table 1 presents the scope of government R&D expenditure (direct government R&D and support for civilian R&D at two points in time – 1998 and 2005). As we can see, the absolute government expenditure on R&D has increased by about 2.2% a year (totaling about 17% over seven years). However, this rate is lower than both the economic growth rate and the increase in the overall scope of R&D. The table also illustrates that only small changes have occurred in the targets of government R&D expenditure during this period. The important question is whether government expenditure is directed to the right targets, that is, is support directed to areas of significant market failure, high risk and high likelihood of innovation and sectoral breakthroughs with external impact.

Table I: Government Expenditure on Civilian R&D by Target

(in NIS and % of government R&D expenditure)

	1998	2005
Total government expenditure on R&D (millions NIS)	3,580	4,173
Technology and product development (mainly programs of the Chief Scientist in the Ministry of IT&L)	36.7%	30.1%
Agricultural R&D	7.7%	7.2%
University research	43.9%	48.8%
Support for other technological R&D	5.1%	3.1%
Research on education, welfare, and social sciences	3.3%	6.9%
Support for research infrastructure	0.6%	1.6%
Other	2.7%	2.3%

Source: National expenditure on R&D 1989-2005, Central Bureau of Statistics

8. Israel's knowledge and technology industry has relied on government policy guided by two principles. **The first principle** was that of government intervention by supporting R&D due to the market failure in this area, primarily of positive **external impacts** on society, that are not expressed in returns to firms or individuals. **The second principle** was that of **neutrality** in government involvement, based on the recognition that the government lacked the knowledge that could give it an advantage over the market in selecting preferred sectors. In fact, criteria were adopted for R&D grant allocation, which gave clear preference to R&D projects in ICT fields, where results can be seen relatively quickly – within a few years – as opposed to the longer time periods and riskier prospects of fields such as bio-technology. Government intervention in supporting R&D will be needed in the future as well, as market failures will exist in knowledge industries, justifying an active government support policy. On the other hand, significant changes have occurred that warrant re-evaluation of the neutral support policy. Expansion of knowledge and technology industries based on government R&D policy has gained significant impetus world-wide. Many countries, large and small, have entered this activity with great force, not on the basis of market preferences but rather by government selection that has been formulated into extensive, comprehensive government support for targeted sectors. **Targeting** does not take a neutral stance but rather actively chooses sectors on which the state will focus. We must consider this policy's implications for Israel: should Israel maintain its completely neutral approach as it has done for the past thirty years or so, or should it change and vary its approach?
9. From the outset, the policy of the Office of the Chief Scientist's for supporting civilian R&D in Israel was characterized by "neutrality". Selection criteria for applications were uniform across all areas, without explicit preference for one sector or another. Through

this policy, successful technological enterprises could receive support and could prosper, while unpreventable errors involved in trying to predict which areas would be economically successful, were avoided. In fact, however, **the policy created government R&D support that was oriented toward manufacturing and technology development sectors, primarily in ICT** (see Table 2, below). While the Chief Scientist's policy was neutral, the national system was biased in favor of these sectors, whose success stemmed in part from the national bias, and in part from military R&D investment's preference for ICT. Today, following high technology's impressive international achievements (especially those of ICT), we require a strategically directed policy with a long-term perspective, which will reconsider some of the basic assumptions of the past, in view of changing present and future conditions. Such directed policy is needed to balance the market failures and system failures that characterize time-intensive developments; global developments that point to a widespread expansion of countries that are entering the R&D realm with great force and that employ a targeting policy; technological and economic uncertainty; significant external effects of investments in various realms; built-in knowledge gaps between entrepreneurs and investors; and distance from markets. The more government support for civilian R&D is directed towards basic research and basic development, as we recommend here, the better the chances for creating a comparative advantage for a large cluster of existing and future sectors. We propose an additional structured consideration for assessing government involvement. According to our proposal, one of the most important considerations for assessing investment for the purpose of granting the Chief Scientists' support will be systemic evaluation, according to criteria to be set by experts in the field, regarding the significant external benefits of a given investment.

Table 2: Chief Scientist's Allocations by Target

Technological Category	2006	2005	2004	2003	2002	2001
Electronics, electro-optics, ICT	63%	66%	67%	71%	75%	73%
Chemistry	4%	3%	2%	3%	3%	3%
Life sciences	28%	27%	23%	22%	18%	19%
Other	5%	4%	8%	4%	4%	5%

Source: OCS 2006

10. The overall expenditure on civilian R&D (4.7% of Israel's GDP), one of the highest in the world, is misleading. It conceals surplus allocation for "development" at the expense of "research". The Israeli government's share in civilian R&D has declined continually from 37% in 1991 to 23% in 2003. At the same time, the business sector's share in R&D has increased over this period from 43% to 69%. Seemingly, this is not a negative occurrence, in that it may reflect the business sector's maturity and strong ability in recent years. The

business sector can and must fund business development, as it has indeed done increasingly in recent years; however, the "market" cannot lead research. Basic scientific research suffers from "market failure" due to its long-term and uncertain nature, and the relatively large investment it involves. Thus "research" is defined as investment of funds, primarily in order to produce knowledge. "Development", on the other hand, is the investment of knowledge primarily in order to create a product (i.e., income from sales). A large part of scientific research is done not in order to achieve a specific economic/technological end, but rather to achieve understanding of processes and produce scientific abilities, the practical outcomes of which cannot be foreseen. This research, however, is essential for creating the knowledge and insight by which to educate scientists and technologists, who can in turn harness and leverage innovative technologies to create products and services. Research that is funded primarily by the business sector will always be oriented toward achieving short-term results, at the expense of long-term development that only government (and generous non-business-motivated donations) can fund. The government is obligated to focus on funding research. Policy by which the government reduces budgets designated for support of **development** and transfers the funding burden to the market can only be appropriate if at the same time government increases its **research** ("science") and basic development (as opposed to applied development) budgets. In fact, a decline is occurring in both types of government activity. One of the problems that make policy analysis difficult is the binding of both research and development activities under one inclusive term - R&D.

11. Cuts in research budgets inevitably affect the ability to recruit and keep university staff members, who are to create the next generation of researchers and users of science and technology. The current policy intends to change the trend of recent years (this was one of the motives for establishing the Shohat Commission, which clearly stated the need for increased academic research). However, fixing the damage of recent years will require significant investment. International competition over academic talent is a strong lure for young researchers to make their future abroad, which constitutes a serious risk to the generation of technological and scientific researchers and developers in Israel.

12. Existing funding mechanisms and available capital for establishing enterprises are also biased towards ICT industries. Just as the government judiciously discerned the need to support the establishment of a capital venture industry to develop these industries 15 years ago, today government must activate venture capital in higher-risk areas requiring greater investment and longer-term returns on investment than in ICT (as in bio-tech, for example).

Recommendations

The recommendations listed below are to be implemented according to the following guiding principles:

1. Government intervention is warranted only in cases of significant market or system failure.
2. Government should address and treat "research" and "development" activities separately, and split the term "development" in two: "basic scientific/technological research" and "applied or engineering development"¹¹. Government must provide resources and infrastructure to enable R&D and innovation, increase its investment in research, and, to a lesser degree, in basic development, and support engineering development only minimally (to be financed by business).
3. Government support programs should be assessed continually and regularly, and the findings of the assessment published. Implementing findings and establishing a government support policy for R&D requires that an updated database serve as an integral part of any government support program. Databases will be expanded and updated on an ongoing basis, and include data on science, R&D and innovation activities and their economic contribution.
4. The organizational system must be adapted to future action in three areas of policy change:
 - **Creating a very senior governmental body, to be responsible for prioritizing planning and policy-making** in an ongoing, forward-looking manner. The new body will address education, science, technology and innovation issues, hence its name: the National Science and Technology Council (Hebrew acronym *Malmat*). This recommendation stems from the complexity, the protracted development and the varied nature of the factors that need to be harmonized in order to create appropriate policy for science, technology and industry. It also reflects the need to adopt a dynamic, flexible, adaptable, active and initiating process for prioritizing policy, as opposed to setting reactive frameworks and means at the operational level, which were successful in directing Israel's' economy on the right path in its first stages (see also Chapter V on institutional changes in public service).
 - **Strengthening the free business environment** in Israel, which is open to competition and globally-oriented, and developing the necessary infrastructure to encourage Israeli companies to take advantage of technological achievements at home and abroad;

¹¹ The term "research" relates to the stages of creating new scientific/technological knowledge and technological problem-solving that is not directed towards a specific economic goal. The term "development" relates to applying new knowledge and adapting it to a well-defined goal, typically in a business framework. Development will be considered "basic" if it is generic knowledge or technology that serves various applications. "Engineering development" is designated as the adaptation or assimilation of existing technology into a specific application.

making Israel attractive for multinational corporations in broad and varied sectors; and enabling strategic connections and cooperation with important forces in the world arena, new and old, at the national and corporate levels. Studies conducted abroad indicate that the presence of international high-tech corporations domestically, makes a significant direct contribution to the scope of domestic R&D activity (Intel in Israel, for example); its indirect contributions are no less important, in the form of “spillovers” of technological knowledge and experience in work methods and organization of business R&D activity.

- **Promoting technological innovation and basic research in universities, and recognizing their third function** in transferring technology, assimilating innovation, and creating an ongoing base for existing and new high-tech sectors in the economy. This objective will be achieved by developing new relationships between the producers of new technologies and scientific inventions (the researchers) and potential users in the various industry and service sectors.

Following is a list of concrete recommendations for changes in each of the three policy areas detailed above:

4.1 Appointment of an Advisor to the Prime Minister on Science, Technology and Research and creation of a new, very senior government body to be responsible for the process of prioritizing planning and policy-making on these issues: the National Science and Technology Council (*Malmat*)

Given the vast implications of education, scientific and technological R&D and assimilation of new technologies in broad industry sectors and the economy overall, we propose to establish a **council** of senior rank that transects all relevant government ministries and bodies. The council will set priorities for delineating policy, and will coordinate the implementation of publicly-funded measures. The council will facilitate regular, ongoing activity at the strategic (not operational) level of outlining and assessing policy. It will be based in the Prime Minister's office, and, similar to the South Korean model, will obtain the PM's prior approval for its general operating budget. The council will also be linked to the Office of the Chief Scientist, as operational experience and developments on the ground are to be central in identifying new strategic priorities and translating them into new policy guidelines. However, the council must be independent of the Office of the Chief Scientist as regards proposals for new priorities, setting criteria for identifying the external benefits of single-discipline and sectoral R&D, new programs and reassessment of prior policy guidelines (all currently carried out by the executive units themselves). Actual budget allocation to firms according to the council's policy will be executed by the Chief Scientist.

- **The new council's main functions:**
 - To identify and specify **strategic priorities** for areas under its responsibility which require investment. In setting priorities, the council will consider the state of the economy, its developmental level, the resources at its disposal, its needs and its integration into the global system. Council decisions will take into account the market failures that prevent achievement of the objectives under given circumstances.
 - To characterize **Malmit's general policy** for Israel, and for the next 5-10 years. For example: assimilating advanced technologies (especially ICT) into broad economic sectors and cultivating ICT firms to become Israel-based global companies.
 - To set criteria for identifying significant external benefits of firms' investment in R&D, and to determine their weight in the decision on providing funding for the investment.
 - To fulfill a central professional role in **setting an integrated national budget** for all aspects of science and technology policy in Israel.
 - To fulfill a **"coordinating" role between the various ministries and bodies** involved in science and technology policy (especially at the strategic level).
- **Strategic priorities and principles for setting science and technology policy.** The recommendations for strategic priorities in these areas will be based first on **broad national objectives**, then on **specific goals to achieve these objectives**, and finally on **identifying specific areas of activity** that are affected by science and technology policy. These three levels must guide the priority-setting process. According to this approach, three criteria direct the setting of goals: a) the existence of active companies with very high abilities and large growth potential; b) a real possibility for *cooperation with leading reputable high-profile foreign elements* already active in the region; and c) the possibility to *achieve and maintain, within a relatively short period of time (five years, perhaps) a significant global market share*. Examples of potential areas whose transformation into Multi-Agent Structures (clusters of firms with horizontal or vertical affinity with each other) should be considered, include public security; stem cells; other specific life sciences fields; clean-tech and ICT fields.
- **Setting priorities in a systematic, comprehensive manner involves identifying promising areas and new technology applications that require appropriate support and public promotion in order for them to develop and grow into thriving industries with significant shares in world markets.** Promising new technology-based national industry and research clusters include water technologies, advanced agricultural technologies, ICT, alternative energy, space industries, life sciences, public security, chemical industries, and nano-technology. Discussion of these clusters will be expanded below.

4.2 Strengthening the free business environment

In this area, a number of vertical policy areas are specified that may affect productivity and innovation across industries. Also known as enablers, they offer fertile ground for encouraging innovation and enterprise based on R&D and advanced technology. Some of the policy measures involve public investment, whether by supplying infrastructure or free public services, or by direct support grants, or by tax reductions. Others involve legislation, regulation or setting standards, which do not require designated budget expenditure. While the measures in the second category are typically attained at low cost to government, mostly for enforcement of regulations, they are not necessarily any less efficient in encouraging innovative activity than measures involving public investment.

The following proposed measures will serve as general incentives; remove obstacles to innovation in Israel's business sector; and make Israel more attractive to companies competing and operating in global markets. Measures that should be utilized include: a) creating an open, competitive business environment, accompanied by efficient systems of law enforcement, capital market and public acquisition; b) reshaping regulatory rules and removing the protective measures that hinder innovation and the adoption of technology on the one hand, and adopting leading standards in new areas for the development of new technologies and industries, on the other; and c) providing incentives and building infrastructures that will help to attract global companies. Following is a list of issues that require attention and policy change in order to create a better business environment.

- Regulations regarding foreign experts, researchers, and students, that allow for temporary employment, shared R&D enterprises or academic studies; thus introducing knowledge acquired abroad and strengthening connections with other countries upon these individuals' return to their countries.
- Trade and taxation agreements with major trade partners and harmonizing legislation and regulations regarding intellectual property rights.
- **Fiscal incentives for R&D, innovative activity and global expansion**
 - Considering granting tax credits for R&D expenditures, in addition to the existing tax deductions, as a substitute for some of the present direct support (factors to consider include, among others, the importance of timing of funding and of projected revenue), training and activities in the field of innovation. As a growing number of countries are encouraging domestic R&D activity and attracting foreign R&D investments by providing these kinds of incentives, Israel will suffer unless it offers similar benefits. The precise nature of activities that warrant incentives should be carefully defined.
 - Careful assessment of competitive tools included in other countries' R&D policy, and their impact upon Israel.

- **Means to facilitate the attraction of multi-national corporations to Israel**
 - Signing international agreements and strategic agreements.
 - Providing tax benefits to Israeli companies that acquire other companies, in order to encourage the growth of global Israeli companies which otherwise would be too small to compete efficiently in the international arena.
 - Instituting a program to motivate Israeli companies to maintain headquarters in Israel, and foreign companies (or Israeli companies that were sold abroad) to situate their headquarters in Israel. (See also Chapter IV, Israel and the Global Challenge, sub-chapter on creating global companies.)
 - Considering providing a tax exemption on interest from foreign sources and profits from R&D royalties, as long as a certain percentage is invested in domestic R&D or in another recognized activity.
 - Considering granting tax relief for transfer of capital and equipment between branches or subsidiaries abroad of international corporations whose headquarters are based in Israel.
- **Providing modern infrastructures for rapid growth and an innovation-driven economy**
 - High-level labor force at all levels – technicians, researchers and scientists (see Chapter VIII).
 - A high-quality, efficient physical infrastructure system (see Chapter XI).
 - Modern, efficient communications and information infrastructures.
 - Systems for sewage and waste removal and purification systems (see Chapter X).
- **Continued development of capital markets and funding mechanisms**
 - Additional sources of entrepreneurial funding, particularly for sectors outside of ICT.
 - Continued reforms for encouraging competition; capital market and banking reforms to enable varied funding tools.
 - Creating funding mechanisms for small-scale start-ups.
- **Data collection and development of methodologies for evaluating government support programs**
 - After years of neglect due to lack of funds, the government must ensure allocation of appropriate budgets for updating economic databases on an ongoing basis; databases should include input-output data and data on essential scientific research and innovation activity. Investment will also be required to develop new measures for

evaluating technological trade balance and services sector development, which the OECD countries have been promoting. Data collection is the basis for policy planning and assessing outcomes; it is one of government's clear roles.

- A statistics infrastructure must be developed for evaluating government R&D support programs, based on specific data that enable estimating programs' economic impact. Awareness must be raised of the importance of assessment, by conditioning programs' execution/expansion upon the existence of a data infrastructure. In the OECD countries, it is customary to inform the public of the scope and impact of government support programs, through printed reports and on the internet. When Israel joins the OECD, it will be appropriate for it to adopt this transparency as well, regarding its support policies for industry and R&D.

4.3 Nurturing universities' technological innovation and basic research and recognizing their third role

- Significant investment is required in university teaching and research (see also recommendations in Chapter VIII, Higher Education and Scientific Research). In addition to their regular missions, universities must be recruited for a third task: promoting innovation and transferring knowledge to the business sector. This task of the universities includes technology transfer, conducting applied research and cooperating closely with industry in order to realize the fruits of scientific research. This third role may fail, however, if assessment of faculty members continues to be based entirely on the exclusive criterion of research and academic publishing. Thus, for universities to succeed in their third role vis-à-vis applied research and transfer of technologies, significant changes will have to be implemented in their structure, assessment procedures and incentives for faculty. The essential principle of academic freedom requires that this objective be fulfilled with the consent of the academic institutions, not coercively.
- Cooperation between academic and non-academic research institutions selected by the National Science and Technology Council (*Malmat*) should be considered. The business sector will be substantively involved in determining the activities (similar to the Engineering Research Centers model in the US). Cooperation with the business sector will be essential for ensuring the relevancy of the research topics and assimilating the fruits of research into economic sectors. The institutes may assume a virtual format, or use physical facilities, given justifiable considerations for operating laboratories and equipment. Experience has shown, however, that it is recommended **not** to establish independent government-sponsored laboratories and national research institutes. These require continued funding and do not enjoy the atmosphere of innovation and research assistance that students provide (and as exists in universities).

- Technology-transfer offices in universities and public research institutes should be made more efficient, and have a business/applications orientation, by speeding up processes of legislation regarding publicly-funded intellectual property, and determining researchers' share in the incentives.
- Including business sector-related projects in required studies for science and engineering undergraduates.
- Increasing the supply of entrepreneurship professions, conducting business plan competitions, and establishing entrepreneurship centers in academic institutions' management studies programs.
- Encouraging penetration into the global market of companies that are based on technologies which were developed in the Magnet program, as part of the attempt to leverage the Magnet program for success in the global market.
- Updating universities' and faculty's incentive systems in a way that will promote applications for the fruits of research; considering such applications' contributions in the academic promotion process.
- Providing incentives to universities and colleges to interact on the technological or business level with the local business community.
- Expanding cooperation between local R&D centers and local colleges, to enhance development and assimilation of innovative technologies, and encourage the periphery.

Required Investment

The national civilian R&D expenditure is nearly 5% of the GDP. This rate should be maintained in the future as well. Government expenditure for various R&D channels must constitute at least 1% of the GDP. The importance of government funding is its focus on decreasing entrepreneurs' risks in innovative, ground-breaking fields. The majority of government support should be directed to scientific research, in the framework of overall science, technology, innovation and higher education policy. The Chief Scientist's support must be focused on basic development, which offers external benefits to the economy. Support for encouraging relationships between higher education institutions and industry must be continued.

Examples of Technology-Intensive Industries with Potential for Excellence and Significant Impact on Israel's Technological Development, and the Risks They Face

The following are promising industries whose potential has not yet been fully tapped. Technology-intensive industries whose success has already been proven (e.g., the information industry) are not mentioned here.

1. Life Sciences

The Israeli life sciences industry is ranked 8th world-wide in terms of number of companies. According to international publications, there are about 500 life sciences companies in Israel (including medical devices, biotechnology, pharmaceuticals, veterinary medicine, and agriculture), a large number of which have been established in recent years. This achievement can be attributed to Israel's academic capability in the life sciences. Many of the companies were started by academics and are situated in proximity to academic institutions. Nonetheless, this industry still faces numerous obstacles, in the realms of funding, policy, infrastructure and human resources:

- **Funding** for life sciences companies is problematic all over the world. The current trend is of funding companies in their advanced, rather than initial, stages. Israeli venture capital funds do not invest in life sciences companies in their early stages. Thus there is a shortage in funding that is designated to bridge the interim stage, of the invention's transfer from academia to industry prior to the proof of concept stage – before the product can be presented to investors. Most of early-stage funding for life sciences companies comes from the Chief Scientist, but the Chief Scientist's direct investment in life sciences is very limited, restricted to R&D. On the other hand, Contract Research Organizations (CROs), which offer clients a wide range of pharmaceutical research services that are essential for the biotech industry, do not meet the Chief Scientist's

funding criteria. Therefore, a shortage in CROs has been created, and many companies seek CRO services abroad, as they cannot afford to carry out these services (such as animal and protein research) on their own.

- Transfer of knowledge between universities to industry is deficient. Most of the study and development of new inventions is done through personal connections and social networks, rather than through structured channels of knowledge transfer.
- While academically Israel is ranked as one of the world's best, it has a shortage of life sciences employees who have industrial experience in the areas of management, development and production. The source of this problem is the industry's developmental stage in Israel. More than 80% of these companies are at the seed stage. Therefore, only a few companies have been successful in taking a product from the research stage to the production stage.

As life sciences industries have a large global market, developing Israel's academic dominance in this field may position Israel as a leader in this market. To this end, the following measures should be taken:

Giving an incentive to multi-national corporations (MNCs) to create development and production facilities in Israel, which will serve as a source for training manpower with industrial experience, and may perhaps even bring back Israelis who work in these industries abroad.

- Developing training programs for company employees and providing grants or alternatively financial support for start-up firms that are willing to implement training for new employees.
- Proposing interim stage funding. Short-term funding is required that will allow companies to present their proof of concept and to obtain funding from the private sector.
- Developing additional CROs.
- Obtaining funding for highly expensive life sciences equipment, in order to drive company development and the overall industry forward.
- Providing knowledge, counseling and training on how to request funding from the Chief Scientist.
- Evaluating IP policy. Sometimes projects funded by the Chief Scientist are part of a complete product and therefore royalties need to be distributed accordingly.
- Signing agreements with other countries, such as China, in order to help Israeli companies penetrate large markets. Currently, international cooperation is difficult.

2. Alternative Energy

Israel has a world-wide reputation for developing technologies for utilizing alternative energy, especially in the solar energy field: Israel is among the world's leaders in developing technology for the purpose of utilizing solar energy. The Ministry of Infrastructure invests in research for advancing the alternative energy field. But during 2002-2005, the Ministry's energy research budget was cut by 33% and budget implementation decreased as well. The National Council for Research and Development recommended establishing a fund for national energy research, to be operated by the public service authority¹². In addition to considerable knowledge in the renewable energy field, Israel also has appropriate climate conditions for the broad development of green energy. In 2005, 45.5 million kw/hr of renewable energy was produced in Israel. This is only 0.09% of the total of electricity produced in Israel, some 48,600 million kw/hr (most –about 78%--of Israel's electricity is currently produced by coal, Israel's knowledge and climate conditions notwithstanding). The field of alternative energy use is still only in its initial stages in Israel, with less than one percent of the total electricity being produced by this kind of energy. Practically speaking, Israel trails behind the world's countries in this field. Israel must be a leader in solar energy use and research, considering its scientific and technological capabilities, its natural attributes, the environmental impact of energy consumption, and Israel's clear political interest in developing energy sources that do not rely upon oil and its products, which will in turn diminish the power of oil-producing countries.

3. Agricultural Technologies

Several of Israel's agricultural fields have succeeded for many years to be at the forefront of innovative production technologies and to achieve peak output. This success can be attributed to farmers; scientists; services, such as training, provided for agriculture; innovative input industry; successful export of quality products that are off-season in target markets; an efficient production and marketing/export chain that involves producers; innovative managing techniques; efficient exchange of labor into capital, with mostly skilled and innovative human capital and an abundance of entrepreneurs. Even initially negative features, such as sometimes-extreme environmental conditions within limited geographical bounds and water constraints, contributed to the need for innovation. The outcome is the ongoing, successful ability to cope with the challenges of land and climate; the constraints of difficult trade conditions; competitive markets for fresh and processed produce; unstable financing conditions; small production scales; and sometimes hostile public opinion in target countries. Israel's agriculture has had extraordinary results in the areas of technological progress, innovation with high productivity, exceeding those of other sectors. However, Israel has not leveraged the agricultural R&D sector as an export industry. Agricultural research

¹² Research and Development in Israel: Report #1 (updated draft), the National Council for Research and Development, June 2006.

infrastructure is diminishing as a component of technological innovation. For example: The Agricultural Research Administration has been weakening continually: from 400 researchers a decade ago, it now employs only about half; only 35% of its budget is designated for research. The Institute of Agricultural Engineering, which is supposed to serve all agricultural sectors, is very limited. The Technion's Faculty of Agricultural Engineering has been merged with its faculty of Civil Engineering.

4. Water Technologies

In 2004, Israel's water industry exports totaled \$825 million: 50% of exports were irrigation products, systems and projects; 15% were gate valves and water meters, 14% engineering and projects; 8% desalination; 8% filters, and the remainder were irrigation computers, pipes, connectors and miscellaneous. Israel's water field is growing and becoming a promising business field, given the high demand for its products in the world market.

The annual growth rate of the world market for "traditional" products such as water and irrigation conductors, for the years up to 2008 is estimated at 6-7%; the annual growth rate of the world market of "new" products such as desalination, recycling, quality, security and more is estimated at 10-12%; the overall market for water industry products is estimated at \$400 billion, according to the following break-down: 65% for infrastructure products, 25% for water treatment, quality assurance and security and the remainder for consumption products and knowledge.

In 2006, Israeli exports in the water market exceeded \$1 billion. Israel currently has a designated technological incubator (*Kanarot*) and more than 60 start-up companies directed to the global water market including massive entry of venture capital firms. 50% of the companies are involved in waste water treatment, water improvement and purification; 5% in desalination; 11% in monitoring and 33% in other issues. Seven countries -- England, Holland, Australia, Singapore, France, Denmark and Israel -- have defined their core capabilities on the water issue. Sweden and Japan have established national knowledge centers on water issues and support international marketing of their water industries. Due to the reduction in technological and scientific training on these issues in recent years, a shortage is beginning to develop in professional manpower, which may damage the sector's future development.

5. Space Technologies

Israel is ranked among the world's ten leading countries in space technologies. Its prominent achievements in this field, despite its meager investments as compared with other countries, indicate a comparative advantage in at least some of these technologies. Israel's space activities have created a flow of foreign investors' capital into the economy, jobs, and

purchase requisitions to industry. They have helped upgrade technological knowledge and create high-quality training centers. Israel has been active in space for 25 years. For each dollar of government expenditure on space, a return of 1.7 dollars has been received from other countries. The economic contributions of space research include developing advanced industry for export; creating penetration capability into the world market by utilizing Israel's expertise in the two most popular satellite fields: remote sensing and communications; promoting collaboration with various countries based on Israel's proven space capabilities, contributing in turn to foreign relations; creating human capital; creating a fertile ground for integrative technological applications; and contributing to employment.

A space technology infrastructure has indeed been developed in Israel, which can be utilized for financial returns, scientific research and prevention of a "brain drain", but the field requires ongoing renewal. We must maintain the quality gap that separates Israel from its neighbors. Unless decision-makers understand and recognize the importance of intensive Israeli space activity, Israel will be left behind and lose the advantages it has gained until now. Therefore, Israel must **turn the space program into a national project and formulate a national policy outlook on the subject of space**. The world's space market is about \$170 billion a year (military and civilian), made up primarily of communications. Israel is one of only eight countries in the world with capabilities in this field. Therefore, a target of 5% of the market is not unattainable. Today the sales of Israeli space companies are an estimated \$600 million (about 0.3% of the world market).

6. Public Security Industries

The world public security market has grown tremendously since the attack on the World Trade Center. In 2006, it reached about \$55 billion (about half in the US alone). This market is expected to grow over the coming decade at a yearly rate of 14%. The sales of Israel's public security industry currently total an estimated \$300 million a year, making up only 0.5% of the world public security market. Despite the huge investment in this area world-wide, in the six years since the September 11 attacks, most of the equipment and knowledge sold rely on knowledge that was developed a decade or more ago. The technological improvement of terror threats exceeds that of adapted anti-terrorism technologies. Therefore, the Israeli industry has a unique, but short, window of opportunity to become a world player, at least in a number of important sub-sectors in public security. However, realizing this opportunity requires an integrated government-led effort, which has not yet been mobilized.

6.1 Opportunities and advantages in Israel's public security industry

Successful multi-year experience in integrating technologies from various fields of knowledge for defense purposes.

- Areas of expertise developed in Israel: anti-terrorism; defense of land, air and sea borders; control and monitoring systems; software and communications for emergency and rescue services; long-distance sensing and observation devices; unmanned devices for observation, sighting, interception, neutralizing, etc.
- Advantages characterizing all of the Israeli security industries: short development periods, developers' practical/security experience; excellent professional and engineering manpower, etc.
- Israel's experience with different types and intensities of terrorism, with which it has coped relatively successfully over an extensive period, exceeds that of other countries exposed to terrorism over the past years.

Due to the multiplicity of players and technologies participating in the developing public security market, Israel should focus on a relatively small number of technological areas in which it has proven success and regarding which demand is expected to increase. For example: airplane, airport and seaport security; land transportation security; border control; security and monitoring systems for buildings and facilities; web and communications security; readiness for handling emergency situations; means of identification and defense against non-conventional (CBRN) weapons; intelligence and international cooperation; control and monitoring systems between various bodies (military, law enforcement authorities, war against terror, emergency services).

6.2 Why is government intervention required?

An estimated 200 private public security companies operate in Israel, some clearly export-oriented. While Israel's industry has a high potential for capturing a significant share of the world public security market, its realization will require special government intervention, for a number of reasons:

The world public security market is much less open to free competition among producers/suppliers than are regular high-tech markets, due to the centrality of government security branches in this market.

- Beyond technological risks, uncertainty regarding future standards and distribution of responsibility between and among government branches, and between private and public sectors, curbs private investment in research and development.
- As in the defense industry, maintaining a leading government client is a first-rate marketing asset that can determine chances of success/failure in the world market.
- Israel has special public security needs. Directed, efficient government investment can respond to these needs, saving hundreds of millions of wasted shekels, and covering the public expenditure by income from exporting technologies. Examples: Alarm and monitoring systems for security fences; devices for detecting tunnels, etc.

Therefore, government organization and support should include the following components in order to give the Israeli public security industry a chance to capture an appropriate market share within a relatively short period (5 years), at least in a number of key public security sub-sectors:

- A designated venture capital fund for public security by government cooperation or subsidization (a government investment of \$10-20 million a year).
- A designated R&D program in the Office of the Chief Scientist's in the Ministry of Industry, Trade and Labor, integrated within a broad systemic perspective based on mapping of national needs in this realm.
- Creation of a staff unit for management and supervision of designated technological developments for public security in the Ministry of Defense (which has, as opposed to the Ministry of Public Security, proven and successful experience with technological development for security needs). Due to the unique connection between public security technologies to the civilian market, this unit should be separate from *MAPAT* (the Administration for Research and Development of Means of Warfare and Technological Infrastructure), but should operate in coordination and cooperation with it.
- Speeding up standards setting processes for standards required in various areas of public security, and defining in a clearer manner the bounds of responsibility for the provision of public security services among the different levels of government (national, district, municipal), among security branches and between the public and private sectors. (Financial investment – zero; organizational and political effort – considerable)

7. Chemical Industry

Israel's chemical industry, which creates about 25% of the industrial contribution to the national economy, has achieved in recent years an impressive increase in sales, export, profits, company market value, contribution to the added value of the business sector, and the number of employees. In 2005, this sector's product (added value) was about NIS 20 billion, some 4% of Israel's business sector product. Despite these achievements, this industry is vulnerable to challenges and restrictions that block its continued growth and threaten to create a crisis in the sector.

To prevent negative scenarios in the future and to enable continued growth, the chemical industry must make large investments in infrastructure, the environment and of implementation and absorption innovative technologies. At the same time, investments are required in physical infrastructure for industry, regulation and scientific and professional education. These last issues require government initiated policy. A detailed report by the Neaman Institute surveys the potential of Israel's chemical industry, and specifies the required investments

and policy measures for realizing this potential. The report describes three potential paths for the development of Israel's chemical industry. On the optimistic path, the report projects growth of the chemical industry's product to about NIS 100 billion in 2025, as opposed to continuing on its current growth path, which will achieve less than half of this product level. The report emphasizes the need for coordination between government, academia and industry to create the conditions and resources that will enable fulfilling the optimistic path, and prevent the sector from spilling over into a waning mode. The report identifies seven recommended areas for development: nano- and bio-technology; pharmacology and bio-pharmacology; public security systems; environmental technologies; renewable energy; transport systems; synthesis of intermediate pharmaceutical and advanced materials. The report specifies numerous policy measures that relate to providing human capital, standards, infrastructures and investments – that will place the chemical industry on the optimal growth path. The report includes a recommendation to establish a coordinating body at the national level, to manage all policy aspects, and estimates the required yearly investment for the next twenty years at about \$150-250 million a year (about 1% of the projected added value for this industry in 2025 on the optimistic path).

Appendix to Chapter VI

Table VI-1: Forecast for Major Technological Applications to 2020 and their Scope of Influence, according to RAND, 2006

		Implementation Feasibility			
		Niche market only (--)	May satisfy a need for a medium or large market, but raises significant public policy issues (-)	Satisfies a well-documented need for a medium market and raises no significant public policy issues (+)	Satisfies a well-documented need for a large market and raises no significant public policy issues (++)
Technical Feasibility	Highly feasible (++)	<ul style="list-style-type: none"> Chemical, biological, radiological, or nuclear (CBRN) sensors on emergency response teams (2,G) 	<ul style="list-style-type: none"> Genetic screening (2,G) GM crops (8,M) Pervasive sensors (4,G) 	<ul style="list-style-type: none"> Targeted drug delivery (5,M) Ubiquitous information access (6,M) Ubiquitous RFID tagging (4,G) 	<ul style="list-style-type: none"> Hybrid vehicles (2,G) Internet (for purposes of comparison) (7,G) Rapid bioassays (4,G) Rural wireless communications (7,G)
	Feasible (+)	<ul style="list-style-type: none"> GM animals for R&D (2,M) Unconventional transport (5,M) 	<ul style="list-style-type: none"> Implants for tracking and identification (3,M) Xenotransplantation (1,M) 	<ul style="list-style-type: none"> Cheap solar energy (10,M) Drug development from screening (2,M) Filters and catalysts (7,M) Green manufacturing (6,M) Monitoring and control for disease management (2,M) Smart systems (1,M) Tissue engineering (4,M) 	<ul style="list-style-type: none"> Improved diagnostic and surgical methods (2,G) Quantum cryptography (2,G)
	Uncertain (U)	<ul style="list-style-type: none"> Commercial unmanned aerial vehicles (6,M) High-tech terrorism (3,M) Military nanotechnologies (2,G) Military robotics (2,G) 	<ul style="list-style-type: none"> Biometrics as sole identification (3,M) CBRN sensor network in cities (4,M) Gene therapy (2,G) GM insects (5,M) Hospital robotics (2,M) Secure video monitoring (3,M) Therapies based on stem cell R&D (5,M) 	<ul style="list-style-type: none"> Enhanced medical recovery (3,M) Immunotherapy (2,M) Improved treatments from data analysis (2,M) Smart textiles (4,M) Wearable computers (5,M) 	<ul style="list-style-type: none"> Electronic transactions (2,G) Hands-free computer interface (2,G) "In-silico" drug R&D (2,G) Resistant textiles (2,G) Secure data transfer (2,M)
	Unlikely (-)	<ul style="list-style-type: none"> Memory enhancing drugs (3,M) Robotic scientist (1,M) "Super soldiers" (2,M) 	<ul style="list-style-type: none"> Chip implants for brain (4,M) 	<ul style="list-style-type: none"> Drugs tailored to genetics (2,M) 	<ul style="list-style-type: none"> Cheap autonomous housing (6,G) Print-to-order books (2,G)
	Highly unlikely (--)	<ul style="list-style-type: none"> Proxy-bot (3,M) Quantum computers (3,M) 	<ul style="list-style-type: none"> Genetic selection of offspring (2,M) 	<ul style="list-style-type: none"> Artificial muscles and tissue (2,M) 	<ul style="list-style-type: none"> Hydrogen vehicles (2,G)

In () after "technology": number of industries in which this technology may be applied, and an estimate of degree of world-wide dispersion by 2020 - G- global dispersion, M- limited dispersion for various reasons.

Chapter VII: Traditional Industries and Services Sectors

Chapter Summary

Industry and services sectors that are classified as traditional or mixed-traditional technologies account for the large part of the business sector's product and employment. These sectors suffer from low productivity per employee, as well as a slow rate of improvement in productivity. Due to their considerable share in the product and in employment, the gains specified in the vision cannot be attained without focusing on improving these sectors' productivity. The key to achieving this objective is to provide incentives to employers to implement innovation, including assimilation of advanced technologies (primarily information and communications technologies, or ICT); openness to organizational changes; considering business model modifications; and aiming to increase export's share in output. The findings put forward in this chapter indicate that company management in traditional sectors lacks awareness, information, and analytical tools regarding the importance of such changes. A detailed situation report for these sectors (including appendices with detailed tables and international comparisons) is also presented. In the absence of one universal remedy for all the required changes, the chapter proposes numerous policy measures for traditional industries. Each measure is quite limited in scope, and aims to raise awareness of innovation's importance in both the technological and the business realms, and to create incentives, in the form of grants and tax benefits, for companies that take concrete measures in innovation and assimilation of advanced technology.

The chapter also proposes to establish university-based "virtual" research institutes per sector, to be funded jointly by the relevant sectors and the government. These institutes' activity will be directed toward clarifying generic problems faced by the relevant industrial and services sectors, in both the technological and the business realms, and transferring and facilitating the assimilation of advanced technologies. **Existing** academic faculty members with appropriate skills will be employed in these centers, as part of their academic duties, along with students studying towards various degrees, who will learn how to implement their acquired academic knowledge and gain close familiarity with market sectors.

The chapter includes a special section on the services sectors, which hold the greatest economic potential. As opposed to industrial sectors, services sectors do not enjoy a designated supportive policy that recognizes their uniqueness. In addition, there is a lack of appropriate infrastructure for gathering statistical data on services sectors' outputs and improvements.

Introduction

Despite the leading status of Israel's advanced technology industry, including information and communications technologies (ICT), and its crucial contribution to improving the balance of payments over the past two decades, the high-tech sector cannot single-handedly maintain the targets for GDP growth and increased employment set by this plan. This is due to the relatively small dimensions of the high-tech sector, and its minor share in employment¹³. This sector's contribution to Israel's economy has been primarily in the production of new technologies and the manufacturing of products shaped by these technologies; it has done less in the way of assimilating new technologies and products within other economic sectors. Therefore, most of the national effort regarding industrial policy for the coming years must be directed toward increasing labor productivity in economic sectors outside of advanced technology, especially in industrial sectors that are classified as traditional or mixed-traditional technology, and in the services sectors (hereinafter: traditional sectors). Classification of economic sectors by technological intensity is based on internationally-accepted measures of the scope of R&D activity and use of advanced technologies; these measures have also been adopted by Israel's Central Bureau of Statistics. Increased productivity in traditional sectors will be facilitated by broadly assimilating and increasing the use of new technologies in these sectors, and promoting innovative business models and management approaches, while strengthening competitive abilities domestically and in foreign markets. This course of action is very crucial, as it will increase income per employee in traditional sectors and reduce income gaps that stem in large part from the dualism existing between the sophisticated high-tech sector and the traditional sectors.

Traditional industries and the services sector, make the largest contribution to the economy in terms of product and employment. They must, then, play an important role in dispersing the advantages of economic growth. In developed countries, including Israel, the services sector accounts for more than half of the GDP and employment. Services sectors and traditional industries are heterogeneous, and include very diverse industries. They employ a great variety of employees, including the economy's largest share of unskilled employees. Tables App-VII-2 and App-VII-3 expand on various economic sectors' product, employment and export in 2006. The internationally-accepted classification of industry sectors by technological intensity can be found in Table App-VII-1. An international comparison of product by different industries is found in Table App-VII-4, and Table App-VII-5 groups the data from the previous table by the various sectors' technological intensity.

In many of Israel's traditional industries, output per employee is up to 50% lower than that found

¹³ Advanced and mixed-advanced technology industries (including services) produced about 23% of the business sector's output for 2006, employed about 12% of the sector's manpower, and were responsible for about 44% of Israel's overall export that year. See appendices for sectors' technological classification (Table App-VII-1), and output and export data (Tables App-VII-2 and App-VII-3).

in Europe and North America. These sectors' product (added value) per employee and capital per employee are also low as compared with their counterparts in the US and Western Europe. Improvement in employee product (labor productivity) in Israel occurs at a very slow rate as compared with other developed countries. Israel's labor productivity grew by only 8% during 1995-2004, as compared with an increase of about 60% in Ireland, 33% in Finland, and about 25% in the US and Sweden, during the same period. The concern is that in the absence of government policy to increase productivity, gaps in labor productivity will only increase. Another important measure is the increase in the economy's total factor productivity (TFP): the share of product growth that is not explained by the increase in labor and capital input, and which is thus attributed to technological and other improvements in productive activity. While developed countries demonstrated about a 1% increase per year in TFP during 1995-2004, Israel's TFP estimates for this period are negative, at -0.75%.

A major factor in Israel's lag in TFP and labor productivity is, apparently, insufficient investment in ICT technologies in traditional and mixed-traditional technology sectors. Most of the investments in ICT in Israel focus on ICT manufacturing companies. Developed Western countries have been wise enough to understand that the more significant economic advantages of ICT come from sectors that utilize, rather than produce, ICT. International experience indicates that investment in ICT in traditional industries and in the services sector may lead to improving efficiency of these industries, which are responsible for two-thirds of the GDP. In the US, for example, the services sector was the primary contributor to GDP growth in the last decade, in large part due to its adoption of advanced ICT¹⁴. Investment in ICT has two primary impacts on growth. The first has to do with the investment's size, and thus is similar to the contribution of regular capital investments. But more importantly, investment in ICT increases labor productivity (product per employee). Various estimates from recent years show that during 1995-2003, investments in ICT contributed about 0.9% to the annual GDP growth rate in the US. In Israel, the contribution of ICT investments has been much lower - between 0.3% to 0.5% a year during this period. Investments in ICT per employee in Israel are also significantly lower than in the US: some 40-50% of the US investment rate. This notwithstanding, investments per employee in Israel during this period totaled 60%-95% of the US rate. The conclusion is that investment per employee in traditional sectors is excessively capital-oriented, and insufficiently directed towards R&D and innovation, resulting in these sectors' low productivity.

Indeed, examining the components of Israel's economic growth vs. those of developed countries in 1989-2004 indicates that, while developed countries have improved their TFP by utilizing investments in ICT and increasing the quality of the labor force, Israel has been able to achieve positive (and, in the past three years, even impressive) growth rates by increasing the level of input: investment per employee outside ICT, and increasing labor inputs by increasing the rate of

¹⁴ Most prominent were those trade sectors that successfully utilized ICT technologies for enhancing logistics efficiency and supplying client demand for products (as done, for example, by Walmart or by electronic trade in financial products).

participation in the labor force and labor hours per employee. The problem with basing growth on increased inputs rather than on technological improvements (that create TFP increases) is that it is very difficult to maintain. There are natural barriers to capital and labor inputs, and when they are reached, growth stops.

In recent years, the OECD countries have demonstrated a high level of policy-making and research activity in services sectors. One reason for this is ICT's increasing potential impact on services sector productivity, and the potential for economic growth by basing services sectors on advanced technologies¹⁵. In March 2007, a number of American and EU companies and research institutes collaborated on a research and innovation initiative in the services sectors.

Interviews, studies and surveys conducted in the framework of this paper indicate that the lack of awareness of advanced technologies and the inability to absorb them sometimes constitute an obstacle to their adoption, with the exception of pockets of excellence. Israel's services sector (as well as its traditional industry) lags behind other Western countries in adopting new technologies, in innovation and in conducting R&D, and as a result, it lags in productivity as well. Beyond adopting advanced technologies, organizational changes and awareness of innovation are additional keys to resuscitating the traditional industries. Support programs must not only focus on increasing awareness of new technologies' value and the profitability of investing in their assimilation, but must also encourage employing new marketing and management approaches and adopting new business models. Recent attempts made by the Office of the Chief Scientist to encourage traditional industries in these directions are commendable, but only a small part of the designated budgets are in fact utilized by traditional sector firms, apparently due to a lack of awareness of the importance of investment in advanced technologies and innovation. Possibly, the office lacks expertise in organizational innovation and familiarity with low- and mid-tech industries. Supplementing resources may help increase awareness to the issue.

Vision and Strategy

Our vision for traditional and services sectors seeks to achieve their stable, sustainable growth and development and to enable their employees to maintain a high standard of living. The majority of the population is employed in these sectors, for the most part earning low wages. Making changes in these sectors' development, then, will be very significant for the entire economy. Their increased productivity will produce a parallel increase in income and wages, facilitating an increase in employees' standard of living. This is also a significant key to resolving social gaps, as a close relationship exists between economic duality and social duality. In the mid- to long-term, there is no other way to achieve a sustainable reduction in the large income disparities among employees in Israel.

The services sectors account for the economy's largest share in employment and output –

¹⁵ See OECD Council 2005 report «Growth in Services Sectors: Promoting Employment, Productivity and Innovation».

about 50% of the employees in Israel's business sector work in services sectors, as opposed to less than 20% in industry. Increasing services sectors' productivity is, therefore, very important. It is especially important to focus on services sectors that have export potential. Tourism sectors, health-related services, education-related services, and business/financial services, are examples of sectors with high potential for future development.

Israel must utilize the existing strength of ICT and other advanced technology sectors, and disperse them into traditional industries and services sectors. It must also encourage traditional and services sector businesses to adopt innovative approaches as regards product and services development, supply chain improvements, and enhancement of manufacturing systems. This should be facilitated by Israel's varied, multilingual and multicultural labor force.

Dilemmas and Problems

There are a number of central dilemmas related to increasing productivity, growth and income per employee in traditional industries and services sectors. This discussion will facilitate the formulation of appropriate policy to address them. The primary dilemmas are presented as follows:

1. One of the negative factors contributing the lag of some of the services sectors and traditional sectors is the availability of unskilled **foreign workers** in the labor force, who receive low wages and no workers' rights. Their availability reduces the incentive to adopt efficiency-improving technologies in industries such as construction, agriculture, tourism, and other traditional sectors. There is no doubt that the construction sector, which has long relied (since the early 1970s) on low-cost foreign workers, has been lagging significantly in adopting existing technologies that are well-known world-wide, thereby reducing the industry's productivity per employee. A similar development occurred in the agricultural sector, which has employed an increasing proportion of low-wage foreign workers. This has occurred in other traditional sectors as well. In a workplace abundant in foreign workers, the quality of Israeli manpower declines. Employment of foreign workers has brought down the wages of low-skilled Israeli workers, and has left many outside of the labor market.
2. In traditional industries and some (non-financial) services sectors, the level of academic and technological manpower is relatively low. Human capital is the key to increased productivity, growth and competitiveness.
3. Traditional and services sectors have a small share in export. Studies indicate that the larger an economic sector's share in export, the greater its expected productivity and innovation.
4. **Managers of industrial industries are less interested in innovation**, due to their concern

that the advantages will not cover the costs, in addition to the shortage of professional manpower.

5. Innovation is perceived as important, but **adopting advanced technologies is perceived as unprofitable**. According to the results of the special survey conducted by the study's authors, company managers believe that innovation is a key factor in improving their competitive standing and the quality of their products. Nonetheless, they do not assign importance to using advanced technologies.
6. **Existing innovation is not managed correctly**, and therefore is not effective, because it is not client-directed or market-directed.
7. Investments in capital that embody new technologies are lower than what is acceptable in similar sectors in developed countries.

Primary Developments and Data

1. Productivity, Employment and Output in Economic Sectors

Table 1 presents an international perspective on the Israeli economy's structure and performance. The table demonstrates the relative labor productivity – the product per employee in each major sector relative to the average product in each business sector in the same country. As compared with Israel, labor productivity itself is significantly higher in all countries in the comparison (for example, 50% higher in the US, and 40% higher in Belgium). Israel shows particularly low labor productivity in the agricultural and construction sectors, and in commercial accommodations services – about half the product per employee relative to business sector overall. Although these sectors' productivity is **relatively** low in the comparison countries as well, it is noteworthy that their rate of capital per employee is very low. Sectors showing relatively high labor productivity in Israel (for example, the electricity, gas and water sectors, in which labor productivity is 2.57 higher than that of the business sector overall), demonstrate even higher relative productivity in other countries.

As compared with other sectors, product per employee in Israel's electric and electronic equipment sector (where most ICT is located) is especially high; it is even 33% higher than this sector's relative productivity per employee in the US. This point illustrates the Israeli economy's degree of specialization in ICT and its dependency on it. However, Israel's output per employee in this sector is lower than in the US or Finland¹⁶.

¹⁶ See complete comparison of the economy's major sectors regarding output, employment, productivity, and capital per employee in Table VII-App-2 in the appendix to this chapter.

**Table 1: Relative Labor Productivity in Various Economic Sectors,
Israel vs. Select OECD Countries 1995-2003**

(average product per employee in all business sectors in each country = 1.00)

Sectors	USA	Italy	Israel	France	Finland	Denmark	Canada	Belgium
Avg. product per employee for all business sectors (\$2000 PPP, 1995-2003. Basis for calculating relative productivity in various sectors)	71,800	63,098	47,439	58,133	55,807	53,376	53,192	67,324
Quarry mining, wood & wood products, non-metal mineral products, other industries	0.85	0.73	1.10	0.93	0.76	0.82	1.30	0.86
Food, beverages & tobacco products	1.23	0.91	0.91	0.94	0.85	0.84	1.35	0.95
Textile & clothing products, footwear, leather & leather goods, paper & paper products, publishing & printing	0.87	0.69	0.68	0.87	1.28	0.79	1.09	0.83
Oil refinery & products, chemical industry & products	2.48	1.63	2.01	1.61	1.56	1.61	2.40	1.96
Plastic & rubber products	0.86	0.90	1.03	0.90	0.94	0.92	1.16	1.07
Basic metals & metal products	1.00	0.79	0.86	0.95	0.94	0.78	1.32	0.97
Machinery & equipment, transport vehicles	1.17	0.91	1.11	1.09	0.86	0.81	1.71	1.01
Agriculture, hunting & fishing	0.53	0.51	0.53	0.62	0.53	0.68	0.75	0.50
Electricity, gas & water (production & distribution)	3.84	3.12	2.57	2.50	2.33	3.48	4.05	3.58
Construction	0.72	0.68	0.61	0.76	0.73	0.77	0.84	0.77
Transportation, storage & communications services	1.19	1.40	1.21	1.00	1.20	1.07	1.19	0.93
Electric & electronic equipment, communications equipment	1.24	0.85	1.65	1.11	1.63	0.97	1.42	1.04
Wholesale & retail trade, accommodations & food services, social, personal & otherservices	0.61	0.76	0.61	0.64	0.67	0.72	0.51	0.64
Banking, insurance & other financial institutions, real estate, business services	1.59	1.89	1.61	1.81	1.68	1.76	1.52	1.51

The services sector receives special attention in this chapter for several reasons. It already employs more than half of the labor force in developed economies, and is responsible for more than half of the GDP. About 50% of business sectors' employees and product come from services sectors. In the US, the services sector accounts for about 63% of the business sectors' product and employment. Services sectors present higher growth rates than do most other sectors in developed economies. The rate of increase in the scope of R&D is also particularly high in services sectors, as are rates of women's employment in these sectors. Therefore, these sectors offer an appropriate solution for the problem of the low participation rate in Israel's labor force (especially in the women's, ultra-Orthodox and Arab sectors). Any improvement in these sectors' labor productivity will have a significant impact on the economy's productivity. The services sector includes a wide variety of very diverse industries. Table-1 shows that the accommodations and commercial sectors are among the sectors with the lowest labor productivity rates in developed economies, while labor productivity in business, insurance and banking services is at least 50% higher than the average productivity for the business sector.

Historically, the services sector has not received the attention it deserves from policy makers, given its size and its potential for growth and employment. While an impressive awakening has occurred throughout the world on this issue in recent years, Israel's development policy is still "industry-oriented", as manifested in the absence of support for services, and the very partial, irregular collection of statistical data on this important segment of economic activity.

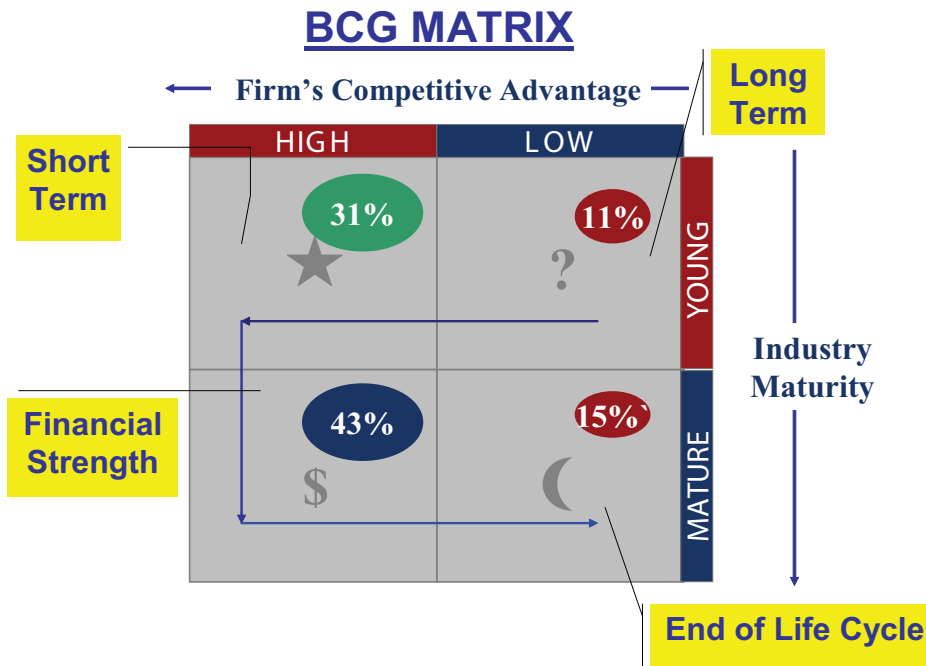
2. Innovation and R&D in Traditional Sectors

In early 2007, a special survey was conducted in the framework of this project in order to better understand the scope of innovation, as well as the obstacles and challenges to its implementation among traditional industry and services companies (medium-low tech and low-tech). One hundred twenty companies responded anonymously to the survey that was sent to them. Following are number of noteworthy points that were revealed:

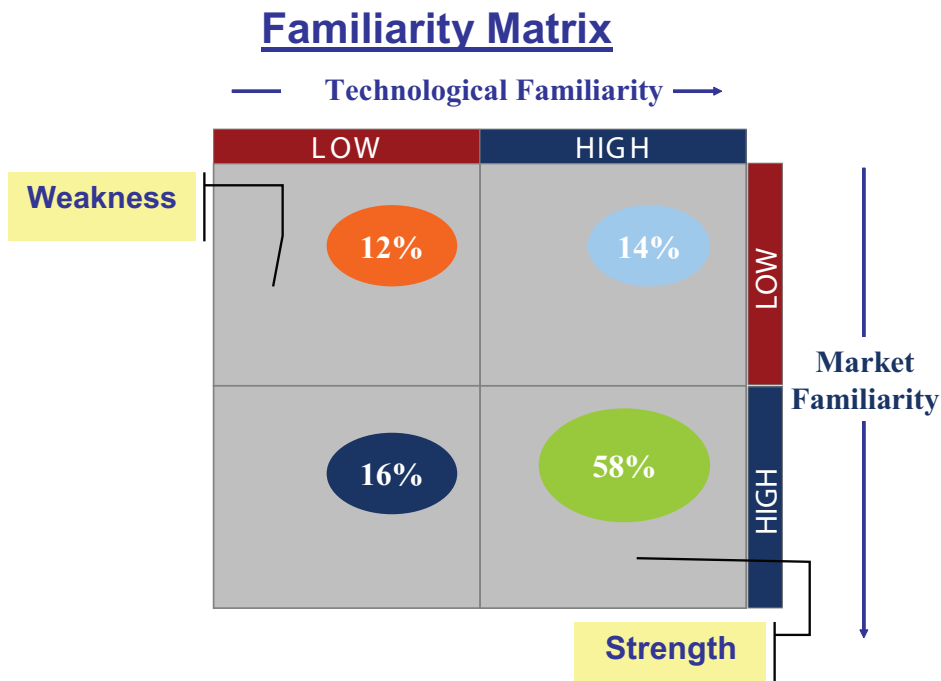
- Traditional industry companies did well over the past three years in the following areas: competitive standing, familiarity with relevant markets, and growth.
- About 25% of companies in traditional sectors are not innovative and do not invest in R&D. It is interesting to note that lack of funding was not the significant obstacle to promoting innovation in these companies, but rather uncertainty regarding future profitability has prevented companies from investing in innovation.
- While generally speaking, the levels of investment in innovation and R&D activity are reasonable, these activities are not effective. Investment and innovation efforts have

not affected the measures of companies' success, because the developments have not been client- or market-directed. Furthermore, most of the efforts in innovation have been product-oriented, with only minor innovation in process development.

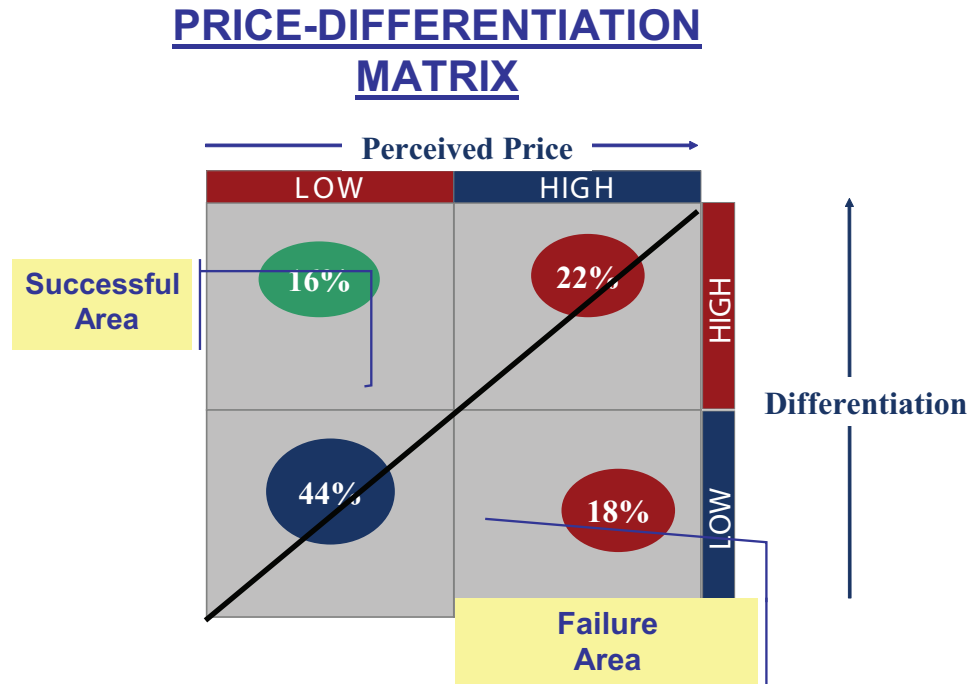
- Information on relevant innovation comes primarily from marketing and private sources, while public and academic institutions provide less useful information.
- Companies in traditional sectors tend to prefer internal R&D rather than off-the-shelf technologies or R&D done outside of the organization. According to the survey, internal R&D is more appropriate for products developed for these companies' target markets.
- Innovation in management and marketing, directed to client or market, make a significant contribution to the success of companies and facilitates companies' improved performance.
- It was found that an innovative organizational culture greatly contributes to the investment in innovation and its success. Companies that encourage their employees to propose new ideas for change and improvement, tend to invest more in R&D and innovation, develop more innovative products and processes, and adopt more advanced management and marketing approaches.
- **The Boston Consulting Group's matrix enables assessing traditional companies' business units on two axes: the maturity of the industry in which firms operate and firms' competitive standing within the industry.** According to this analysis, the formula of traditional companies' units is satisfactory: there are a sufficient number of new and mature companies as well as financially-stable companies. The largest group of companies (43%) falls under the category of "cash cows", but 42% of companies require investment of additional resources in innovative technologies and marketing. The two uppermost cells of the matrix - the question mark and the star - represent companies at the stage of penetration and growth that require investments in marketing, particularly in marketing, distribution, sales and campaigns. Conditions of high competitiveness also require investments in technology (continuous improvements in product and accompanying services).



- The matrix of familiarity with technology and the market** - About 58% of companies have good familiarity with the market and technology, while only 12% are in the problematic zone of low familiarity with both the market and technology. 30% of additional companies require better familiarity with the market or with technology.



- **According to the cost vs. differentiation matrix** - 16% of companies have a differentiated product (from their competitors), and a price perceived as attractive by clients. A similar percentage (18%) of companies is in the problematic zone of an undifferentiated product and a price perceived as high. In the age of high competitiveness and low profit margins, companies must improve products and services and adopt advanced management processes in order to improve differentiation.



Recommendations

1. Recommendations for Traditional Industries

- Create support mechanisms for employee training in the Ministry of Industry, Trade and Labor, aimed at traditional industries and based on skilled teams with deep knowledge of these sectors, including marketing and strategic planning experts, and on designated budgets.
- Continue expanding efforts for increasing awareness among manufacturers regarding the importance of innovation, and the support available for this purpose. Traditional industries should be offered adapted versions of the Chief Scientist's programs that were originally created for high-tech sectors, such as "Magnet" and "Tnufa".
- Expand post-secondary education in technology, in order to create human capital that is appropriate for assimilation and use of advanced technologies in industry and services, and broaden possibilities for continuing education in innovative approaches to organization, business management and international marketing.

- Initiate a new grants program for companies in traditional industries that adopt new technologies able to bring about significant change in company performance. Companies should be offered grants to cover costs of training manpower for implementing new technologies, industrial R&D and professional knowledge (similar to the Singaporean grant program for new technology initiatives).
- Initiate a specific program in the Office of the Chief Scientist that offers industrial teams or students, as well as academic mentors, for projects undertaken by traditional industry companies. Many university and college projects can be planned and directed toward traditional industry. This will offer the added value of exposing students to traditional industry, while exposing traditional industry to advanced management methods and new technologies.
- Grant special tax benefits in the form of tax **credits** for R&D expenditures and investments in ICT. The existing tax benefits for R&D (section 20A of the Income Tax Ordinance) allow deducting R&D expenditures, subject to approval of the R&D plan. In addition to tax benefits in the form of deductions, many of the world's countries grant a tax **credit** of 10%-50% of R&D expenditures beyond a certain level, in order to encourage R&D activity. Israel's corporate tax rate is gradually being reduced, and is planned to reach a rate of 10%-15% within a number of years. Thus, the rate of R&D subsidies hidden in R&D expenditure deductions by section 20A will be dramatically reduced. In addition, Israel will be unable to attract international corporations that employ expansive R&D activity unless it provides benefits comparable to what these corporations are offered elsewhere. See also "Appendix B - Encouraging the Establishment of R&D Centers: Taxation Aspects, International Survey and Recommendations for Discussion", sub-committee for evaluating appropriate frameworks for attracting multi-national corporations to open R&D centers in Israel for strengthening the periphery, the Makov Committee report, "Strengthening the Periphery and Traditional Industry " (2007).
- **Temporary provision: granting tax credits for employers in traditional industries and services in the periphery, for expanding employment in their businesses.** In order to halt and reverse the trend of abandoning businesses in the periphery, we propose instituting a program to encourage employment in these areas for a number of years. (Distant periphery must be clearly defined; eligibility for the program may be restricted to certain types of industries or a certain company size.) Tax credits will be awarded to companies that expand their workforce as compared with their average number of employees during the previous three years. The annual tax credit will be significant: for example, the cost of each additional employee's monthly salary. Thus a connection will be made between the salary paid to additional employees and the credit given to the employee for taking them on, providing a stronger incentive for hiring skilled employees. The tax credit will be calculated along with the company's annual taxes, based on the

employer's periodic reporting on deduction of tax at source for employees.

- The tax credit for employers will be attractive only for those employers that expect additional income as a result of expanding their workforce. Cost to the state will be quite low, as the additional employees will pay taxes on their income, while the total of transfer payments and support for these otherwise unemployed workers will also be reduced.
- The Makov Committee report indicates that granting tax credits for residence in the periphery misses the target of maintaining quality manpower in these areas: the data show that quality manpower often prefers to live in central Israel, even when its workplace is in the periphery. We believe, however, that the Makov Committee's recommendation to improve roads and transportation networks between the periphery and central Israel will only intensify this trend. The above recommendation to provide tax benefits to employers who expand the scope of employment in businesses located in the periphery should, at least partly, curb businesses' tendency to move to central Israel and leave the periphery's population without sources of income.
- We endorse the Makov Committee's recommendations¹⁷ to increase support grants for business R&D conducted in the periphery, and to set criteria for evaluating applications for support by businesses in geographical areas defined as deserving of encouragement. Such applications for assistance will be evaluated in view of exclusive criteria that promote innovation, assimilation of advanced technologies and employment in businesses located in the periphery.
- Encourage marketing for export in small, young companies as well. Becoming familiar with the international market will drive the required processes for increased growth, productivity and income per employee, and for incorporating innovation.
- Facilitate mergers and acquisitions that enable the penetration of innovation and R&D activity, in order to support organizations that have a critical mass and that can think in higher-level strategic terms (many companies from traditional sectors are too small to develop their own R&D or innovation strategies).
- Initiate specific programs for creating connections between university laboratories (Engineering Research Centers) and traditional industries, such as the Dutch voucher system that gives companies government-funded vouchers for acquiring services from an approved research lab in order to solve a specific problem.
- Encourage the creation of cooperative consortia of technology users.
- Initiate professional industrialist forums for specific industries involved in innovation.

¹⁷ Report of the Committee to Evaluate Means to Strengthen the Periphery and Traditional Industry, October 2007.

2. Recommendations for the Services Sector

- Support investment, manpower training and ICT use in order to increase productivity in the services sector.
- Create a services-supportive environment in regulation and business terms, by signing international trade agreements, especially with the EU, and make support, incentives, and subsidies for services sectors equal to those offered in the manufacturing field.
- Develop productivity and innovation measures in services from OECD services, and adapt them to Israel's services sector.
- Encourage the demand for innovative services by public bodies (such as education and tourism services, etc.) through changes in government standards and in government requisitioning and acquisition policy.
- Examine how Chief Scientist support programs such as "Magnet", incubators, bi-national agreements and so on, can be implemented in the services sector.
- Implement the international benchmarking survey in order to increase awareness of the services sector's growth and export potential, and of Israel's reputation in the services realm, as well as identify constraints and "bottle-necks".
- Support the creation of services clusters, research programs and centers in the services realm in universities, and cooperate with foreign companies and nations.
- Establish a services forum that includes representatives of the services sector, the Ministry of Industry, Trade and Labor, and academia. The forum's task will be to create awareness and provide expertise in the field of innovation and productivity enhancement, based on the study of accepted practices in policy, support programs and companies in Israel and abroad, as well as on academic research. The services forum will provide position papers, conferences and brochures for interested parties (leveraging and distributing acquired knowledge); mentored academic activities and contribution to applied research in the services sciences; redefining R&D to include innovative activity in the services realm; and developing new measures and indicators to measure the sector's output and productivity.

3. Recommendations Arising from Analysis of the Findings of the Special Survey

- Collect and analyze information on markets, technologies, opportunities and threats regarding economic and legal aspects, and transfer information to companies.
- Improve management training and provide professional support in strategic planning and marketing, with a special emphasis on client- and market-directed innovation.
- Encourage companies that lack innovative activity to develop this kind of activity in a cautious, gradual manner.

- Encourage adoption of management and technological methodologies in the following areas: strategic planning, new business models, assimilation of new management information technologies (for example, in ERP - enterprise resource planning, and CRM - customer relationship management).

4. Required Plan of Action and Government Budgets

The entirety of measures detailed above does not constitute an operative plan of action. In order to propose such a plan, each recommendation must be examined separately, in cooperation with the relevant responsible agency (for example, the Office of the Chief Scientist, Ministry of Finance, State Revenue Administration, Investment Center, Committee for Planning and Budgeting, Prime Minister's office, etc). **Formulating the entirety of measures required for dispersing innovation and advanced technologies in traditional and mixed-traditional industry sectors and services sectors, is an appropriate task for the National Council on Economy and Society.** It need not be an especially lengthy process, but as it involves diverse aspects, such as taxation, trade restrictions, encouragement of R&D, post-secondary education, applied research in cooperation with higher education institutions, population-distribution policy, etc., its formulation requires an integrative perspective that examines the overall picture, relegates specified tasks to designated ministries and agencies, and sets priorities for allocating resources for the various programs.

It is therefore, difficult to present at this stage itemized budget costs for the entirety of measures brought forth in this chapter. A preliminary assessment, which includes an assessment of budget costs of the Makov Committee report's recommendations, arrives at budget supplements of approximately NIS 500 million a year, as itemized below:

- Direct incentives for innovation, R&D, and assimilation of technologies – NIS 250 million a year
- Establishing cooperation between higher education institutions and traditional economic sectors – NIS 50 million a year
- Training and consulting programs in the realms of innovation, organizational management, and assimilation of advanced technologies – NIS 100 million a year
- Direct support for businesses in the periphery – NIS 100 million a year

Budget supplements of approximately NIS 500 million a year are expected to activate internal economic processes with returns that are much higher than the additional government expenditure. Some of the government expenditure will go back into the budget, from royalties and taxes paid by successful companies and employees.

Appendices to Chapter VII

Classifying Economic Sectors by Technological Intensity

Table App-VII-1 below presents the Central Bureau of Statistics' classification of manufacturing sectors and some services sectors, by technological intensity. This classification corresponds with that of the OECD and is based primarily on rates of direct R&D investment and investment in R&D-related equipment, as compared with these sectors' output and investment. Note that the classification includes mostly manufacturing sectors; it does not cover most services sectors and important sectors such as construction, electricity production and transmission, water supply and so on.

Table App-VII-1: Productive Industry Sectors in Israel by Technological Intensity

Traditional technology	Mixed-traditional technology	Mixed-advanced technology	Advanced technology
			Manufacturing:
Food products	Quarrying of sand & stone, mining of metals, other quarrying and mining	Oil distillery & products and nuclear fuel	Pharmaceuticals
Beverages & tobacco products	Production of crude oil & natural gas	Chemicals & chemical products (exc. pharmaceuticals)	Machinery for office, accounting & computers
Textiles	Plastic & rubber products	Machinery & equipment	Electronic components, isolated cables and wires
Clothing products	Non-metal mineral products	Electric engines and electricity-distribution apparatus	Electronic communications equipment
Footwear, leather & leather products	Non-ferrous & precious metals, including casting	Transport vehicles (exc. sea vessels, aviation vehicles and other transport equipment for airports)	Industrial control & supervisory equipment, medical & scientific equipment, measuring and testing equipment
Paper & paper products	Basic iron and steel industry, foundries, pipes and metal products		Aircraft
Printing & publishing	Boat & ship building		<u>Services sectors defined as high-tech:</u> Communications services, computer services, R&D
Wood and wood products, furniture	Jewelry, ornaments & silversmithing		

From Israel Central Bureau of Statistics, Technical publication #63, Standard Industrial Classification of all Economic Activities, 1993-Second edition; and the CBS' 2004 report by the sub-committee for official classification of high-tech sectors, on defining the high-tech field in Israel.

**Table App-VII-2:
Added Value and Employees in the Business Sector, 2006**

by CBS classification of economic sectors at two-digit level

Sector code	Sector name	Added value	Employees (2)	Added value per employee
		Millions current NIS, base price	thousands	Current NIS, base price
	Total business sector	402,236	2,058	195,461
A	Agriculture, forestation and fishing	11,038	72	152,833
B	Industry (mining and manufacturing) - total	86,889	332	262,108
13	Quarrying Sand & stone quarrying, stone mining	2,056	3	623,103
14,15	Food products	7,286	47	155,357
16	Beverages and tobacco products	1,417	7	218,038
17	Textiles	1,883	11	165,185
18	Clothing products (except knitted)	812	7	124,931
19	Shoes, leather & leather products	192	2	119,860
20	Wood & wood products (except furniture)	581	4	141,628
21	Paper & paper products	1,448	10	147,737
22	Publishing & printing	3,334	21	155,812
11,23,24	Oil distillation & its products, chemicals & chemical products	16,039	26	619,250
25	Plastic & rubber products	4,328	21	210,085
26	Non-metal mineral products	2,551	10	262,965
27	Basic metals	1,163	5	223,683
28	Metal products (except machines & equipment)	8,983	35	257,392
29,30	Machines & equipment: Office machines, computers	2,982	16	181,837
31	Electric engines & electricity-transport apparatus	1,784	8	234,784
32	Electronic components	3,949	16	245,303
33	Electronic communications equipment	5,536	16	357,161
34	Industrial equipment for supervision & monitoring, medical & scientific equipment	11,100	31	355,760
35	Transport equipment	5,087	17	306,468
36	Furniture	2,231	10	232,422
37	Diamonds	1,035	3	356,926
38,39	Jewelry, ornaments & silversmithing for airport products	1,111	8	142,381
C	Electricity and water	11,175	17	640,067
D	Construction	28,123	188	149,780
	Services	265,012	1,449	182,900
E	Trade, vehicle repair & other repairs	54,761	349	156,741
501	Motorized vehicles & fuel sales	3,668	36	103,311
500,502-530	Trade	51,094	314	162,784

F	Accommodation & food services	11,260	130	86,413
55	Hotels & accommodations services	3,862	25	155,742
56	Restaurants & food services	7,397	106	70,116
G	Transportation, storage & communications	44,340	173	256,895
60	Land transport	13,789	70	196,430
61-62	Sea and air transport	5,510	10	568,069
63	Transportation services	7,383	29	259,042
64	Storage & car parking	865	8	102,985
65	Mail & courier services	1,344	18	76,366
66	Communications	15,449	38	404,416
I,H	Finances & business services	115,124	475	242,163
67	Banking & other business institutions	20,342	59	344,204
68	Insurance & provident funds	9,306	28	327,668
70	Real estate	12,163	18	668,322
71	Leasing of machines & equipment	5,998	7	908,765
72,73	Computing & R&D services (inc. estimate for start-up firms)	31,305	96	326,434
74	Employee recruiting & manpower services	2,060	8	260,786
75,76	Business services	33,949	259	130,927
L	Business educational, health & welfare services	26,156	132	198,200
M	Social, personal and other services	13,370	189	70,628
94	Leisure, culture & sports activities	6,915	41	168,667
95,96	Personal and other services	6,455	148	43,524

- 1) Except for industry sectors:
 - a) The data include foreign workers;
 - b) Due to the depth of detail, the Central Bureau of Statistics based some sectors on a number of assumptions.
- 2) Including general hospitals.

Source: Israel Central Bureau of Statistics.

**Table App-VII-3:
Business Sector Goods & Services Exports, 2006**

by CBS classification of economic sectors at two-digit level

Sector code	Sector (Exporter) name	Millions current NIS
	Total Business Sector (2)	58,766
A	Agriculture	421
B	Industry (mining & manufacturing)	35,250
14-15-16	Food & beverage products	1,039
17-18-19	Textile	1,186
24	Chemicals	6,603
32	Electronic components	2,229
33	Electronic communications equipment	3,438
34	Industrial equipment for supervision & monitoring, medical & scientific equipment	4,287
35	Transport vehicles	2,758
37	Diamonds	4,691
38	Jewelry, ornaments & silversmithing	334
39	Manufacturing for airports/n.e.c.	8,684
C	Water & electricity	246
D	Construction & civil engineering works	461
	Services	22,388
E	Retail and wholesale trade	9,402
50	Motorized vehicles, motorcycles & bicycles – sales, maintenance & repairs, retail fuel sales	88
51	Wholesale trade (exc. vehicles, motorcycles, & diamonds)	4,584
5135	Wholesale diamond trade	4,595
52	Retail trade	135
F	Hotels and accommodations services and	538
G	Transportation, storage and communications	3,978
60-65	Travel fare	588
60-66	Other transportation services	3,178
66	Communications	212
H	Insurance and public administration	58
I	Real estate, leasing activity and business services	8,234
70-71	Real estate activity and equipment leasing	290
72	Computing services	4,395
73	R&D (inc. start-up firms' services exports)	2,168
74-75	Security activities and labor recruitment	49
76	Other business activities	1,333
M	Leisure, entertainment & sports activities	178

Source : Israel CBS.

**Table App-VII-4:
Business Sector Industries – International Comparison**

Averages for the years 1995-2003 or recent available data. Product per employee (added value) and capital per employee -\$2000 PPP. Number of employees – in thousands. Sources: OECD data, Israel CBS, Applied Economics.

Industry	USA	Italy	Israel	France	Finland	Denmark	Canada	Belgium	
1. Sand and stone quarrying, mining of minerals, wood & wood products, non-metal mineral products, jewelry, other industries	Product per employee	46,050	51,685	56,131	42,226	43,531	68,284	58,142	
	% business product	4%	2%	2%	3%	3%	4%	3%	
	Employees	2689	866	30	371	68	70	367	86
	% of business sector employees	2.6%	5.0%	2.0%	2.1%	4.3%	3.7%	3.2%	3.0%
2. Food products, beverages & tobacco products	Capital per employee	80,359	172,711	145,894	162,886	133,170	146,114	281,930	
	Product per employee	87,851	57,072	55,446	47,047	44,998	70,024	64,065	
	% business product	2%	3%	3%	3%	2%	3%	3%	
	Employees	1765	487	52	621	44	81	246	97
3. Textile and apparel, footwear, leather & leather products, paper & paper products, publishing and print	% of business sector employees	1.7%	2.8%	3.6%	2.7%	4.3%	2.1%	3.4%	
	Capital per employee	109,839	204,601	165,147	225,673	156,637	102,643	253,754	
	Product per employee	62,999	43,181	52,154	71,377	41,949	56,842	56,162	
	% business product	3%	5%	3%	3%	7%	5%	3%	
Employees	3692	1288	85	607	92	68	480	111	
	% of business sector employees	3.5%	7.4%	3.5%	5.8%	3.7%	4.2%	3.9%	
	Capital per employee	84,143	114,487	125,550	324,939	127,805	131,501	218,934	

Industry	USA	Italy	Israel	France	Finland	Denmark	Canada	Belgium
4. Chemicals & chemical products, oil refinery	Product per employee	177,457	102,614	95,968	87,185	85,938	123,269	131,448
	% business product	3%	2%	2%	2%	2%	2%	5%
	Employees	1136	261	19	463	28	106	77
	% of business sector employees	1.1%	1.5%	1.2%	2.7%	1.4%	0.9%	2.7%
5. Plastic & rubber products	Capital per employee	342,444	432,069	342,715	244,136	356,056	404,415	386,221
	Product per employee	62,317	56,481	48,814	NA	49,208	62,259	71,941
	% business product	1%	1%	2%	NA	1%	1%	1%
	Employees	957	201	25	NA	17	109	25
6. Basic metal, metal products	% of business sector employees	0.9%	1.2%	1.6%	NA	1.2%	0.9%	0.9%
	Capital per employee	97,516	201,195	147,264	NA	135,950	78,720	349,140
	Product per employee	71,054	49,436	40,764	57,878	41,716	70,521	65,279
	% business product	2%	3%	3%	3%	2%	3%	3%
7. Machinery & equipment, transport vehicles	Employees	2187	766	58	548	54	255	100
	% of business sector employees	2.1%	4.4%	3.8%	3.2%	3.5%	2.2%	3.6%
	Capital per employee	99,570	191,937	76,225	158,866	200,486	168,744	263,332
	Product per employee	84,020	57,006	52,559	66,032	47,840	89,634	67,832
8. Agriculture	% business product	4%	4%	2%	4%	4%	5%	4%
	Employees	3831	865	28	688	86	365	104
	% of business sector employees	3.7%	5.0%	1.8%	4.0%	5.4%	3.2%	3.7%
	Capital per employee	115,415	168,535	81,123	152,185	100,557	114,740	203,464
8. Agriculture	Product per employee	37,819	32,311	25,478	37,154	36,254	37,388	33,617
	% business product	2%	3%	3%	4%	4%	3%	2%
	Employees	3248	1180	75	1052	140	494	104
	% of business sector employees	3.1%	6.8%	4.8%	6.1%	8.8%	4.3%	3.7%
Capital per employee	140,627	265,201	84,011	170,173	206,688	383,236	116,727	180,659

Industry	USA	Italy	Israel	France	Finland	Denmark	Canada	Belgium
9. Electricity & water (production & distribution)	Product per employee	281,920	199,488	122,301	148,496	129,746	185,602	240,218
	% business product	3%	3%	3%	3%	3%	3%	3%
	Employees	785	149	18	190	19	109	27
	% of business sector employees	0.8%	0.9%	1.1%	1.1%	1.2%	1.0%	1.0%
10. Construction	Capital per employee	1,154,645	2,056,922	1,197,047	1,242,347	1,850,433	1,784,394	2,173,601
	Product per employee	51,413	42,968	28,596	44,157	40,436	40,987	51,606
	% business product	5%	6%	9%	6%	6%	7%	6%
	Employees	8024	1515	234	1414	143	158	231
11. Transportation, storage & communications	% of business sector employees	7.7%	8.7%	15.1%	8.1%	8.9%	7.7%	8.2%
	Capital per employee	27,386	71,932	12,583	38,662	33,587	54,674	95,185
	Product per employee	85,448	88,211	57,194	59,002	67,015	57,051	62,503
	% business product	8%	9%	11%	8%	13%	10%	9%
12. Electric equipment, electronic components, electronic communications equipment	Employees	7135	1091	136	1420	167	179	264
	% of business sector employees	6.8%	6.3%	8.7%	8.1%	10.4%	7.6%	9.3%
	Capital per employee	224,563	399,896	434,086	253,552	479,686	302,729	276,230
	Product per employee	88,319	53,485	78,252	67,135	90,570	51,989	69,528
13. Trade, accommodations and food services, social, personal and other services	% business product	3%	2%	7%	3%	6%	2%	2%
	Employees	2274	455	64	420	60	132	54
	% of business sector employees	2.2%	2.6%	4.1%	2.4%	3.8%	1.1%	1.9%
	Capital per employee	148,220	160,672	151,735	133,563	72,115	95,418	244,312
13. Trade, accommodations and food services, social, personal and other services	Product per employee	44,084	47,598	28,809	37,444	37,110	38,301	42,771
	% business product	25%	24%	16%	21%	19%	24%	20%
	Employees	42478	5569	403	5711	449	624	880
	% of business sector employees	40.7%	31.9%	25.8%	32.8%	28.0%	33.5%	31.2%
Capital per employee	47,933	82,279	NA	82,202	121,994	113,109	26,202	105,772

Industry	USA	Italy	Israel	France	Finland	Denmark	Canada	Belgium
14. Banking, insurance & other financial institutions, real estate & business services	Product per employee 114,313 37%	119,340 30%	76,253 34%	105,479 39%	93,582 25%	93,958 31%	81,085 32%	101,332 35%
	Employees 24233	2815	330	3707	237	325	2394	661
	% of business sector employees 23.2%	16.1%	21.1%	21.2%	14.8%	17.4%	20.8%	23.4%
Avg. product per employee in all business sector industries 1995-2003	125,918	1,149,216	NA	912,196	1,242,753	1,104,715	101,196	768,688
	71,800	63,098	47,439	58,133	55,807	53,376	53,192	67,324

Table App-VII-5: Business Sector Industries by Technological Intensity - International Comparison

Averages for 1995-2003 or recent available data. Product per employee (added value) and capital per employee - \$2000 PPP. Number of employees – in thousands.

Technological classification	USA	Italy	Israel	France	Finland	Denmark	Canada	Belgium
Traditional & mixed-traditional								
Food, apparel, paper & printing, wood, mining, plastic & rubber, metals, non-metal minerals, jewelry, boats and ships.	67,885 10% 11,289 11%	47,814 16% 3,608 21%	40,562 14% 250 16%	55,254* 11%* 2,147* 12%*	55,372 16% 276 17%	43,654 13% 294 16%	64,749 16% 1,457 13%	61,522 13% 418 15%
1. Mixed-high								
Pharmaceuticals, oil distillation, chemicals, machinery & equipment, transport equipment exc. boats/ships	91,380 105,389 7% 4,967 5%	161,900 67,576 6% 1,125 7%	101,711 70,271 4% 47 3%	149,017* 78,391 8% 1,151 7%	233,782 55,869 7% 108 7%	131,240 52,941 6% 119 6%	132,876 97,220 7% 471 4%	258,266 94,764 9% 181 6%
2. High								
Electric equipment, office machines, electronic components, communications equipment, control & supervisory equipment, scientific equipment, aircraft.	167,338 88,319 3% 2,274 2%	229,612 53,485 2% 455 3%	187,861 78,252 7% 64 4%	189,197 67,135 3% 420 2%	154,032 90,570 6% 60 4%	152,221 51,989 2% 43 2%	180,069 73,587 2% 132 1%	280,835 69,528 2% 54 2%
3. Unclassified								
Agriculture, electricity & water, construction, transportation, storage & communications, accommodations, trade, vehicle repair, personal services, business & financial services, real estate	148,220 69,953 80% 85,904 82%	160,672 67,400 75% 12,320 71%	151,735 46,265 76% 1,196 77%	133,563 60,648 81% 13,493 77%	72,115 54,025 71% 1,154 72%	95,418 55,416 79% 1,407 76%	70,307 48,337 75% 9,433 82%	244,312 66,021 75% 2,166 77%
Capital per employee	96,307	394,429	193,680**	346,886	430,965	399,386	105,130	357,202

No2tes:

* The numbers do not include the aggregate plastic & rubber industry.

** The numbers do not include the following industries: commerce, accommodations, car repairs, personal services; business, financial and real estate services. (a) The pharmaceutical industry is classified as high technology but is included here under mixed-high technology.

(b) The electrical equipment industry is classified as mixed-high technology but is included here under high technology.

Sources: OECD, Israel CBS, Applied Economics.

Chapter VIII: Higher Education and Scientific Research

Introduction

The higher education system has undergone many changes since the establishment of the state. Initially comprising two universities (Hebrew University and the Technion) and a research institute (the Weizmann Institute of Science), Israel's higher education system now consists of 65 institutions¹⁸, among which there are seven universities, including the Weizmann Institute, and a variety of colleges. About one quarter of a million students are currently enrolled in the system.

The missions and objectives for the coming years present the system with additional considerable challenges, whose attainability is in doubt, unless structural changes are made, objectives are set and appropriate resources to achieve them are allocated. The higher education system is one of the most important national infrastructures for advancing Israel's society, state, economy, welfare, security and national values. Achieving this plan's strategic high economic growth objective of over 6% a year will depend upon training an educated labor force, which is the product of a dynamic, quality oriented higher education system. It follows that nurturing diverse, accessible and high-quality higher education is one of Israel's most important objectives for the coming two decades.

Vision and Strategy

Achieving the primary objectives of advancing the nation, its values, its economy and its welfare, all of which constitute the foundation of Israel's quality advantage and rely upon its spiritual, cultural, scientific and technological strength, must follow Israel's higher education road map, to be outlined according to the following vision:

Promoting a higher education system that ensures research excellence at the standard of the world's finest universities; offers universal access; provides fair and equal opportunity for all; and enables the individual to fulfill his or her potential. This system will be composed of a number of tiers and comprise a variety of institutions that enjoy broad administrative and academic freedom. The system will be open and amenable to students' transition between tiers, and will charge a fair tuition, while providing accessible financial aid tools for those in need.

Basic research conducted at research universities is the central pillar of Israel's science policy, and an important basis for its economic and social development. It follows that **conducting**

¹⁸ These include seven universities, an open university, four designated colleges, five engineering colleges, 13 general colleges, nine private colleges, 26 teachers' colleges.

scientific and technological research of the highest standard is necessary in order to maintain and advance Israel's scientific standing and to ensure its economic and security future. At the same time, Israel must maintain and promote strong involvement with world science and with international scientific organizations and institutions. **In addition, ensuring high standards in the humanities and social sciences is an essential national need. Finally, another major task of universities, of equal national importance, is training the best and most talented young people in all disciplines at the B.A. level.** When the time comes, these graduates will comprise Israel's leadership echelon in all spheres of life. Like the rest of the developed world, Israeli society is willing to bear the university system's expenses, in view primarily of the latter task, while also recognizing the importance of the former.

According to the road map proposed here, a quality, world-class higher education system will be created gradually over the next twenty years, to include at least two research universities whose academic achievements place them among the world's twenty leading institutions. Also, according to the proposed road map, by 2028 over 75% of the relevant age group will acquire higher education. The system will encompass a wide variety of academic institutions: elite universities, universities that confer all degrees, an open university, academic colleges and community colleges, all of which will operate side by side, nurture competition, aspire for excellence, and complement each other in various realms.

Situation Report

Israel's higher education system has experienced rapid growth for some time. Historically, it has transitioned from a system characterized by elitist access (in the 1950s and 1960s), through broad access (the 1990s), to the universal access of the twenty-first century and beyond. During this period, the number of students has increased from a few thousand in the 1950s to 250,000 in 2007.

The system's structure and management are regulated by the 1958 Higher Education Law, which stipulated the establishment of the Council for Higher Education (CHE). In 1977, the Planning and Budgeting Committee (PBC) was created by a government decision. The CHE regulates institutions' licensing and the awarding of degrees, while the PBC regulates the system's planning and budgeting by the government. The PBC conducts negotiations with the Finance Ministry regarding the entirety of the system's resources and their distribution. The current model for university resource allocation is based on a formula for a teaching budget for bachelors programs, determined by the number of students (subject to PBC rules) and type of discipline; and an institutional research budget determined by research output (according to the number of advanced-degree students, publications and citations, research funds raised by the university,

and other similar criteria). On average (with the exception of the Weizmann Institute, which is a research institute without a bachelors program), about two-thirds of a university's budget is based on teaching, and one-third on research output. College budgets are for teaching only.

The present post-secondary system, which developed partly out of organized planning and partly out of domestic and foreign private initiatives, is comprised of about 120 post-secondary institutions. These include universities, academic colleges, colleges for technicians and practical engineers, non-academic teachers' seminars, art schools and vocational training schools.

Dilemmas and Problems

The existing system, its structure, its management and its budgeting, which served the state well for decades and saw considerable achievements, no longer fits our future needs, for the reasons detailed below.

1. National Higher Education Policy

Currently, there is no policy defining the optimal size, scope and composition of the higher education system from a national perspective for the coming twenty years. Such a policy is essential for any long-term planning for the Israeli economy. A long-term perspective is especially important for the planning and developing of the higher education system, where the time constant from planning to academic output is about ten years; and if one considers the school system through matriculation, this period increases to thirty years. In light of the trends in Israel and around the world, it is clear that the system needs to grow significantly.

2. System Funding and the "Brain Drain"

There is no long-term national policy for setting the higher education budget, which is an integral part of long-term planning. Although PBC does operate according to five-year plans agreed-upon with the Finance Ministry and approved by the government, this has not prevented the budget cuts that have been made in recent years. Since the beginning of the 21st century, these cuts have posed a difficult challenge for Israel's university system and scientific research, causing a slump, even a standstill. Universities suffer from lack of resources for advanced research; a diminishing, aging academic faculty; and, as will be described below, an inability to bring the best young scientists back to Israel and to prevent a "brain drain". While Israeli science and its system's graduates remain of high quality, they are the product of 75 years of effort and past progressive national policies; absorption of world-class scientists; nurturing of domestic talent; and dedication and Zionism of academic faculty, for whom returning to Israel after advanced study abroad was a given, and who saw academic work as a national mission, not a personal career. The current trend, however, indicates a decline in quality. Should the system deteriorate, in the absence of all these

irreplaceable historical components, all of this will be lost, and it will be impossible to restore the required standard and quality.

3. Regulatory Bodies

The system's present size already renders CHE's and PBC's centralized and intensive management of each institution inefficient to impossible. Each new program of studies or degree at any of the system's sixty academic institutions (universities and colleges), requires budgetary treatment by PBC as well as approval by CHE, via ad-hoc committees. Any of PBC's allocations to these institutions undergoes laborious negotiations between the institution and PBC; each of the institution's budgets requires PBC approval.

4. Components of the System: Universities and Colleges

Due to the current world view of the higher education system, and CHE and PBC policy, all seven universities see themselves as elite research universities, and many colleges aspire to attain university status. This policy necessarily produces equal distribution of institutional research funds, which does not encourage nurturing centers of excellence. Israel cannot provide adequate resources to maintain seven research universities at the highest world-class standard; no less important is the fact that the human resource of leading world-class scientists and prominent humanities and social science scholars is not available to achieve this objective at all seven universities in most disciplines.

Significantly increasing Israel's research budgets as proposed in this plan, will allow focal points of excellence at some universities to promote and nurture research at the highest international level. In our estimation, increasing research funds to the proposed extent will enable at least two universities to reach elite university status.

Public colleges were designated to be learning and teaching communities that fulfill an important role in training a high-level professional labor force. Some colleges' aspiration to become universities impairs the fulfillment of the designated mission envisioned for them when the college system was created. Furthermore, a system that lacks community colleges and two-year professional institutions which are formally connected to the higher education system in a regulated manner, cannot provide universal access to higher (post-secondary) studies while fulfilling, at the same time, the state's human resource needs. Universal access, which we have set as a national objective, means that at least 75% of the relevant age group will be engaged in post-secondary studies.

5. Research and Excellence

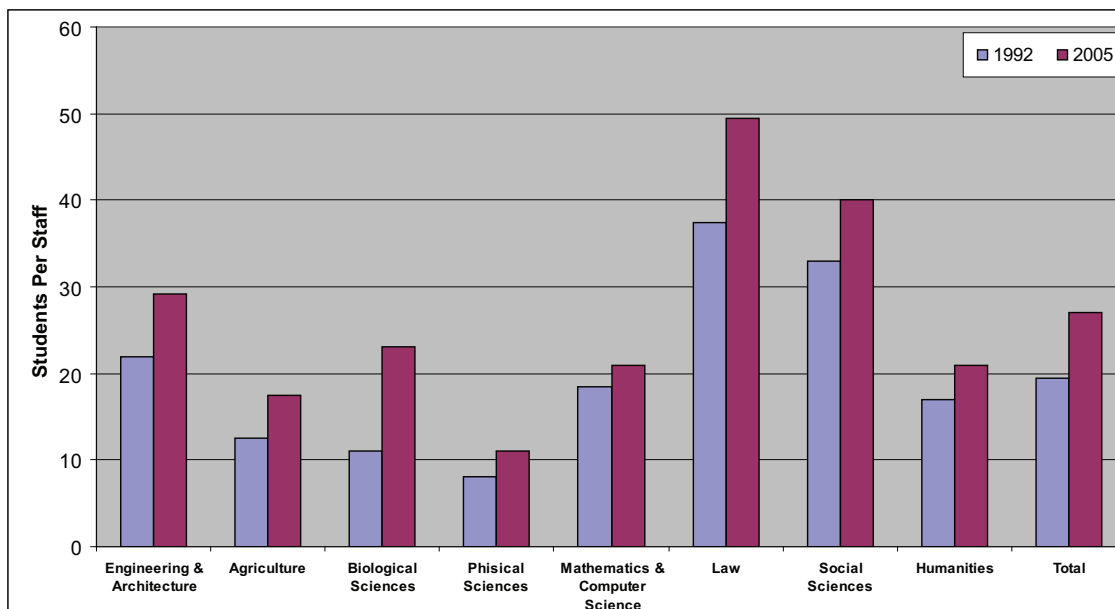
Promoting human knowledge through research in broad scientific and technological fields is a major role of universities, where most of Israel's basic research is conducted. In the past, this cornerstone of Israel's national science policy stemmed from the recognition that in a small country, the university system alone would preserve scientific quality, through a critical

mass of researchers and research infrastructure. As a result of this policy, Israel's basic research has achieved an international level, and in a number of fields at universities, has arrived at the forefront of world research. Basic research constitutes a tier of technological objective-driven research that relies on involvement and funding by the business sector, the government and the institutions themselves. The country's socio-economic and security-related achievements are the product of past investment in human capital and research infrastructure. Action needs to be taken to maintain and promote the high level of scientific and technological excellence, by building appropriate human and research infrastructure and ensuring the stability of its operation in the framework of a multi-year budget.

6. Preserving, Developing and Enhancing Academic Faculty

In recent years, the number of academic faculty members has continually declined, relative to the massive increase in the number of students, a trend that has significantly eroded the student-faculty ratio (Chart A). This trend has serious implications for the development of the higher education system. There is a need to recruit young, high-quality faculty for research institutions, in order to achieve a number of faculty members that better corresponds with the increase in the number of students, and to replace faculty members who retire each year.

Chart A: Student: Staff Ratio for 1991/2 and 2004/5 (Source: PBC)



A relevant issue of national importance, which demands appropriate policy, is that of the "brain drain": scientists who accept offers to move to outstanding research institutions abroad, particularly in the US.

Another phenomenon that has exacerbated the system's problem in recent years is that of excellent academic personnel who do not return to Israel after receiving their PhDs or following their post-doctorates abroad, particularly in high-demand fields in the US and some of the EU countries. A state intervention program is required to help provide Israel's research institutions with the needed resources and research infrastructure to bring quality faculty back to Israel. Due to insufficient hiring of academic faculty members, the ratio of teachers to students has declined in all faculties, which may cause a decline in teaching quality, not only in research.

7. The Impact of Colleges on the Direction and Quality of Higher Education

Many colleges, especially in the periphery, are unable to recruit a critical mass of senior academic faculty whose primary work is at the college. In addition, most of the colleges have a small student body. Twenty-one colleges with an average of less than 2000 students are budgeted by PBC. Colleges that train teaching staff have low enrollment, and on average, the 27 existing colleges of the various streams, have about 1000 students per college. These figures require rethinking the structure and distribution of the academic college system, so that they may be efficiently operated both academically and administratively.

8. Private Colleges and Foreign Extensions

No clear national policy exists regarding the status and role of private colleges and foreign extensions in the system. On the one hand, non-budgeted colleges and foreign extensions regulate high demands for popular disciplines, especially business and law, and on the other, alter the map of public higher education and charge high tuitions. Considering that the degrees they confer are recognized, there is a lack of thorough, organized quality assurance in this regard.

9. Tuition

Traditionally, tuition has been set by a public committee, with representatives of the institutions, students and the Ministry of Finance. Experience shows that such committees are subject to political pressure, individual interests and populism, and are, therefore, no longer productive. A new model must be found for setting tuition.

10. The Ultra-Orthodox Sector

In the Israeli reality being formed in recent years, a phenomenon is emerging that will pose an important challenge for higher education's objectives. The ultra-Orthodox sector, which places the study of Torah and yeshiva study at the center of life ("the learner's society"), does not participate in academic study at higher education institutions. Not only does it have a low participation rate in the labor force, but its participation in higher education is also very low. The sector's skills, therefore, are insufficient for the advanced, developing labor market.

Subsequently, those from the sector who do enter the labor market have a low income level. It is a unique challenge, then, to adapt the required conditions for this sector, in order to facilitate its participation in the acquisition of higher education in a way that fits its lifestyle, while ensuring essential core studies in its elementary and secondary school systems.

11. The Arab Sector

In recent years, there has been an increase in the Arab participation in post-secondary professional education and teachers' colleges; however, this sector's relative share in the higher education system remains low. We must find ways to enhance the Arab sector's access to higher education across institutions and disciplines.

12. Quality of High School Education

Graduates of the formal education system are the foundation and the human infrastructure of the academic training in the country, and from them Israel's future scientists.

Recent decades have seen a decline in high school education and preparation for entrance to University. Eligibility for matriculation is also at a standstill and not increasing. Breaking this standstill will require increasing the matriculation eligibility rate in the periphery, the Arab sector and the ultra-Orthodox sector. Unless changes occur in the ultra-Orthodox sector, in which the number of Torah learners is increasing significantly, the change will be slow and insufficient.

13. Training for a Labor Force According to Current and Projected Needs

In addition to the usual tasks of the higher education system, it is sometimes required to provide an appropriate response to manpower shortages that develop in certain fields. This happened in the 1990s, when a manpower shortage was created in the fields of computer science and electronic engineering. If this strategic plan is not adopted, we can expect a severe shortage in a professional labor force for building physical infrastructures and in training high-level public administration manpower.

Israel lags behind considerably in most of its physical infrastructures, relative to all other Western countries. Development of physical infrastructures such as transportation, seaports, airports and mass transit systems, requires significant manpower training in the field of civil engineering and other complementary fields. This development also requires preparing the higher education system for this challenge (for more on physical infrastructures, see Chapter XI).

Improving Israel's public administration is a prerequisite for economic growth and building a modern, value-based society. Improving manpower inputs in public administration (such as in the areas of health care systems management, local government management, or non-profit organization management), must be done through the higher education's manpower training system.

14. Institutions' Internal Governance

The governance of universities and colleges (excluding the Technion and Weizmann Institute) was founded on the unique Hebrew University model, featuring a dual structure of President and Rector. This structure was changed a number of years ago by PBC and CHE, inspired by the Finance Ministry (according to the report of the Maltz Commission, "Changes in the Organizational Structure of Universities in Israel"), to a unitary model, in which the institution is headed exclusively by its President. However, apart from this commendable change, other components of the changes evoked controversy and debate: they create the potential for conflict with academic freedom in regards to governance and internal management; neutralize any real authority of the Board of Trustees (although most important donors to institutions are board members); and grant excessive power to the Executive Committee, thereby decreasing academic faculty's involvement in the institution's management. Additional follow-up will be needed in order to examine the nature of advisable governance for each academic institution.

15. Administrative Authority and Responsibility

At present, all of the responsibility for managing the institutions is placed (justifiably) on its Presidents. However, they lack the powers required for efficiently managing the institution. For example, university management lacks the basic authority to set the academic faculty's wage terms; promote new academic programs without the regulatory bodies' approval; build new buildings; and set the tuition rate.

16. The Role of Philanthropy

In most countries, there are three components of funding of expanded higher education systems that ensure universal access: public funding, tuition and philanthropy. However, government policy completely ignores the major historical role of philanthropic donations to institutions, although most of the physical development and some research, are still funded by philanthropy. Instead of encouragement and recognition, there is alienation and indifference. Clear, encouraging policy is required on this issue.

Specifics and Data Analysis

The task force has estimated the scope of the system's long-term needs in terms of input and output (budgets, students and basic research needs). The basic model chosen takes into consideration the primary variables that produce student growth per institution, especially natural increase (including immigration); the advisable increase in the number of recipients of matriculation certificates; and the demand for advanced and professional studies.

These estimates take into consideration the needs of the education system and the Israeli economy, as detailed in previous chapters, and merge with the data on the academic and technological labor force required for leading the Israeli economy towards accelerated growth and placing it at the forefront of developed countries.

In order to achieve Israel's development objectives, there is an urgent need to change priorities in education. Formal education requires urgent promotion, along with high school students' preparation for entrance into the higher education system. Therefore, and in view of the past five years' stagnancy in matriculation eligibility, we must prepare and encourage a significant increase in 18-24-year-olds eligible for matriculation. Seemingly, past figures indicate a significant improvement in the rate of matriculation over the past two decades, but the data is relative to the low level seen in the past, and does not indicate an improvement in relation to the Western world. Israel is currently at the bottom of the list of developed countries in the relevant population's eligibility for matriculation. The proportion of matriculates of the relevant ages is under 50%.

Therefore, a forecast is required for setting a clear, defined target for a significant breakthrough. That is, setting ambitious, attainable objectives for the next twenty years, with different alternatives that will provide a response to the primary factors in the demand for higher education; natural increase, rise in matriculation rates, increase in the demand for advanced degrees, and more.

The plan examines a number of alternatives, but in fact, the economic growth target of over 6% per annum requires adopting the higher objective. The current number of students is about 250,000 for 2008. The time frame for planning and testing alternatives is the next twenty years:

- **The maximal alternative sets target to increase the number of students to about 610,000 students in 2028, in such a composition and according to parameters described below. This is the alternative required for fulfilling the vision of this plan.**
- The middle alternative sets a target of 460,000 students in 2028, in such a composition and according to parameters explained below. While this alternative requires significant effort, it is insufficient for raising Israeli economy and society to the high position to which we aspire.
- The minimal alternative sets a conservative target according to existing trends, sufficing with about 390,000 students in 2028, according to the composition and parameters explained below. This alternative is presented to emphasize the large gap between it and the alternative that is in fact required for positioning the Israeli economy at the desired high international level. The minimal alternative will not enable the leap forward required for achieving the objectives presented in this plan.

The leading variable among the different alternatives is the matriculation rate of the relevant age group, and the increase in the demand for Master studies. The increase in the matriculation rate is an urgent, crucial necessity for changing priorities in the education field.

The forecasts relate to bachelors, masters and PhD programs, non-budgeted colleges, and upgrading post-secondary institutions to two-year or three-year institutions that confer Associate degrees.

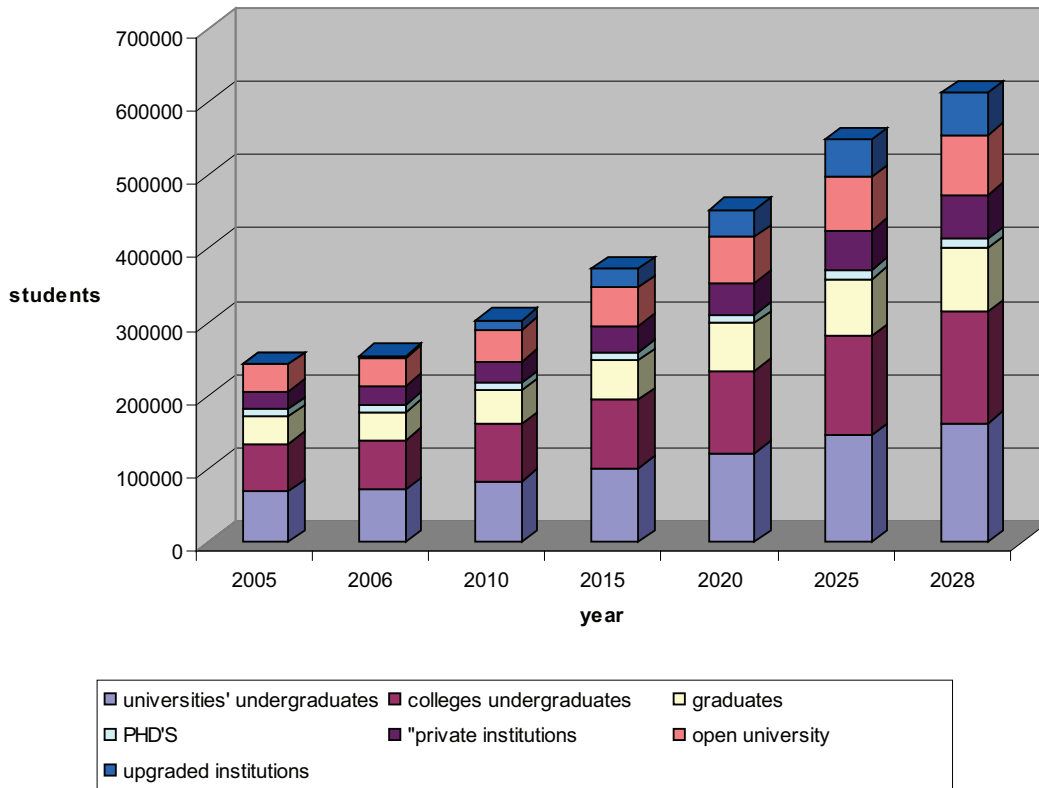
Along with the forecast for the rise in the number of students, objectives are also presented for budget increases over the next twenty years. Increasing the budget requires a real increase in investment beyond the rise in the number of students, in order to achieve objectives for research and international excellence objectives.

Table 1 (with Chart) summarizes the forecast for the number of higher education students for the maximal alternative.

**Table 1:
Forecast for Increase in Number of Students – Maximal Alternative**

Forecast summary of increase in higher education students 2008-2028							
Academic year	2005	2006	2010	2015	2020	2025	2028
BA - universities	69,840	72,459	83,955	100,922	121,318	145,837	162,866
BA- funded colleges	64,733	67,160	77,816	93,542	112,447	135,172	150,957
MA	37,330	38,730	44,874	53,943	64,845	77,951	87,053
PhD	9,340	9,480	10,062	10,839	11,677	12,580	13,154
Non-budgeted colleges	24,322	25,295	29,591	36,003	43,803	53,292	59,947
Open university – all degrees	36,950	38,243	43,885	52,122	61,904	73,523	81,516
Upgrading institutions		2,500	12,500	25,000	37,500	50,000	57,500
Total	242,515	253,868	302,683	372,371	453,494	548,354	612,993

**Chart 1:
Development of Increase of Students for 2028
by Category & Institution**

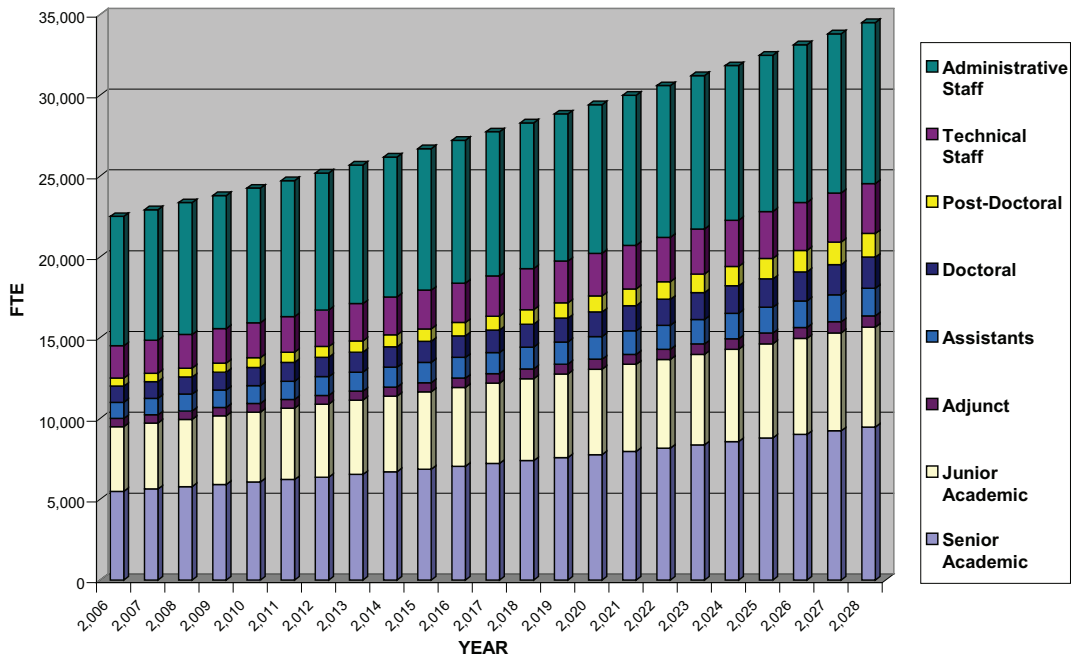


Increase in the number of students clearly requires a corresponding increase in academic and other staff in the system as presented in Table 2 and Chart 2.

Table 2: Forecast for Staff Increase 2007-2028 - FTE

Required Staff Increase for 2028 - FTE	
Senior faculty	9,500
Junior faculty	6,200
Adjunct	700
Teaching assistants	1,700
Doctoral students	1,900
Post-doctorates	1,500
Technical staff	3,100
Administrative staff	10,000
Total	34,500

Chart 2: Forecast for Academic and Other Staff Increase



The necessary increase in various degrees granted in order to achieve the plan's strategic objectives is given in Tables 3 and 4, while Table 3 shows the needed additional budgets, and Table 4 the detailed calculation.

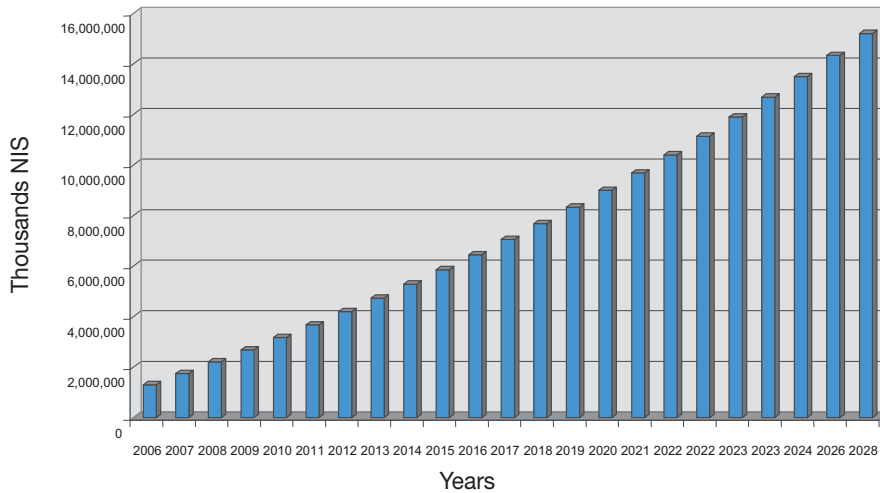
Table 3: Factors in the Increase Rate by Degree

Degree	Parameter	Yearly rate of increase
BA	population increase	1.5%
	Immigration	0.5%
	Matriculation increase	1.75%
MA	population increase	2%
	Immigration	0.5%
	Matriculation increase	1.5
PhD		1%
Open university		3.5%
Upgrading existing post-secondary institutions		5%

Table 4: Itemized Required Budget Supplement for 2028

In thousands NIS

Details/years	Unit Rate	Unit of measure	2006	2007	2015	2028
BA- University						
Increase in students	35	Matric. Student	91,665	186,767	1,087,865	3,255,913
Improving teaching	0.1	Classroom crowding coefficient	9,167	18,677	108,787	325,591
Total			100,832	205,444	1,196,652	3,581,504
BA- budgeted colleges						
Increase in students	25		60,687	123,650	720,226	2,155,590
Improving teaching	0.1		6,069	12,365	72,023	215,559
Total			66,756	136,015	792,248	2,371,150
MA						
Increase in students	65	Matric. Student	90,992	185,396	1,079,877	3,232,004
Improving teaching	0.1	Improving adjunct-senior staff ratio	9,099	18,540	107,988	323,200
Total			100,091	203,936	1,187,865	3,555,204
PhD						
Increase in students	150		21,015	42,345	224,918	572,136
Doctoral scholarships	0.1		2,101	4,235	22,492	57,214
Total			23,116	46,580	247,409	629,350
Open University	10	Matric. Student	12,933	26,318	151,716	445,659
Upgrading institutions	20	Matric. Student	50,000	100,000	500,000	1,150,000
strengthening research	100	Allocation for researcher	550,000	563,750	686,875	946,864
Student aid	5	Matric. students	56,763	115,166	649,280	1852,389
Construction	30	7 sq. meter per student (@ \$1000/sq.meter)	340,578	350,418	443,581	667,383
Total added expenditure			1,301,068	1,747,627	5,855,626	15,199,504
Funding						
Increased tuition	15	Matric. students	155,696	315,728	1,772,632	5,022,795
Supplementary PBC budget		Complementary Self-income	979,948	1,209,850	3,344,257	8,279,983
Self-income	5	Matric. students	51,899	105,243	590,877	1,674,265
Construction-donations	10	7 sq. meter per student (@ \$1000/sq.meter)	113,526	116,806	147,860	222,461
Total added income			1,301,068	1,747,627	5,855,626	15,199,504

Chart 4: Required Budget Supplements until 2028

Recommendations

1. National Policy

The higher education system will remain public, supported mainly by government sources. It will be the state's duty to influence and direct the shaping and implementation of the system's development policy, in order to achieve the primary objectives of promoting Israel's values, standards, economy, and security. The state's impact upon the direction and development of the system must be founded on non-political public/academic principles, as fits an enlightened state.

Over the next twenty years, a higher education system with a changed structure should gradually be created. The system will include at least two elite research universities, whose academic achievements place them among the twenty leading institutions in the world. We do not intend to choose two institutions to be designated as these elite institutions; rather, funding policy should be promoted that creates competition among all universities. As a result, it is likely that at least two universities achieve elite university status. In such an open competitive process, clearly all universities will be able to promote fields of study and centers of excellence. In addition to the elite universities, the system will include a wide variety of academic institutions: universities that confer all degrees, an open university, academic colleges and two-year community and vocational colleges – all of which operate side by side, promote competition, strive for excellence, and complement each other in

certain realms. The system must be open to students' convenient transition between its components, according to their ability and will, and must charge fair tuition. It will enable the majority of the population in the appropriate age groups to participate in the higher education experience, so that by 2028, over 75% of the relevant age group will be enrolled in the system, reaching 610,000 students in 2028 (up from the current 250,000), by the institutional breakdown provided in Table 1.

2. System Budgeting and Funding Policy

Attaining the higher education system's objectives according to the recommended alternative requires that government budgets be increased already, as well as for the mid - to long term. This will minimize the damage caused by the cuts of recent years, match the increase in the number of students to the teaching needs of various degree programs, and nurture research excellence. As compared with the current situation, the system's budget resources from government sources must be increased by no less than NIS 2.5 billion for the base budget over the next five years (as per the Shohat Commission report, "Examination of Israel's Higher Education System"), as well as an additional increase of about NIS 2.5 billion for the base budget for each of the three upcoming five-year periods, so that in twenty years, the system's base budget will be about NIS 10 billion larger than at present. These budgets must be designated for improving the system's outputs in teaching and research as well as improving access to the system, as will be detailed below. These budgets correspond to the demands of the maximal alternative.

Budgeting for university and college teaching will be transparent, based primarily on the number of Bachelors and professional Masters students, and will vary by discipline. A certain gap will exist in the same discipline between university and college.

Budgeting university research will be done almost exclusively through competitive research foundations: the Israel Science Foundation and additional designated research foundations that should be established. These foundations' budgets will come from re-directing CBP's institutional research funds (currently allocated to universities, in the framework of their regular budgeting, according to criteria such as the number of advanced-degree students, publications, etc.), competitive research foundations, as well as significant augmentation of the Ministry of Finance's overall allocations for scientific research. Research grants will include about 40% of overhead costs designated for the academic institution. Likewise, researchers will have to fund scholarships for their advanced-degree students out of their research budgets.

3. Expanding National Foundations for Scientific Research at Universities

The national foundations for scientific research at universities need to be expanded and enhanced, as indicated in Chart 4, in order to attain the supreme goals for research quality,

and to have at least two elite universities classified among the world's twenty best. In addition, high-level research must be done at universities that confer advanced degrees. In order to achieve these main objectives, two directions need to be taken. First, the scope of funds for competitive basic research based on exclusively on excellence must be significantly expanded. Existing foundations must be enhanced and new foundations and programs must be created at a yearly budgetary scope of an additional approximately NIS 1 billion. The increase in research budgets is an essential condition for improving Israel's academic research, in order to enable it to be internationally competitive and to attract the strongest scientific forces to Israeli institutions.

Second, a system of national foundations must be established for specific research fields. The Israel Science Foundation has proved itself as the leading foundation for basic research. This foundation, which supports outstanding research on a competitive basis, is an important factor in promoting basic research in Israel. The foundation's leap forward occurred in 1992, when it was expanded by the initiative of the Israel Academy of Sciences and Humanities and PBC, and was upgraded for basic research and expanded by hundreds of percentage points. However, progress in world science, the need to build large-scale research groups and the need to create means for research and large-scale designated research infrastructure, all require an additional significant expansion of the foundation's resources, in order for Israel to maintain its status as a leader in world research, and to excel in fields in which it has comparative research advantages. Such a budget increase is also deemed necessary by international comparison to national science foundations in other small, developed countries, such as Switzerland and Sweden. At the same time, new financial sources need to be allocated from the budgets of the higher education system, the Finance Ministry and other budgets (Ministry of Health, Ministry of Energy and others), to promote research in fields in which there are gaps in knowledge and standards, so that within this strategic plan's time frame, we can arrive at personal and institutional competitive research funding at a scope of \$1 billion. We note that the scope of research at one elite university in the US can range between \$500 million and \$1 billion.

The routes to expanding the system of national science foundations for research will include:

- Reinforcing the Israel Science Foundation, which is based on competitiveness and excellence, in order to enhance support for research excellence by researchers and research groups, and to establish competitive institutional research infrastructure, without institutional considerations.
- Establishing additional competitive foundations in specific fields, one for medical research and the second for the humanities. These funds may function in the framework of the Israel Science Foundation.

- Establishing foundations or programs for designated research in specific fields (such as nanotechnology), to be funded by pooling government and university resources.
- New financial resources need to be allocated from the budget of the higher education system and other budgets (Ministry of Health, Ministry of Energy and others) for the advancement of research in fields that have gaps in knowledge and standards. In this context, we must also develop a bio-medical research foundation based on the existing knowledge infrastructure at Israel's medical centers, which are not utilized at all or only minimally. Establishing a foundation to unite medicine and the life sciences will advance medical research and enable physicians to take a significant role in research, as compared with the current situation.
- Research should be nurtured in the humanities in general, and Jewish studies in particular.
- Israeli science's connection with world science in the framework of international organizations and institutions should be promoted. Management of these relationships should be concentrated in the framework of the Israel Academy of Sciences, in cooperation with the Ministry of Science.

4. Regulatory Bodies

The state provides the higher education system with considerable resources, and will have to provide even greater resources in the future. Therefore, it is not only permitted to influence and guide the system, but is obliged to do so. This is currently done through the two regulatory bodies established by the state: CHE and PBC. Over the years, these bodies have supervised and managed the system with considerable specific involvement in institutions' business. In view of the system's current size, and certainly in the future, when the system grows significantly, direct, specific control and intervention in micro-management will no longer be appropriate. It would require the establishment of a large, very awkward bureaucracy. **The advisable alternative is redefining the roles and powers of the CHE and PBC and delegating broad powers to the institutions.**

CHE cannot respond in reasonable time to the numerous applications for starting new programs of study and new institutions. Also, the method of establishing ad hoc committees for each request is slow and problematic. Therefore, CHE also needs to delegate some of its powers regarding the creation of new study programs and conferring of new degrees by recognized institutions, to the institutions themselves, in turn shortening and simplifying procedures, even if this has budget implications.

PBC must navigate the system via judicious, clear and transparent funding policy, as described above, providing broad powers to institutions, without its specific intervention. At the same time, it must focus on monitoring the institutions' outputs.

As for the establishment of new institutions, study programs and degrees at unrecognized institutions, **an additional CHE sub-committee should be created. The exclusive role of this professional, skilled sub-committee will be to make recommendations to CHE (in coordination with PBC) on issues pertaining to institution licensing, conferring of degrees and monitoring outputs of the entire system.**

Transferring powers to universities and colleges as regards programs of study and conferring of degrees places the responsibility for monitoring and quality assurance on these institutions. Thus, they will take it upon themselves to conduct external academic monitoring of each department and faculty once every six years. The evaluating committee's report will be transferred to CHE via the new sub-committee. In addition, the new sub-committee, in coordination with PBC and CHE, will be able to make an occasional request to the Israel Science Foundation to initiate a survey of the fields of scientific research at a national level.

5. System Components

The higher education system is currently composed of two main tiers: universities and colleges. The proposed higher education system will have three main tiers: universities, colleges, and two-year community colleges. The system must allow easy transition for students who meet demands, from tier to tier, and universal entry to the two-year colleges. Such a structure will enable the attainment of the national universal access target of 75% of the relevant age group enrolled in higher education. Every type of institution has a defined, complementary designation and mission, as detailed below.

5.1 Universities

The universities have a multi-dimensional role, which includes a) promoting human knowledge; b) educating and training national leadership in all disciplines at the Bachelors level and beyond; c) creating modern technologies and training high-level scientists, academics and executives; d) distributing knowledge and establishing progress and enlightenment; e) shaping and maintaining our national and cultural foundations; f) serving society's need for decreasing gaps; and g) building bridges to world science and to world Jewry.

As detailed above, through appropriate funding policy we must strive for **at least two** universities to be positioned among the world's twenty leading universities.

In order for universities to fulfill the mission described above, they must maintain high entry thresholds and filter candidates through accepted exams. They must maintain a student-to-faculty ratio that allows for appropriate teaching standards at all degree levels.

As universities are public and publicly-funded, and in order to provide equal opportunity for the periphery and minority sectors as well, **universities must accept, without**

exams, 2% of those eligible for matriculation who have scored highest among the country's high schools. They will also have to accept college students who show acceptable university-level achievement and who are interested in continuing their studies at university.

A management model appropriate for the university's needs should be examined. University management will require expanded powers to set faculty pay, and to conduct negotiations and agreements with faculty, while setting clear rules for their budget responsibility. Management's control over academic faculty's pay, along with dramatic improvement in research conditions, will provide universities with the necessary tools to prevent a brain drain and to bring back talented Israeli scientists from abroad.

It is important to emphasize the considerable role of the research university in developing applied R&D. Although most industrial R&D is currently done through business and government involvement through the Chief Scientist in the Ministry of Industry, Trade and Labor, its foundations are in basic research and researchers' connections with industry. Moreover, one of the characteristics of the 21st century is the merging of science and technology into an indivisible entity; therefore, it is expected that most important breakthroughs will come from universities' basic research. The connection between universities and industries was supposed to be conducted through university R&D companies, which exist at most universities and fulfill an important role in transferring knowledge to industry. There is an urgent need to promote the issue by setting clear intellectual property policy that provides an incentive to the solitary researcher to commercialize his or her studies, and enables the university to promote science and technology to applied and commercial tracks, without state intervention. We recommend encouraging university subsidiaries, through competitive foundations, to upgrade basic research and transfer of the knowledge to industry.

Finally, we note a uniquely Israeli problem. Select military intelligence units, such as 8200, employ a significant number of Israel's most scientifically-talented young people. They serve in the military for extended periods at the precise age at which scientific ability should be nurtured. Due to this defense need, Israel certainly loses a large number of outstanding scientists. In order to mitigate the damage to Israeli science, we recommend that the Israel Academy of Sciences and Humanities take up this matter with the IDF and universities, and create special multi-university study programs with the finest scientists as lecturers at IDF camps, so that by the end of these young people's military service, they will have completed at least a Masters, perhaps even part of a PhD.

5.2 Academic Colleges

Colleges must continue to focus on awarding BA, and sometimes BS, degrees; those that prove their comparative advantage may award Masters degrees, typically of a professional nature. PBC-funded colleges need to arrive at a critical mass of students and faculty; otherwise they may be closed or merged with other institutions.

Colleges will be allowed to set students' acceptance criteria. However, publicly-funded colleges must accept candidates from community colleges who have passed exams (coordinated with them), and high school students eligible for matriculation, whose matriculation scores were at the top third of their class. This will ensure that relatively strong students at peripheral schools are accepted into college without entrance exams.

The primary role of college faculty is teaching. College academic rankings must be determined by the colleges themselves, in procedures set by them, the primary criteria being teaching, innovation in teaching, scholarship and contribution to the college.

Like their colleagues at universities, college teaching faculty requires continuing education. We propose that PBC create a competitive foundation for this purpose that will fund a stay of a semester to a year in the framework of one of the research universities in Israel, with visiting lecturer status.

We do not recommend that colleges be run by or employ for a long period an excessive number of university professors. Colleges should be different from universities. It is advisable that management and faculty be made up mostly of people whose primary interest is the college.

College faculty members will be free to apply for competitive research funding, on the condition that they have proper research infrastructure or that they are allowed to use existing university infrastructure, on an ongoing or designated cooperative basis. Colleges will not be allowed to apply for competitive infrastructure grants.

5.3 Community Colleges

As stated above, achieving universal access requires the formal addition of a third tier of higher education, that of two-year community colleges. There are currently about sixty institutions of this kind. These colleges will focus on three directions: a) professional tracks that prepare graduates for specific professions (technicians, practical engineers, nurses, dental technicians, photographers, etc.). Many such programs currently exist. The colleges will determine the entry criteria for these programs; b) preparing students who either do not have matriculation certificates, or have only partial matriculation or

insufficient grades for acceptance into colleges and universities. These are the various preparatory courses; and c) general studies for ongoing education. In the latter two tracks, entry will be open to all.

Community colleges will award the preliminary Associate's BA or Associate's BS degree. Colleges and universities will set rules for accumulating certain credits for community college studies.

The addition of these colleges to the system and expanding their activity can provide important leverage for a) the entrance of ultra-Orthodox young people into the labor force (see below) and b) making the services sector and traditional industries more efficient. These challenges certainly demand that numerous new community colleges be established, designated for specific professions. As this topic requires more clarification, we propose to establish a committee that will examine it in depth.

5.4 Foreign Extensions and Private Colleges

Private colleges and extensions of foreign universities are a positive phenomenon, as they regulate supply and demand, deserving of encouragement as long they maintain adequate standards. CHE will provide recognition of the degrees they award, via a new sub-committee to be established for this purpose. Private colleges should have freedom of action, but their awarding of degrees should be supervised.

6. Tuition

In principle, tuition at publicly-funded higher education institutions should maintain a reasonable balance between the acquired education's contribution to the individual and its contribution to society, taking into consideration the individual's ability to bear the burden. There is no simple formula for this balance. We propose a uniform tuition for Bachelors studies in each tier, which reflects half of the cost of teaching in the least expensive field in that tier. In this way, education's contribution to the individual's earnings potential and to the goal of state and society to train an educated, skilled labor force, are both expressed. Tuition for the Masters degree will be higher. In addition, **we propose that every IDF and national service veteran receive a year of education free of charge per each year of compulsory service.** A support system for students in need, including loans for all students, should also be created.

7. The Ultra-Orthodox Sector

Labor force participation by the ultra-Orthodox sector, whose share in the Israeli population is expected to increase significantly, is a near-prerequisite for attaining the supreme goals of the strategic program proposed in this plan. The higher education system must play a

central role in fulfilling this task. In light of this sector's inadequate preparation in basic skills required for higher education (math, science and English), community colleges, especially professional ones, are an appropriate instrument for promoting this goal, due to their relatively short study period, the fact that the study content does not conflict with their beliefs, and the opportunity they offer to be absorbed in the labor market at the completion of studies. If existing professional community colleges cannot respond to the needs in terms of size and geographical distribution, we recommend establishing new colleges in densely-populated ultra-Orthodox areas such as Bnei Berak and Jerusalem.

8. The School System and Higher Education

Higher education is based primarily on the formal school system, from elementary to high school, and preparation for matriculation exams. An essential but insufficient prerequisite for the existence of a quality, accessible higher education system is the building of a quality school system that trains the student for independent learning and creative thinking, and serves as a knowledge infrastructure and strong foundation for academic studies. We must also promote professional studies and practical training.

Higher education must make an essential contribution to improving formal schooling's objectives and content. It must encourage and guide enhanced teaching standards in high schools in all subjects. This can be done through greater involvement in shaping school curricula and better preparing students for academic studies.

Improving the standard and quality of studies for all students and populations in Israel will facilitate the expansion of access to higher education without compromising academic excellence. There is a crucial, urgent need to increase the number of recipients of matriculation certificates by 1.75% a year, beyond the natural increase of the relevant age group, while maintaining appropriate pedagogical standards.

9. The Role of Philanthropy

As stated, philanthropic donations to universities and colleges play an important role in these institutions' income, especially as regards physical development. New buildings, student dorms, renewing equipment, acquiring expensive research infrastructures for universities, and other many activities are currently done through philanthropic support. In addition, scholarship foundations and faculty chairs by philanthropic endowments support research budgets and institutions' current budget. All of this produces very significant savings to the public treasury. It is also important to note that as opposed to the US, where support of academic institutions comes mostly from their alumni, in Israel most of the support does not come from alumni or from affluent Israelis, but rather from world Jewry, especially from the US. This support is important not only in itself, but also in its creation of an ongoing,

warm relationship between Israel and the Diaspora. This phenomenon is especially important in a period when the connection between Israel and the Diaspora is weakening. **We recommend that this issue be examined in depth, in order to develop national tools for encouraging philanthropy and recognizing those involved. Philanthropic donations to higher education institutions should be viewed as an important, central element in their funding.**

10. Promoting Social and Cultural Values

We must take into consideration that an important part of higher education is not measured in terms of training manpower for the labor market, or adapting the scope of studies to economic market variables. This statement particularly characterizes the humanities and other general studies. Promotion of teaching and research in the humanities, social sciences and Jewish studies should continue, by directing research funds to this issue and encouraging teaching in these fields at all institutions and for all degrees, in order to preserve and promote Israel's cultural treasures.

Chapter IX: Labor Policy

Introduction

This chapter addresses an issue central to every economy and society: the appropriate use of labor resources on the one hand, and the desire to fully recognize the employee's aspirations and needs, on the other. The global age and the significant, world-wide changes associated with it pose great challenges for policy makers. They must create policy tools that address the human behavior-related issues associated with the existence of the individual and the collective in the labor market. Our labor policy vision provides appropriate employment for individuals, aiming to attain near-full participation of working-age individuals in the creation of the economy's GDP.

The first part of this chapter addresses the world labor market's main dilemmas. A special discussion is dedicated to insights arising from relatively new developments in the labor market, some of which are already implemented in Israel while others are yet to be fully implemented. The discussion of these new developments will address a new conceptual field in labor policy, signaling a shift from the labor policy of the nation-state age, to one that addresses the ramifications of globalization, technological change and new social values. This conceptual field has been adopted by most developed countries and international organizations, including the International Labor Organization and the World Bank. In the EU countries, the new language serves as the basis for shaping uniform labor policy standards in the framework of the Lisbon Protocol.

The second part of the chapter focuses on analysis and recommendations for Israel's labor policy, based on new concepts and approaches to addressing the challenges of the global labor market.

Vision

The vision is aimed towards Israel's adoption over the next decade – long before 2028 – of labor policy that is appropriate for its economy's needs in the age of globalization. This policy will strive for rapid economic growth; the bridging of income gaps; increased participation rate among traditional groups; removal of obstacles faced by individuals struggling to integrate into the labor market; and promotion of life-long learning. In the framework of this vision, the state offers the employee a contract by which it shares in the risks and responsibilities, in accordance with the individual's various needs and positioning in the labor market.

The vision requires creating consistent labor policy that fits economic policy objectives that strive for economic growth; full employment; maintenance of a social security system; provision of basic and higher education; and economic activity appropriate to a market economy within a welfare state.

The coming generation's new and future labor market will be more competitive, dynamic and complex. Growing income disparity poses a challenge for policy makers, as it becomes increasingly difficult to intervene and exercise control over the labor market. While employment in itself does not necessarily prevent employees and their families from experiencing poverty, non-participation in the labor force almost always leads those who do not own property, to poverty. Citizens, employees, and employers expect the government to deal with the challenges of the new labor market, while the government must build support and safety nets that enable the active, responsible citizen with initiative to perform successfully within the new labor world.

Strategy

The strategy is based on cautious, selective intervention in the labor market. A strategy for realizing the vision will require action on three fronts:

- **The labor market:** intervention across the labor market, from the upper level, through the relatively-stable central level, to the lower level that involves low entry low thresholds and a high degree of instability. On this front, an effort will be made to attain four goals: increasing the rate of participation among various groups; providing protection and insurance for employment transitions; facilitating persistence in the work place; and removing obstacles to entry faced by traditional groups and groups with low employment skills.
- **Setting labor policy:** intervention that strives to produce consistent, long-term, measurable labor policy, which sets employment objectives for the shapers of economic policy, and energizes intervention in the labor market according to need. Consistent labor policy for Israel will be based on creating a continuum of services that assist employees; ensuring that it corresponds and is integrated with interfacing systems; repositioning of labor as an issue for government action and intervention. In this framework, **we propose re-instituting the Labor Ministry** as the source of policy, and reshaping existing activities and units accordingly.
- **Setting economic and social policy:** intervention that strives to produce coordination and integration of government labor activity between National Insurance, the Ministry of Education, the Ministry of Welfare and the Ministry of Finance. This coordination and integration will also be directed to a new partnership between employees and employers that is adapted to the changing structure of the labor market. Expansion of this partnership and coordination of policy-driving activities will try to help organize third sector organizations' increasing social role, and the new role of local government.

The growth target of over 6% on average per year, which is at the heart of this plan's macro-economic policy, is contingent upon ensuring high levels of participation and employment.

The New Conceptual Field and Labor Policy Dilemmas for the Coming Years

1. Labor Policy

The term "labor policy" refers to the state's basic approach to government involvement in the regulation, operation and management of all aspects of the labor market. It is derived from fundamental economic, social and political perceptions, from which a tool box is constructed and measures established that facilitate government policy making. Labor policy is not created in a vacuum, isolated from the state's circumstances and background, but rather is influenced by historical continuity, political culture, social structure, legal aspects, and foremost, by its convergence with other realms of social policy. The nation-state's market economy in the global environment requires that labor policy ensure human capital, technological development and the increasing economic competitiveness.

Core labor policy will focus on increasing the rate of participation in the labor force, promoting life-long learning, locating labor market trends, creating partnerships between government and business/civil sectors, and dealing with labor market failures in the context of the participation rate. These activities require developing progressive theory and sophisticated evaluation systems.

According to this approach, government intervention in the realm of labor is applied at the intermediate level: while it does not rely upon macro-economic policy alone to achieve industry/sectoral objectives, it avoids micro-economic policy that is appropriate for a single enterprise.

2. Labor Policy on the Supply Side

In customary terminology, labor market supply comes from the employees who offer their services, while demand comes from employers. Supply-side labor policy is distributed between improving human capital and employee skills, and impacting upon employees' quality and suitability to market needs, through various means. This plan relies on the assumption that, with the exception of a number of sub-topics, labor policy should be oriented toward employee supply; it is considerably more difficult to intervene on the side of demand, which risks creating distortions stemming from influencing employers' willingness to take on additional employees or impacting upon the scope of available jobs through employment subsidies. In a global, more competitive market, distorting resource allocation is costly in terms of loss of competitiveness and ultimately, in terms of employment.

This approach constitutes a shift from a policy of creating broad job demand through business or industry subsidies, to one that addresses unemployment, the low participation rate and improvement of human capital in accordance with the demands of the labor market.

3. Work First

Another new labor policy concept involves the ideological preference for "work first", which is at the heart of vigorous debate. According to this view, it is preferable to direct non-participants in the labor market toward low entry-level jobs, as opportunities exist beyond this threshold for employment mobility. The assumption is that work skills are better acquired in the framework of on-the-job learning in the workplace. Conversely, some claim that only higher threshold jobs along with an intention to persist will have good outcomes. They cite the working poor who lack stability, as a witness to the failure of "work first"-oriented labor policy. Some of the tension between the two approaches can be resolved through micro-management of policy to bring workers back to employment, as Israel has learned in recent years, from its experience with the *Mehalev* program ("from securing income to secure employment"), the Israeli version of welfare-to-work intervention (the "Wisconsin Program").

4. Work Skills, Employability and Removal of Obstacles

The term "employability" describes one objective of the new labor policy. This objective involves primarily removing obstacles to human capital and work skills, thus improving access to the labor market. This term comes from an awareness of the complexity and multiplicity of obstacles to the individual who does not participate in the labor force. Israeli society in the global age, with its diverse presentations of lifestyle and identity, requires a varied labor policy.

5. Two Basic Approaches

Labor policy philosophy distinguishes between two basic orientations. One emphasizes integration into the labor market, and the other stresses protection from the labor market. Those who fear placing emphasis on increased labor force participation, or the "work first" approach, propose the term "flexurity", which integrates the need for employer flexibility with assurance of security for the employee, incorporating a leisure-family-work balance. The two approaches may be appropriately balanced through practical application of programs aimed at integration into the labor force.

6. Active Labor Policy

In view of today's varied employment needs, multiplicity of specializations and diverse life situations, there is a need to produce "custom-made suits" to facilitate integration of the individual employee into the labor market. Intervention programs must be proactive as regards non-participants and the unemployed. The multiple presentations of disengagement from the labor market require a new, more personalized effort as opposed to the relatively simple "off-the shelf" solutions of the 1950s and 1960s, which included vocational training

and job placement services in the framework of the Employment Bureau.

The new category of individual-oriented policy, known as "Active Labor Market" policy, has become a widely accepted consensus. Some of its versions, which address the poverty trap faced by vulnerable, benefits-dependent populations, have been known as "Welfare-to-Work", costly programs that require creating theory and preserving knowledge.

7. Soft Non-Cognitive Skills

Alongside the emphasis on active policy that may involve producing "custom-made suits", a pedagogical innovation has emerged among employers stressing the importance of employees' soft, non-cognitive skills. These skills, required in many service sector jobs and in contact with customers, include learning ability, initiative, flexibility, teamwork abilities, diligence, reliability, accuracy and problem-solving ability. Additional soft skills include the ability to work under the stress of meticulous standards and monitoring of achievement. These new emphases multiply as the economy becomes more post-industrial and services-intensive.

As a large share of the labor market is "Wired" - regardless of whether a job is situated in traditional, service or knowledge-based industries – some approaches define soft skills in terms of one's ability to work in a technologically-controlled environment. While such demands are becoming part of the work reality, they do not make traditional skills redundant, but rather join them under the definition of "Multi-Skilled".

In contrast to pedagogical labor policy innovations that emphasize "New Skills", more skeptical approaches claim that while the new world of labor indeed complicates the skills issue due to needs differentiation, there remain sectors in which job training can be carried out through traditional tools; "Core Skills" exist including literacy in communications, technology, learning, math, language and problem-solving in the context of one's job. An even more radical approach opposes the specific analysis of occupations at the low end of the labor market and what it considers the over-use of the term "skills".

8. Identifying Needs and Skills

The traditional definition of job skills involves a simple model of rational information transfer from the seemingly knowledgeable employers, who accurately describe market needs. Job skills analysis has become a complex field of evaluations that take their inspiration from various disciplines.

New labor policy's experience shows that employers tend to describe in simplistic terms the skills they are interested in, without great differentiation and in language that expresses eternal disappointment in labor force quality. As we approach the level of the individual

business, a clearer understanding emerges regarding the needs for employee skills. A similar situation exists regarding the status of the public education system, which is supposed to provide, by the simplistic model, a skilled, flexible and responsible labor force, while in fact, public education and the school-to-work transition is much more complex. The golden age of "School-to-Work" was appropriate for the first half of the previous century, for part of that era's work technologies and particularly for the needs of industry of the time. The role of education is changing in relation to work, with the emphasis shifting towards the provision of soft skills and basic math, language and technology literacy.

9. Temporary Solutions vs. Policy Infrastructure

The labor market's dynamic nature and the multiplicity of external influences in the global age have produced the need for flexible intervention that aims to reduce risks and identify opportunities. Thus, for example, specific interventions can address trends or predicted crises in industry growth. It is very difficult to maintain static labor policy that is based on a fixed platform. On the other hand, a temporary labor policy may become an eclectic collection of random interventions. We must, therefore, balance fixed labor policy components and context-dependent interventions. Maintaining this kind of model requires strong tools for identifying and collecting knowledge, that are shared by all the government agencies involved.

10. Positioning or Substituting Traditional Tools

One of the basic issues of the new labor policy has to do with the positioning of active labor market policy programs in relation to the traditional labor policy tool box. One model may propose that "welfare-to-work" programs replace vocational training departments and public job placement services; another model keeps these services within the continuum of services and tools at the disposal of policy-shapers. The plan supports an active labor market policy that re-organizes the existing tool box of government intervention in the labor market and recruits traditional labor policy systems according to need, thereby preserving the employment service and vocational training in the framework of programs for integration into work.

11. Population Variation and Differentiation

A coherent labor policy addresses not only unemployed and non-participating populations, but also at-risk employees, temporary employees, low entry employees, and part-time employees. In a labor market that contains an unstable employee tier, focusing exclusively on the participation rate may create a "revolving door" syndrome with a multiplicity of entrances and exits to and from the labor force. Such short-term unemployment may cause despair, and especially hurt vulnerable populations such as women, the poor and minorities.

"Snap-shot" measurement of unemployment is insufficient. There needs to be clarification of how many employees have experienced unemployment or underemployment. Labor policy must also provide strong employees in stable jobs with life-long learning opportunities, and provide vulnerable employees with close support and opportunities for on-the-job mobility.

12. Accompanying Tools

The core of the new labor policy requires a supportive "envelope", addressing taxation, social security policy, labor laws, work immigration policy, housing policy and education.

Labor policy may be supported by various tools, some of which are controversial, such as negative income tax or minimum wage. It must also rely on enforcement mechanisms, as regards, for example, minimum wage, overtime and social benefits. The narrow margins of the new labor market and the complex nature of intervention require balancing and employing numerous tools. Universal, sweeping application of these tools may be inefficient and wasteful.

Some of the new labor policy's "envelope" pertains to social security policy. On the one hand, provision of social security benefits may create a poverty trap that debilitates labor policy due the non-profitability of giving up benefits in order to transition to work. On the other hand, governments sometimes harness labor policy in order to reduce the number of benefits recipients or to achieve other objectives. Labor policy requires that social security policy prevent the poverty trap and facilitate entry into the labor force. Such a social security policy demonstrates generosity towards those unable to work and encourages others to work. Broad consensus exists for a labor policy that is based on the cautious, selective use of enveloping tools.

If we adopt a supply-side, rather than a demand-side, core labor policy, then only in very exceptional cases may employers be subsidized. Work experience and employees' human capital must be promoted in partnership with employers and organizations.

Another part of the "envelope" involves creating support services, such as day care centers, facilitated and improved mobility, and housing assistance where employment opportunities are available.

13. Between Education and Work

The relationship between educational policy and labor policy is elusive and complex, and touches upon multiple realms. Adult education has undergone changes since its beginnings as teaching language and literacy to immigrants and the poor, through assisting workers in completing their education, to the culture of leisure and enrichment of the last quarter of the twentieth century. Education and labor policy converge at the point where culture

and infrastructure facilitate life-long learning. The shapers of education policy are also responsible for young people's transition into the labor force. Youth of 18-25 years of age can be assisted in completing their schooling and vocational education in a broader context. Vocational education, which involves human capital infrastructure and the economy's needs, addresses the labor market's "skills mismatch". The relationship between the needs of the labor market and employees and the school curriculum has to do with education policy, although some cast doubt whether we can even rely directly upon the public education system as a job-training element. In the Israeli reality, young people who graduate from ultra-Orthodox yeshivas without completing a core curriculum should have the opportunity to enter a track of completing their education.

14. Partnerships in the New Labor Age

In the past, labor policy was naturally created on the basis of the three-way government-unions-employers model. Today, labor policy-shapers are responsible for creating this partnership in a complex system, with a lower level of organized labor. Traditional players' place in policy shaping is being inherited by third sector organizations and businesses, creating an economy of involved, multi-player labor services.

15. Underemployment in the New World of Labor

Primarily as regards populations entering the lower end of the labor market, labor policy must address the issue of a new kind of employment – hourly, without benefits, for defined time periods. Regulatory policy will determine the scope of such kinds of work. A similar question arises regarding retirement age: a policy that encourages high participation must deal with contradictory positions vis-à-vis phenomena of change and variability in retirement. Pension policy pertains to welfare and social security policy, but interfaces with labor policy as well. An active labor policy that promotes the "work first" principle prefers – albeit with reservations - part-time employment and low job persistence over non-participation.

In summary, the once-stable labor world, efficiently regulated through simple, universal tools, is clearly changing. Labor policy has become individual-oriented, complex and directed towards treating vulnerable individuals in times of transition and risk. Labor policy is more crucial than in the past, while the challenge of achieving its objectives has increased. Only ongoing study and monitoring of the labor market can enable the application of new labor policy. Without an educated perception of the new labor world, the market alternative is preferable to an eclectic/political intervention.

Israel's Labor Policy: Challenges and Seeking a Way

The Weaknesses of Israel's Labor Policy

Israel has lacked a consistent labor policy for many years. Its labor policy was formulated primarily in the 1950s, 1960s and 1970s. In the 1970s, what remained of the historical Ministry of Labor was united with the Ministry of Welfare, in what was sometimes called "the merger that never happened". Similarly, a number of years ago, the Ministry of Labor's units were transferred to the Ministry of Industry and Trade (that became the Ministry of Industry, Trade and Labor, or IT&L), without the units' identity or functions being clarified in a systematic fashion. The activity of the department of vocational training soon shrunk from nearly NIS 1 billion to a few tens of millions a year. This was an expression of the Ministry of Labor's poor image in the eyes of national and economic policy-makers. The *Mehalev* program, which signaled a new direction in labor policy, was initially operated outside of the Ministry of IT&L, and was even meant to replace the Ministry's units. Economic and budget considerations determined the spirit of the program to a large degree.

For the past twenty years, the actions of Israel's governments in the labor realm have been characterized by lack of method, lack of priorities and changing objectives that appear secondary to benefits policies. Specific interests or special populations sometimes influenced policy, as in the case of the ultra-Orthodox, Arabs, single-parent families, the disabled, and immigrants. At times, policy was defined in terms of social rights; at other times, the emphasis was on increasing populations' participation rates or decreasing the number of benefits recipients. Israel's labor policy has been weakened considerably by its shifting nature, absence of priorities, lack of standards and frequent replacement of ministers. The *Mehalev* program did not substantively affect the lack of comprehensive labor policy.

The diagnosis of the dismal shape of Israel's labor policy leads to the conclusion that an overall organizing body is necessary. We believe that a government ministry is preferable to establishing an authority, considering our experience with some of those created in the past.

16. Knowledge Bases and Their Rehabilitation

In order to address the complex issues it faces, labor policy requires high-level professional knowledge and a considerable amount of information. Although the surviving professional knowledge and information have been stored in the large departments of former labor policy units, this is not expressed in the labor policy making of recent years. Recently, a great deal of knowledge is being amassed by third sector bodies, such as the JDC's Tabat (Tnufa Beta'asuka, "From Unemployment to Independence") partnership, which manages the development of labor policy and creation of knowledge, and adapts this policy to the

new labor market's structure. The Labor Ministry and its units should be rehabilitated and enabled to set and manage labor policy through pooling units that address policy from within the state service. A newly established independent Ministry of Labor should manage the *Mehalev* programs, in coordination with National Insurance and the Ministry of Welfare and in cooperation with third sector bodies such as *Tabat*. The Ministry will conduct program measurement, evaluation, and knowledge management, and the initiative will specialize in developing services according to the Ministry's work program.

17. Major Labor Ministry Institutions

The Labor Ministry must define its core activities in terms of increasing the participation rate and dealing with multi-dimensional unemployment, as well as supporting the labor market's vulnerable groups during economic or industry crises or personal employment transitions. The labor market will be examined by dividing it up into populations with differentiated employment characteristics.

- **The Manpower Planning Unit** currently serves as a professional institutional unit that enjoys a systemic view of the labor market and incorporates the ability to translate the data systems of the Central Bureau of Statistics, National Insurance, the Employment Service, the Ministry of Finance and the Bank of Israel into a picture of Israel's labor market, as well as to follow trends. This unit should serve as the Ministry's central knowledge and deliberation unit.
- **The Employment Service** was established as the state employment broker that provided counseling and evaluation as well. Increasingly, however, it is becoming a service that technically classifies benefits recipients who require the test of employment. This service needs to be adapted to the new labor market.
- **The Department of Vocational Training**, like similar units around the world, is experiencing an identity crisis. In the absence of an integrated labor policy, its path and goals are unclear. During the period of immigration absorption, in view of Israel's low participation rate, it served as a platform for emergency intervention by providing numerous courses. These activities, however, could not establish the department as a central tier of labor policy. Department knowledge and tools are no longer at the level of core needs, but are still required for purposes of authorization regarding special populations and in some branches. In contrast to the past, vocational training is no longer the core of labor policy but only another tool in labor policy's tool box. The significant budget cuts imposed on the department debilitated this important labor policy tool, which needs to be adapted to the new reality, but should not be abandoned as a potentially important tool for training employees and bringing them back to the labor market.

Increasing the Participation Rate and Addressing Multi-Dimensional Unemployment

In the coming years, labor policy's primary focus should be on increasing the participation rate in the labor force, as well as placing the unemployed.

1. Unemployed

Alongside the challenge of increasing the participation rate, we must address unemployment in terms of its multi-dimensional components:

- Part-time employees;
- Unemployed persons in the traditional sense: that is, individuals actively seeking work and wishing to work;
- Those who have despaired of finding work or who do not intend to work but continue to visit the employment bureau in order to receive benefits.

The traditional unemployed group comprised some 196,000 individuals (as of the fourth quarter of 2007); however, the cycle of individuals who experience unemployment of various types is twice this figure. The real number of unemployed persons in the Western world, including Israel, has increased four-fold over the course of one generation, due to technological, cultural and social changes. However, there are among them some 100,000 individuals who are classified under friction unemployment, or natural unemployment, typical of dynamic, vibrant labor markets.

This group, which experiences various types of unemployment, comprises about 18% of the labor force and will expand in the future, due to the structure of the lower-end labor market. It is characterized by a clear demographic profile, with Arabs, development town residents, and young people predominating. **The most prominent characteristic of the groups that are significantly represented among the "traditional" unemployed population is limited education.** Over the past decade, the average duration of unemployment of this population has increased by 50%, to 37 weeks. The partially unemployed group is characterized by a larger number of Jews residing in central Israel. This group is older than the traditionally defined unemployed and its education levels are higher, but still low.

The group of "detached" individuals, or those who have despaired of finding employment, makes up about one-third of the unemployed in the multi-dimensional sense. At any given moment, this population is experiencing 50 weeks of unemployment. Clearly, then, the traditional unemployment category has been replaced by greater variability, including those on the threshold of the labor market and those sinking deep into the bounds of non-participation. This variability and complexity requires new policy tools. Policy makers must

address both unemployment and non-participation, while the categories themselves are becoming more complex and the labor market unmanageable by macro tools. Distributing the effort between unemployed and non-participants should be done in a balanced manner, and adapted to social security and pension policies.

2. Rate of Participation

Israel has a relatively large group of non-participants. There are many reasons for this, as may be observed through analysis of the 24-65 year-old population. Israel's overall participation rate is less than 56%, about 10 percentage points lower than that seen in the Western world. The necessary goal for the coming years is to gradually but significantly increase Israel's participation rate. Our gradual objective is to increase participation from 56% to 58% in 2018 and to about 60% in 2028. As for ages 25-64, the target is to increase participation from 69% to 74% in 2018 as is customary in developed countries.

Over the years, the increase in the number of women entering Israel's labor force has been satisfactory, with the exception of **Arab women**, whose participation rate is particularly low. The second group is the **ultra-Orthodox**, with about 60,000 yeshiva students. The **disabled** group, which requires intensive labor policy intervention, comprises almost 200,000 individuals who do not participate due to disability or other health restriction. Nearly 150,000 additional individuals under age 65 do not participate in the labor force due to **early retirement**.

This picture becomes more complex when taking into account the increase in non-participants aged 45 and older. In the 35-44 year-old age group, the rate of participation is higher. Thus, alongside the reasons and causes for non-participation, certain age groups have low participation: **young people** entering the labor force, and **those approaching retirement age**. This is a universal phenomenon. When we examine non-participants' education, a clear picture emerges: the lesser-educated participate less - half of non-participants lack a matriculation certificate and less than 20% of them have an academic education. The impact of education on participation is more pronounced among women and the disabled.

Distribution of the participation rates by identity group shows that the rate of non-participants among Arabs is relatively high. Among the ultra-Orthodox as well, the rate of non-participation is high and signals a considerable future risk.

Increasing the participation rate should be attained through interventions on the basis of specialization in different groups and creating baskets of intervention per specific population. That is, management through population groups. We should, however, remember that a rise in the participation rate will not in itself increase productivity or significantly increase the income of those who enter the labor force. The economy needs primarily educated and

skilled manpower. Among non-participants and the unemployed there are few who have appropriate education for the upper labor market tier. Therefore, the important task of labor policy and education policy is to improve the human capital of non-participants and the unemployed.

Increasing the Participation Rate by Population Group

The first group to be addressed is that of **Arab women**, influenced primarily by traditional social mores of Arab society, which demand that women stay at home. A secondary factor is the lack of adequate public transportation infrastructure in the Arab sector, which particularly impairs women's access to the workplace. An ongoing but slow trend of educational and cultural change is increasing Arab women's participation rate, and must be complemented by a policy of directing jobs close to Arab villages for these women. Another means is developing infrastructure, including for transportation, in the Arab sector.

A second group requiring special treatment is the **ultra-Orthodox**. A variety of cultural, occupational and systemic obstacles stand in the way of increasing their participation rate. The ultra-Orthodox require appropriate human capital for the demands of the labor market, as well as acceptable academic and vocational certification. Improvement is needed in ultra-Orthodox men's job skills, in the areas of basic language, writing, English and mathematics literacy. Improving human capital and soft skills of the ultra-Orthodox may facilitate this group's liberation from the poverty trap. Alongside dealing with the individual, we also need to address **cultural resistance** to employment, which has weakened somewhat in the margins of the ultra-Orthodox community. Costly individual treatment may produce certain results. In the framework of labor policy vis-à-vis the ultra-Orthodox community, the window of opportunity for entering the labor force should not be missed, which may risk withdrawal back into the learner's society model for some ultra-Orthodox. During the coming years, systemic treatment will be needed, including community/social work in cooperation with the community's leaders, to focus on maintaining basic values important to this community's way of life, as well as individual treatment, to address the individual's distress and facilitate acquisition of the necessary tools for integration into the labor market.

Somewhat stronger and less complex are the groups of **young people, immigrants, single mothers and women re-entering the labor market**. These groups may be especially suited to active labor market policy programs or to the *Mehalev* program. **A significant portion of single mothers** have low human capital. Therefore, providing education should be combined with removing the obstacles created by parenting, and a policy that does not encourage avoidance of work should be employed. Among **young people**, there is a group that faces difficulties in finding work, due to a lack of military service. The over-45 age group includes two sub-groups: those suffering from deep unemployment and low human capital should be exempted from

work, while the stronger, better educated and more motivated group is appropriate for state intervention. This older population may be assisted primarily through vocational training and completion of education.

The *Mehalev* program's decision to exempt this entire age group from work is excessively sweeping, and ignores the various impacts this may have on this group. Part of the challenge is low work supply for older workers and employers' preference for younger persons, especially in the higher tiers of the labor market. Often family members are dependent upon a non-participant of this age. In such cases, employing a supportive envelope should be considered.

Increasing the participation rate of the severely disabled population should also be addressed, but at a lower priority. Efforts should be directed toward those able to work in a non-protected framework, and dealing with the **moderately disabled** through provision of benefits for working disabled persons. The disabled should be protected from inappropriate work. This approach disconnects the labor policy from social aspects, while respecting the huge integration efforts of the disabled and their organizations. The test for policy makers is employment that provides a living and is accessible, rather than work that serves emotional rehabilitation or the prevention of rejection. These aims should be promoted in other frameworks.

Another population, whose improved performance has to do with regional industrial policy rather than core labor policy, is that of non-participants and detached individuals **from the Jewish periphery**. This group needs to be addressed through job creation via tools of municipal, regional or national policy. The participation rate in development towns is similar to the national average, but if the unemployment rate is taken into account, then the participation is somewhat lower than elsewhere in Israel, and the depth of unemployment worse.

All parts of the future Israeli labor market will be competitive. We must, therefore, **refrain from importing foreign workers** that pull the low end of the labor market downward and fill the jobs of the neediest groups. In the past, globalization of trade exposed low-level workers in tradable economic sectors to competing import, reduced wages and loss of jobs. Importing foreign workers also exposed workers in sectors that are not internationally tradable - construction, agriculture, and various services - to unfair competition and horrendous conditions of exploitation. In 2006, about 190,000 foreign workers were employed in Israel, primarily in the nursing, construction and agriculture sectors. We cannot give up foreign nursing workers without reviving the domestic nursing sector. This is a complex cultural, social and economic issue that requires addressing the question of whether clients and workers in Israel are willing to build, utilize and work in a new sector. Social advocacy groups are placing counter-pressure against removing legal and illegal workers from the agriculture and construction sectors. Without such a change, however, labor policy will suffer greatly.

We recommend a crucial labor policy measure: significantly reducing the number of foreign and Palestinian workers in Israel to no more than 3% of the labor force at any given time, as opposed to the current 8% (and over 12% at the start of the 21st century). Within five years, the reduction is to be implemented until the 3% objective is reached. Implementation mechanisms are to be based on good monitoring, and fiscal measures taken primarily vis-à-vis employers in order to reduce transaction profitability. Cutting the numbers of foreign workers will quickly and significantly affect the unemployment rate and increase wages at the low end of the labor market.

Obstacles and Their Identification

The supply-side approach to labor policy gives first priority to **lack of job skills and low human capital** in terms of applying policy measures. These obstacles involve the lack of basic literacy skills and soft skills such as motivation, learning ability, teamwork, problem solving, flexibility and interpersonal skills. These areas present a challenge for many Israelis, including the ultra-Orthodox, immigrants, uneducated individuals and the disabled, whose lack of job skills may stem from various reasons and require different remedies.

In part, low skills may result from lack of formal education and credentials. Here we may utilize preparatory courses for completing education at the lower levels, and develop community colleges, partly based on technical and practical engineering colleges, which were formerly part of the Labor Ministry's tool box (we propose to upgrade these colleges in the framework of higher education reform – see Chapter VIII). The various preparatory courses can serve as a platform for improving basic labor market skills, and some are already engaged in the task of their development.

Another cluster of obstacles has to do with the **lack of social networks**. The Arab and ultra-Orthodox communities are disconnected from social networks that create labor market opportunities. In a state where the job search relies most often on informal systems, new immigrants face similar challenges. Under these circumstances, the third sector may be recruited to assist in connecting groups to the labor market, as well as to improve technological means and access to the extent possible.

Alongside the lack of social networks, another obstacle is **discrimination against various populations**, especially Arabs. This is a complex obstacle to deal with, but compensation may be made in the form of affirmative action in public positions and state service. It is relatively easy to enforce anti-discrimination laws in public institutions or large businesses, but at the level of the small plant or business, it is typically impossible to go beyond anti-discrimination education.

A significant obstacle to the labor market is the **language barrier** experienced by many groups, including Russian and Ethiopian immigrants, and sometimes Arabs as well. Occupational *ulpanim* (Hebrew language courses) have offered a way to deal with this issue relatively successfully. The challenge of dealing with the **cultural characteristics** of a workplace and work methods is particularly apparent with older immigrants. Often, the problem is exacerbated when the job involves giving up status. A challenge sometimes faced by Ethiopian immigrants is their lack of Western work habits, in terms of time management, reporting, and understanding the nature of employee-employer relations.

One of the largest obstacles to entering the labor market is that of **accessibility**. This term, obvious as regards the disabled, also pertains to the degree of mobility in getting to work. The low-end labor market in the periphery, for example, may face the challenge of distances existing between home and work. Part of the solution is found at the level of improved infrastructures. From other countries' experience, we learn that outsourcing cannot serve as a complete solution to the problem of periphery residents' limited mobility.

Another problem has to do with **motivation and persistence in the workplace**. This obstacle may stem from perceived non-legitimacy of work for the ultra-Orthodox; low wages; lack of perspective for single mothers; and sometimes culture-related difficulties. In these situations, the employee requires assistance in ensuring relatively high-quality placement, or at least a reasonable persistence level. A system of accompanying the employee, in addition to providing incentives for work, may serve the objective of increasing the participation rate.

The obstacle of **lack of jobs** does not have to do with core labor policy; also the government's ability to directly create jobs is over-estimated. The job supply is the outcome of macro-economic and industrial policies that are discussed in other chapters of this paper (see Chapters VI and VII). As stated, our plan does not recommend subsidizing employers. Through regional development policy, we can help increase employment in the Arab sector, the geographic periphery and the new ultra-Orthodox communities, although we must be aware of the dimension of re-division that this may involve.

The *Mehalev* (Wisconsin) Program as a Primary Tool

The *Mehalev* program lays down initial labor policy infrastructure adapted to the new labor era. It triggered public discourse; created an infrastructure of labor-related civil society organizations; provided new levels of information on the labor market; interpreted components of non-participation; revealed the weakness of evaluation; reduced an initial level of misuse of the benefits system; and above all, succeeded, according to various follow-up studies, in attaining relatively high rates of quality job placement, of over 10% during the initial operation period of the past two years.

In its initial stages, the program faced difficulties in conducting evaluations within the populations; did not remove obstacles adequately; failed to create tools and organized theory; relied upon an economic model that encouraged substandard placement; and, similar to other programs around the world, was not always able to find proper work in the community. Great tensions were caused by the mixed balance and right-left politics, subsequently producing compromises and a softening of various aspects of the program. The program's economic model was altered, sanctions were eased, and most importantly, customized tracks were created.

The *Mehalev* program is controversial, because it was planned according to a rigid model, employed inflexible objectives and used private contractors. Israel chose this rigorous Wisconsin model for its "Active Labor Market Policy" programs without understanding its context, or the lessons learned by other countries (e.g., Britain and some states in the US), which subsequently created softer models. The Israeli program was perceived as part of a policy directed at decreasing the number of individuals receiving benefits, rather than one that operated within the context of labor policy. The program for reducing the number of benefits recipients and integrating them into work during the first two years was excessively harsh for some of the vulnerable populations, and earned a cruel image among the public and various organizations. More moderate programs are aimed at increasing the participation rate among stronger groups while balancing incentives with temporary, limited sanctions that are more appropriate for Israel. Such programs may develop out of the recently-formulated recommendations for *Mehalev II* and for JDC's *Tabat* ("From Poverty to Independence") program. An even "softer" approach views such programs as part of the fabric of social rights, expressing the state's obligation to provide the disabled and other vulnerable individuals with employment and opportunities for labor participation, without imposing sanctions; some parts of *Mehalev* indeed reflect this position. Irrespective of the chosen model, research on active labor market policy programs indicates that the degree of their effectiveness is determined on the ground, at the level of the portfolio manager, in accordance with the quality of the employee's evaluation.

Mehalev's rigidity, along with the weakness of its evaluation system, created problems within the more vulnerable populations of benefits recipients in the trial areas. The program's uniform approach; its lack of differential sanctions; its reward system; its lack of work-supporting services; its failure at providing tools and skills; and the lack of civil service for those who do not work, all caused an uproar and a political aspiration to abolish the experiment. It was a threat to the very existence of systematic labor policy in Israel. A compromise was formulated, differentiating between more vulnerable groups, to be handled by the *Tabat* initiative in order to remove the significant obstacles they faced, and stronger non-participating groups. The decision to exempt individuals aged 45 and older from the program is problematic, as this population faces significant obstacles. While the idea of managing variability according to regular and specialized tracks signals an appropriate direction, we must ensure that most of the resources

will be directed to the groups most likely to participate, to make on-the-job improvements and to persist. It is essential to discuss this plan, as it substantially influences the labor market during much of the time period of the vision discussed here.

Quantitative Situation Report

Our plan's demographic analysis of the target population as regards labor policy intervention is based on Israel's labor market data, according to which the number of labor market participants in 2007 was about 2.8 million. The participants category lacks clear boundaries, due to the existence of a large group that straddles the boundary between participation and non-participation; the increasing complexity and multi-dimensionality of unemployment; and the inclusion of individuals who have despaired of finding work within the unemployed category. We must aspire to intervene and make an impact where vague boundaries exist; we must, then, create resource-based research policy, concentrate knowledge in the hands of the state, and translate it into a uniform language.

In 2007, the unemployment rate as it is traditionally measured (individuals who are not employed) was around 7%, consisting of some 200,000 individuals. The group's education level is low; 15% of individuals who lack a matriculation certificate are unemployed. The unemployment rate is about 13% in development towns. Among the Arabs, the unemployment rate is over 11%, and the percentage of non-participation and unemployment among Arab women who hold college degrees is 32%. In general the average depth of unemployment is 37 weeks; an increasing cycle of people experience unemployment within three years. They make up 18% of the labor force. There also exists a "hard core" of unemployed individuals, who have not been employed at all for 50 weeks or more. Multi-dimensional unemployment encompasses a much larger group, including the "traditional" unemployed group; part-time employees (not by choice); individuals who have despaired of finding work; and detached individuals. A strong indication of this group's complexity is the scale of individuals who have experienced unemployment over the past three years, reaching 18.5% and encompassing over 400,000. The unemployed category spans the range from underemployment, through traditional unemployment to despair of finding employment. The data on multi-dimensional unemployment partly explains Arab sector poverty and labor market characteristics. When considering the multi-dimensional unemployment perspective (rather than the traditional definition), the Arab population's unemployment rate is double that of the Jewish population. Similarly, when measuring multi-dimensional unemployment among young people and periphery residents, the unemployment rate is significantly higher, and the unemployment gap between these groups and other sectors, increases.

An initial analysis of the non-participants in the labor force indicates that women have a 40% higher potential than men for raising the participation rate. This phenomenon is partly explained by the familiar, universal occurrence of women exiting the labor force in order to raise children.

Good labor policy can deal with this issue. Women who left the labor market in their thirties often remain outside the labor market after their children have grown, as reflected by the increase in the number of women aged 45 and over who do not participate. This figure comes to about 300,000 women, nearly twice that of the men in this category. In the younger age group (up to age 34), the number of non-participant women is similar to that of the men, perhaps indicating the universality of obstacles facing this age group, regardless of gender. When we observe the gender data on non-participation alongside the reasons given for non-participation, a picture emerges whereby the choice to stay at home accounts for almost half of the non-participants: over 350,000 women.

Within the group of women, we emphasize the particularly low participation rate of Arab women, who have the highest potential for expanding employment in the long-term. Educated, urban, Christian, young women in the Arab community have a higher participation rate, and this rate is in a continuous upward trend. The data by age indicate a cultural norm whereby a proportion of women exit the labor force immediately following marriage.

The second-largest group among the non-participants is that of the learners. This group contains more men than women, given the presence of about 60,000 ultra-Orthodox men who study in yeshivas and kollels, on which we shall expand below.

The group of non-participants due to deformity, handicap, or disability comprises over 200,000 people, among whom lesser-educated individuals over 45 make up the majority. Among this group, there is a large degree of variability in motivation: 30% wish to work but are unable to overcome the obstacles.

The group of non-participants due to early retirement comprises about 140,000 people, two-thirds of which are women and one-third men. This older group is made up of people who have despaired of finding work, as well those who have chosen to retire. Among this group, low-income non-immigrant Jews residing in areas that offer employment, have a strong presence. The majority of this group was previously employed in the industry and services sectors.

The participation rate of immigrants from the former Soviet Union is higher than that of non-immigrants in most population groups, with the exception of the older groups. The participation rate of immigrants from Ethiopia is somewhat lower than the average. At the same time, their unemployment rates are particularly high, around 20%, especially in the uneducated group.

Uncovering the complexity of employment situations in the new labor market requires understanding the profile of those who enter and exit. This is characteristic of the changing labor market. A high employee turnover is prominent in medium-sized businesses that employ lesser-educated employees. Long-term employees are less vulnerable to this risk, while employees working less than five years are at higher risk. Numerous characteristics of the low end of the labor

market require deviating from the standard approach by which participation rate, unemployment and employment were customarily defined.

Under-employment and part-time work (not by choice) are defined as working less than 25 hours a week, a category that comprises about 400,000 individuals and affects a share of the low-end labor market, and to a lesser degree, some of the higher-end market. It comprises some 20% of employees, who are at risk for the "revolving door" syndrome. It is difficult to invest in this group and chances for making an impact are low.

Target Groups

We propose definitions for potential fields of intervention in demographic and social terms and by categories of labor policy. Two large groups require extensive treatment in order to be incorporated into the labor market:

1. **Arab women** – this group's realistic potential is 100,000 individuals, who currently suffer from the obstacles posed by a traditional society, discrimination in services and local infrastructures, and low demand. For this group, active labor policy and vocational training is not justified. Rather, appropriate conditions must be created by giving local-regional preference and addressing discrimination.
2. **Ultra-Orthodox men** – this group's realistic potential is currently at least 40,000 people, and these numbers are expected to increase in the coming years. In recent years, a small part of this group has shown openness to the labor market. The obstacles faced by this group have to do with social norms, lack of appropriate human capital, lack of motivation, and administrative and social traps. Encouraging ultra-Orthodox participation in the labor market involves enabling this group to acquire education and making changes in the Tal Law.

The following groups illustrate additional potential among the unemployed. The groups' data coincides; therefore, they should not be added up in a simple manner, as some figures relate to more than one of the groups specified below.

3. **Older people** – The 55-65 year-old age group has a realistic potential for 50,000 people. Its obstacles have to do with low motivation, lack of skills and low demand.
4. **Uneducated individuals with less than 12 years' schooling and no matriculation** – the realistic potential of this group is 100,000 people, including Arab men, immigrants and non-immigrant Jews. As for this group, active labor market policy, as well as traditional vocational training, can be applied.
5. **Ethiopian immigrants** – this group's potential is 20,000 people. Its obstacles have to do

low skills, lack of work skills, cultural gaps and low demand.

6. **Underemployed, part-time workers** – this group has the potential for 50,000 people, some of whom are interested in mobility but have come up against obstacles that have to do with skills and accessibility. Here, a policy of investment in on-the-job training, vocational training and completion of education may be applied.
7. **Arabs from the periphery and non-immigrant Jews from development towns** – a realistic potential of 200,000 people, some of whom are outside the context of direct labor policy. The solution requires general government budget allocations for domestic and regional development and affirmative action.
8. **"Hard-core" unemployed** – this group includes about 100,000 people, some of whom have a similar employment profile to the non-participants. This group should receive vocational training and active labor programs; it has a realistic potential of approximately 75,000 people.
9. **The severely disabled** - treatment of this group, which comprises 20,000 people, should incorporate elements of protection and subsidization, outside the context of the other populations, due to its distinctive needs regarding integrating into work. Disabled persons who are non-participants due to deformity or less-severe disability should be addressed within the framework of the other categories, while adapting their "envelope" to obstacle removal. This group has relatively low potential, but those disabled persons who wish to integrate into work should be given the conditions to do so, through National Insurance support budgets.

Required Budget

Taking action for each of these groups will require a labor policy budget of about NIS 600-700 million a year, in addition to the resources that currently exist for the *Mehalev* (Wisconsin) program. This financial estimate indicates the budgetary effort required in order to begin to move the processes along for the coming years. We must re-examine the budgets allocated for intervention in the ultra-Orthodox community, as well as the nature of participation in JDC's Tabat ("From Poverty to Independence") program, to ensure efficient allocation and consistent, priority-guided policy.

Condensed recommendations

1. Establish a Labor Ministry that will coordinate policy with the Education, Welfare and Finance Ministries, and with the National Insurance Institute.
2. Establish labor and employment objectives.
3. Intervene using new, supply-side labor policy tools, and develop population-based human capital; build a theory for and specialize in multiple work situations by population group.
4. Create an active labor market policy tool box (continuation of the *Mehalev* program, Part II); provide vocational training beyond those who receive income support; preserve some ability to serve as mediator and link with the labor market. Employers should not be subsidized; we should be wary of the false charms of outsourcing.
5. Monitored use the accompanying tool of "Disregard" in a controlled fashion; struggle against discrimination of Arabs and provide compensation though affirmative action in public service and publicly-supported bodies.
6. Improve evaluation standards; create theory that is adapted to the new labor market.
7. Enforce labor law generally, and minimum wage law in particular.
8. Reduce the number of foreign workers.
9. Establish a hierarchy of population groups; avoid emphases that are driven by political, sectoral or organizational interests.
10. Shape domestic and regional development policy as regards the periphery and the Arab sector.
11. Initiate life-long learning programs in partnership with employers and workers' organizations in the framework of supportive government policy.

Chapter X: The Environment

Introduction

The vision for Israel for 2028 is an economic/social vision that is also based upon a high quality of life for all its citizens and future generations. A quality environment is an integral part of quality of life. Much of the economic progress Israel has made over the past sixty years has come at the cost of a deteriorated natural environment: increased air, water and land pollution, and a significant decrease in open space. The interrelationship between environmental protection and economic development has become clearer in recent years and the principle of "Sustainable Development" or "Sustainability" has become rooted in international development lexicon. In order to achieve our twin goals of economic prosperity and quality of life, Israel must fully embrace the principle of sustainable development.

The principle of sustainable development dictates economic development along with preservation and protection of natural resources; restraint in consumption that causes over-use of resources; preference of renewable over expendable resources, and more.

The continuous growth since the founding of the state has increased pressure on Israel's natural resources. Population growth, along with increased population density and impressive growth in GDP per capita, have lead to increased strain on natural resources. Increased industrialization, electricity production, and motorization are the prominent factors in the tension between modernization and environmental quality. As our national objectives and proposed strategy include continued growth of economy population, we may expect an accompanying increase in consumption and standard of living, motorization rate, industrialization and population density. These forecasts pose considerable challenges for Israeli society, which lives in a limited, densely-populated geographic region. **Unwise exploitation of our limited natural and environmental resources may cause irreversible damage, in the absence of the technology or economic means to rehabilitate them. This may also be seen as an obstacle to sustainable economic growth.**

In recent years, Israel has invested significant efforts in addressing environmental issues: purification and reuse of sewage (Israel reuses purified sewage at a rate of about 70% of sewage; the next country on the list is Spain, which reuses only 15%), a certain amount of solid waste recycling, some regulation of sewage flow into riverbeds and the sea – but this is insufficient. Future challenges and improving areas of past neglect require considerable attention in order to preserve quality of life and environment for the coming years. The greatest challenges involve energy conservation and transitioning to use of renewable energy sources; reduction of domestic and global air pollution caused by stationary sources and transportation; an acceptable quantity and quality of water supply; waste water treatment and judicious use of sewage water; treatment

of hazardous and municipal waste; and, of course, protection of open areas and acceptable urban spaces. Two domestic issues that exemplify Israel's problem are the prevention of dumping sewage into rivers and the completion of a sewage and purification infrastructure in the Arab sector, and the unique issue of necessary Israeli-Palestinian coordination in all realms of water, air and land pollution prevention.

In recent years, tremendous efforts are being made in the developed world, aiming to create a framework for international action and to shape the necessary measures to address phenomena such as global warming, which is one of the most prominent global market failures, as well as ozone layer damage and other challenges. According to a report edited by Robert Stern, head of the British Economic Service and former Chief Economist of the World Bank, and published in October 2006, the composite of dangers posed to humanity is estimated at 20% of the world gross national product, if action is postponed. In contrast, the cost of preventing these serious ramifications is estimated to be about 1% of the world GNP if action is commenced immediately.

Until 2012, Israel is not obligated to reduce greenhouse gas emissions. When the Kyoto Protocol expires in 2012, Israel will have to join the world effort to reduce greenhouse gas emissions. Participation in global processes requires more stringent standards and enforcement, incentives for implementing policy, and increasing awareness and education regarding the various environmental issues.

Economic development must be based on consistent, clear environmental policy that is consistent with the principles of sustainability. Polluted cities, overloaded with motor vehicles and the gases they emit, beaches taken over by the military, and energy and desalination facilities placed along the coastline, may create within twenty years an insufferable situation and a third-world quality of life.

Unless appropriate environmental policy, based upon sustainability, is established and implemented, the Israeli economy will be unable to sustain growth. Protection of public space in as densely-populated a country as Israel requires initiative and consciousness-raising among the public, alongside appropriate policy, planning and implementation. Awareness must also be developed with respect to the urban space where most of Israel's residents are concentrated, as well as in the rural spaces that serve as weekend and holiday recreational and vacation sites.

The resulting conclusion is clear: **the sooner we plan, and the sooner we begin addressing environmental problems and investing in their prevention, the lower the costs to the economy and the greater the efficacy.**

Situation Report and Forecast for the "Business as Usual" Scenario

Israel is one of the most densely populated countries in the world. Looking only at the more settled part of the country, from the Be'er Sheva line northwards, Israel is the most densely populated country in the world. Moreover, its natural rate of population growth, including immigration, is among the world's highest, and the highest in the developed world. One striking example: the Bedouin population in the Negev doubles every 13 years, necessarily leading to additional pressure on land use. The growth of other sectors of the population is also high as compared with the Western world.

Population growth causes the diminishing of open spaces and significant overload on infrastructure services for the population. Problems of quality of life, crime due to overcrowding in neglected areas, and damage to nature, ensue. As city density worsens, city residents' desire intensifies to move out of the city to rural areas.

Some of the realms affected by high population density include urban environment, open spaces, transportation and overall infrastructure services for residents.

1. Urban Environment

Most of Israel's population is concentrated in cities, particularly in those of the Dan region (over four million residents). It is projected that by 2020, this area will contain over five million residents. In the context of population crowding in the metropolitan centers, we are witnessing trends of suburban development, creation of closed-off areas for wealthier populations, and the subsequent segregation and separation from vulnerable populations. City density, restricted space and high land cost have many implications; one is the necessity of restricting area per resident, as manifested in the dense construction of high-rise buildings. While this kind of building is indeed a suitable response to space restrictions, it requires appropriate planning and management. A study conducted by the Technion's Center for Urban and Regional Studies found that high-rise buildings which require significant maintenance expenses are suitable for populations of above-average economic means. Buildings populated by less-wealthy populations quickly deteriorate to the level of "slums". Thus we are building poor neighborhoods at a high cost. There is also the problem of appropriate planning of adjacent areas to include parks, playgrounds, and especially parking and transportation solutions, which will be addressed separately.

2. Trends of Suburbanization and Segregation

Cities' increasing density alongside the decline in the level of services they offer, cause movement of the middle-to-upper classes to the suburbs. This process, as seen in Israel and world-wide, produces problems and does not solve the problem of urban living.

Suburbanization, which causes scattering of residential areas, requires private mobility solutions for all family members (to work, school, social activities, etc.). In turn, this produces an increase in the number of vehicles per family, increased roads construction and overload. Suburbanization makes it difficult to properly plan public transportation and to provide adequate services for the scattered population. There is, then, a clear connection between suburbanization and transportation problems.

In addition, a significantly larger land area is needed for suburban residence than in areas of dense construction. We must remember that the diminution of open space is much greater than the built-up area itself. Thus for example, the construction of a small number of homes on a coastal limestone cliff or a Galilee mountain prevents the public from enjoying a hike in the adjacent open space or camping in a quiet area.

The lack of proper planning for dense metropolitan construction and the social deterioration occurring in existing built-up areas produces the construction of towers and closed-off areas for the wealthy. This clearly promotes segregation and the exacerbation of existing gaps in society.

3. Open Spaces

Preserving open spaces refers to a range of areas: nature reserves, the margins of communities that are sometimes used for agriculture, city parks, beaches, the Sea of Galilee, the Dead Sea and the Red Sea.

Open spaces are an essential need for the balance of nature: gas exchange (plants' creation of oxygen and disposal of carbon dioxide), disposal of air pollutants and more. The modern era is characterized by the development of a leisure culture, which is an essential part of the individual's and community's quality of life. Open spaces play a central role in this leisure culture, from the city park near home, through open spaces a short drive away from the city to the larger nature reserves.

Moreover, in Israel, situated at the margins of the desert, there is a greater need and higher demand for green open spaces (see also the agricultural issue). There is a high demand for vacation sites near bodies of water, primarily Mediterranean beaches, the Dead Sea, Eilat and the Kinneret. Increasingly, Israel's beaches are being taken over for the needs of the economy, such as power plants, future desalination facilities, security needs, hotels, construction and more. The unoccupied space per capita is decreasing, and already, overcrowding along the coastline is a deterring factor that impairs enjoyment.

4. Lands for Development

Establishing infrastructure facilities in Israel requires detailed planning and adapting to master plans. Current master plans which include industrial zones are deficient. Establishing a

desalination facility or a power plant that are not adjacent to existing facilities is problematic. The process for approval of the location takes years, and success is not always assured. It is estimated that in terms of land restrictions alone, power plants can be erected in Israel of a maximum additional production capacity of an additional 6,000 megawatts (of the required additional 15,000 megawatts). Desalination facilities are also intended to be placed along the coast. It is already clear, irrespective of the required financial investment, that **development of energy and water systems will be limited, due to land restrictions.** This is also true regarding industrial plants, particularly of the chemical industry; it is already nearly impossible to create a plant of this type in Israel.

The large majority of Israel's population is currently concentrated in the coastal plain, especially in the Dan region. This distribution has many implications, some of them environment-related. Concentration of the population in a huge megalopolis is an environmental and human problem. Population distribution needs to be such that essential areas will not be taken over, and dispersal of open spaces will not be damaged.

There are two aspects to the issue of population distribution. On the one hand, concentration of the population in the Dan region megalopolis is not environmentally desirable (due to the creation of a thermal bubble, a bubble of polluted air, a concentration of urban waste, and difficulty providing an adequate level of environmental services). Additional problems in other realms include security issues.

On the other hand, construction outside existing built-up areas threatens the open spaces. The primary danger is the threat to areas that are essential for preserving nature, landscape or vacation sites. Examples of such areas that are subject to construction plans are Nitsanim, the east Lachish district and the Gilboa.

Continued suburbanization will destroy the little open space that remains in Israel.

5. Transportation and Air Pollution

If appropriate policy is not adopted and implemented, the continuing process of increased air pollution could lead to the collapse of urban areas and the need to halt transportation and industry. It will lead to an increased incidence of disease, including cancerous illnesses (this process is already in evidence today) and overload on the health system. There is alarming data indicating that thousands of citizens take ill every year because of air pollution in the cities and elsewhere in Israel, due to the effects of transportation and industry. Most of the population in Israel is exposed to polluted air, odors and resultant illnesses of one kind or another. The forecast predicts an increase in population density, a doubling or tripling of motorization, and a rise in the standard of living and energy consumption. If a consistent policy is not adopted and enforced, we are destined to live in a cloud of pollution.

Despite the progress made in vehicle technology and car emissions reduction (and Israel's hoped-for position in this development), there does not appear to be any environmental solution in sight for gas emissions, overloaded roads, traffic jams and congestion, without the appropriate development of public transportation.

Due to other industrial air polluters, some areas in Israel have an air pollution problem at levels that cause a nuisance to the population and pose health risks. We have not achieved the accepted implementation level of developed nations, which experience almost no industrial environmental failures. Growing population density and economic activity may cause air quality to deteriorate, therefore careful planning and proper implementation and enforcement are required.

The health expenditures of the population currently exposed to high levels of air pollution, which is liable to develop illness, must be taken into consideration in the overall calculation. Generally speaking, it is important that the environmental "externalities", the hidden long-term costs, be accounted for in economic decision-making.

Beyond local air pollution, there is the climate issue and that of the contribution of economic activity that emits carbon dioxide and accelerates the world greenhouse effect. **The effect of reducing carbon dioxide emissions must be assessed separately, by a model that evaluates the impact in terms of social welfare and GDP. Moreover, as a member of the family of nations, Israel will be called upon to do its part in reducing greenhouse gases which cause global warming.**

6. Garbage, Waste, Recycling and Contamination

Along with increased population density, and even more so, the rise in the standard of living and growing economic activity, waste quantity increases.

Despite progress on many fronts, which has been led by the Ministry of Environmental Protection, there remain many deficiencies. The great majority of **urban refuse** is transferred to landfills. Though now most of this is done in regulated sites, rather than the unchecked dumping that was done until recently, this technology is inferior, and currently prohibited by other developed nations. It takes up land, increases greenhouse gas emission and endangers land and groundwater.

Construction waste is left at sites not subject to advanced standards and discarded alongside transportation routes.

Industrial hazardous and toxic waste is transferred mostly to Ramat Hovav. Israel has no alternative site nor is there the option of transferring the waste to neighboring countries. In the event of a failure at the site, paralysis of the chemical industry in Israel will ensue; alternately,

contamination by hazardous materials will occur. Modern sustainable environmental policy dictates that to the greatest extent possible, industry should first and foremost reduce toxic and hazardous waste, reuse materials in the production process and treat the waste at source, with only the remainder being transferred to Ramat Hovav.

The world trend is to recycle and re-use waste materials, sometimes producing energy in the process. This issue has not been sufficiently promoted in Israel, due in part to the lack of appropriate economic conditions to encourage this trend.

7. Water, Sewage and Streams

Israel took a big step in assuring the water supply, making an impressive start with its water desalination facilities. We must remember, however, that desalination is a very polluting industry in terms of its reliance on energy and greenhouse gas emissions. There is still the serious problem of polluted water sources, especially at the coastal aquifer. The public mistrusts drinking water quality, as manifested in the growing consumption of bottled water. Some of this mistrust stems from the lack of transparency and underreporting to the public about the home water supply.

As compared with other countries, Israel is relatively advanced as regards sewage treatment and re-use of treated water. Although there have been some improvements made in the poor water quality of Israel's streams, much more needs to be done and sustained activity needs to be continued.

8. Global Aspects, Greenhouse Gases

The growing awareness that human activity can be as powerful as the forces of nature and produce far-reaching global changes, raises the need for revolutionary change in energy consumption and in the use of ozone-damaging chemicals (such as bromine and CFC). This route will be, and in fact already is, a prerequisite for participation in international trade. Israel must get on this track. If up till now we have been outside the primary course, as we were not recognized as a developed country for the purposes of the Kyoto Protocol, after the Bali decisions, restrictions and conditions will be imposed on Israel, beginning in 2012. Moreover, as a state with a developed scientific/technological base, Israel may benefit economically from creating the needed technological tools for preventing damage to the global and local environment.

Summary of Situation Report

Israel's environment has indeed been damaged, but some of the damage is reversible. Recently, progress has been evidenced in the government's and public's recognition of the need for environmental protection.

However, if emphasis is not placed on environmental activity, and we continue on the "business as usual" track, we can expect serious deterioration in Israel's environmental conditions. **The environmental realm does not stand alone, but is affected by what occurs in all realms of life: planning, transportation, construction, energy, etc. We require, then, integration and coordination of activities between the various bodies, and appropriate planning and enforcement.** Unless these occur, we will find ourselves in 2028 in an overcrowded country that lacks the space to enable acceptable living and environmental conditions.

Environmental Quality as a Condition for Israel's Advancement and Development

Israel in the Global Market

Israel is on the threshold of joining the organization of developed countries: the OECD. This is a worthy goal and one which will improve Israel's standing in the world economy. However, the OECD countries view economic development as contingent upon the prevention of environmental damage. Israel is very far from the threshold conditions set by the organization in the realm of environmental protection, as regards:

- Treatment of hazardous materials, which is, as stated, deficient in Israel
- Stringent laws and regulations with a defined structure and a comprehensive view
- Per capita investment in renewable energy sources. The investment today in OECD countries is between \$18-70 per capita; in Israel it is \$0.8 per capita (OECD website data).

The principle of sustainable development dictates economic development along with preservation and protection of natural resources; restraint in consumption that causes over-use of resources; preference of renewable over expendable resources; and more. Israel's non-compliance with international standards and treaties will produce significant difficulties for global integration.

Environmental Challenges Cross Borders

It should be emphasized that in most cases, environmental problems are regional in nature. Pollution does not recognize political borders, particularly in the case of Israel, where almost all water sources are affected by what happens over the border, and where polluted air generated in an Israeli metropolis carries east to Jordan. It is also clear that the issues of the Dead Sea and the

Jordan River have a regional character. Regional interdependence can cause conflicts to flare, but can also help aid in their resolution. The main dilemmas involve the required coordination between Israel and the Palestinians on the issue of environmental protection. There are two aspects to this problem:

- **The political aspect:** Are the Palestinians interested in addressing this issue, even in a state of conflict with Israel? It appears that the Palestinians view environmental issues as a tool in the ongoing struggle against Israel, particularly in light of the fact that they occupy a mountainous area whereas most of the Jewish population is on the coastal plain.
- **The economic aspect:** The Palestinian economy is very poor in comparison to Israel, and cannot allocate many resources to environmental protection. In this case, Israel, along with the international community, must take on most of the economic burden involved in environmental protection.

Another focal point in the regional environmental discussion is the Dead Sea. According to a study conducted by the Samuel Neaman Insititute, annual damage to the environment, to tourism and to roads was estimated at about \$90 million a year. It is, therefore, important to rehabilitate the Dead Sea as soon as possible. It appears that linking the Dead Sea rehabilitation project with the water supply project to Jordan, which combines an aspect of urgency and the chance for international funding, may be advantageous in terms of timetables for implementation, as opposed to alternatives in which funding and initiative are exclusively Israeli or regional.

Environmental Technology Development as an Economic Sector

The environmental technologies market is considered to be one of the world's strongest, most rapidly expanding markets. The Samuel Neaman Institute at the Technion, in cooperation with the Ministry of Environmental Protection, conducted a study in 2004 on the state of environmental technology, and its economic potential for Israel and by international comparison.

The scope of trade in the world environmental market is estimated at about \$600 billion a year, and its growth rate for the next five years is projected at 5-8% a year. It is a stable, consistently-growing market. However, the scope of Israeli exports of environmental products is less than half a billion dollars a year.

Israel has an excellent reputation as a state in which technology and progress produce achievements. It is a leader in such fields as the prevention of desertification and water technologies (desalination, drip irrigation, recycling urban waste water and more) as well as in alternative energy fields (solar and geothermal energy).

The environmental technology industry is based on innovation, adapting solutions for specific, local problems and inter-disciplinary work. Israel's manpower constitutes a competitive advantage in this realm.

It is important to note the important contribution of new immigrant scientists and engineers, mostly from the former Soviet Union, in the fields of environmental technology, water treatment, pollution, and others. State encouragement of this sector's development will provide employment for many immigrants who have not yet found appropriate frameworks for their activities and abilities. This group of entrepreneurs and professionals, which is abundant in professional knowledge, may facilitate Israel's penetration into the broad Eastern European market. A study recently conducted by the Samuel Neaman Institute estimated that within a decade, the environmental technology sector could become a \$7 billion-a-year export sector employing 40,000 employees.

Courses of Action and Environmental Policy

As we have emphasized, Israel's economic development must be based on consistent, clear environmental policy. Polluted cities, overloaded with motor vehicles and the pollutants they emit, beaches taken over by the military or private entrepreneurs and by energy and desalination facilities placed along the coastline, may create within twenty years an insufferable situation and a third-world quality of life. Unless appropriate environmental policy is set and implemented, the Israeli economy will be unable to sustain growth.

The following issues do not constitute a plan of action but are rather conclusions, emphases and an outline for courses of action:

1. Economic growth must take into consideration the economy's restricted resources. In the case of Israel, the limiting resource is land. In order to produce economic growth, we must internalize these limitations and invest in judicious, planned development (for example, by developing sectors that rely on human capital rather than on limited environmental resources).
2. In some cases, harm to the environment cannot be repaired. The damage is often irreversible and in fact, cannot be fixed.
3. In many cases, there is a tendency to separate environmental problems and economic considerations and development policies. Environmental failures usually lead to systems collapse and an inability to continue development. This is true as regards past wrongs, whose rehabilitation requires huge budgets (polluted lands, hazardous construction waste discarded in open spaces, erosion of the coastal cliff, rehabilitation of the Dead Sea and more), and certainly as regards the future as well.
4. The earlier we plan and treat environmental problems and invest in their prevention, the lower the economic cost and the higher the efficacy.

5. The environmental realm is integrative by definition. Water-related programs cannot be separated from those pertaining to energy; both of these are related to problems of air quality, land resources and the means for protecting water of sufficient quality; air pollution problems cannot be discussed without relating them to the character of transportation; energy and water conservation are part of construction policy, the educational system, etc. Therefore, **there is a need for an integrative approach to problems of infrastructure and environment.**

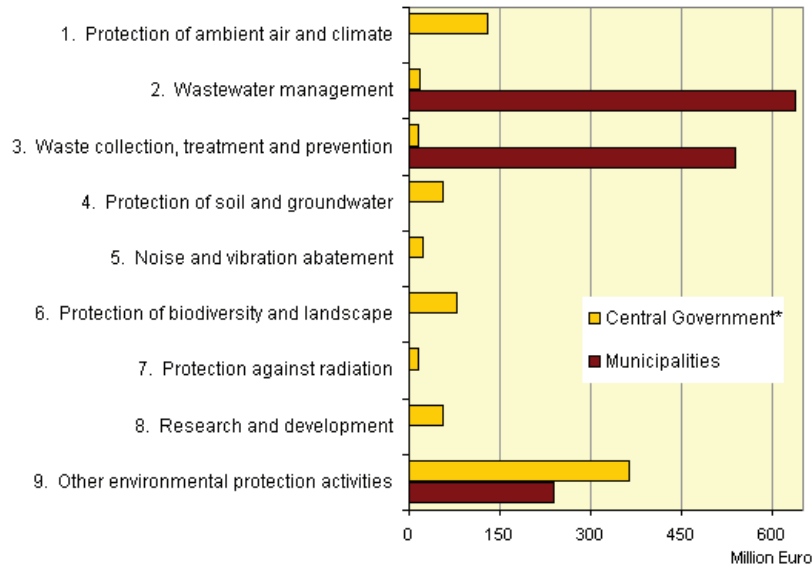
In some European countries, Holland foremost among them, there is a trend to abolish the "Ministry of Environment" as a separate entity, and rather to assimilate its activity into other government ministries. Initially, the ministry operated within the Ministry for National Planning and Housing. Today, environmental issues are assimilated into all government ministries.

Inter-ministerial coordination is required on all issues of infrastructure and environment, necessitating the establishment of a joint system for government ministries: "an infrastructures and development cabinet". In Israel's present state, the various government ministries are in competition with and impede one another. There have been a number of successful attempts to create joint bodies, such as that of the Water Authority, which unifies the authorities of various ministries. There is a need to increase coordination between the various functions.

6. Environmental damage has egregious costs – damage to health, depreciation of real estate, damage to crops and more. At the same time, environmental improvement has benefits that can also be quantified in economic terms. Therefore, there is a need to internalize the external costs and benefits that arise from the economy's overall business activity.
7. In order to evaluate Israel's standing in relation to other countries in the world, acceptable measures in the field should be used.

One of the measures for evaluating the investment in the environment is by assessing the **scope of government and private sector expenditures on environmental issues.** In the Western world, there are organized data on government environmental expenditure.

According to the 2006 Eurostat data: in Austria, Holland, and Germany, the annual environmental expenditure is 1.9% of the GNP, in Denmark it is 1.6% of the GNP and in France, 1.3%. The public expenditure on environment in Sweden, in 2004, is presented in the following graph:



Data on the private sector's expenditure for environmental protection are commercial/business data for the most part, and therefore very difficult to estimate.

Required Action

The economy's leaders (central and municipal governments and the private sector) have at their disposal a "policy tool box", which includes planning, legislation and enforcement, education and information, use of economic incentives and more. The series of actions offered below integrates these policy means.

- 1. Development of quantitative measures** that measure in an organized way the different parameters and degree of change over time in the environmental realm.
- 2. Energy:** implementing clear, consistent policy, along with economic incentives for clean technologies and the development of renewable energy; energy efficiency in industry, commerce and private homes, construction (requirement to meet a green building standard for new construction) and transportation.

Developing renewable energy requires a policy of setting a real price (not subsidized as is currently done in Israel) for conventional energy, and supporting, at least during the transition phase, the development of alternative sources. This expenditure may be set off by developing exportable products.

Setting an objective that 20% of electricity production be derived from renewable sources by 2028 (this is the EU's objective for 2020). For Israel, promotion of alternative sources is

especially important, due to its dependency on external energy sources, including strategic risks to fuel supply.

Managing demand for electricity so as to reduce peak demand. Today power plants are established according to market demand at peak consumption. A policy of managing demands can reduce consumption (it has been estimated that consumption can be reduced by 20%, without employing revolutionary measures). Peak consumption may also be reduced by technological, economic and informational means.

Erecting coal-based power plants should be made contingent upon use of environmentally friendly technology, such as gasification.

An additional element is the placement of power plants. As the coastline is already saturated with structures, it will be difficult to erect an additional power plant there. Concentrating electricity production in confined areas will create an air quality problem in those areas.

Plans for future development of the electricity system will require seriously considering the use of nuclear power plants. While we recognize these plants' problematic nature, they are the only technology available today that enables energy production without greenhouse gas emissions.

3. Planning of Infrastructures and Construction. It is imperative to preserve space for various purposes, including roads, industry, and residential areas, and to leave sufficiently large, substantial areas for nature, vacationing and leisure, within and outside the metropolis. Prudent planning and use of infrastructures are required, along with coordination between authorities and efficient use of existing and new infrastructures. Even today, there remain almost no areas for the development of industry and essential services, which has caused stagnation in the chemical industry, for example.

3.1 Judicious **urban planning** that includes dense construction, preserving urban open spaces, keeping an accessible urban site for public infrastructure and maintaining an appropriate urban fabric (without crime, violence or poverty).

3.2 **Preserving open spaces** – preserving open spaces outside of cities, including agricultural spaces as an essential component of open-space preservation.

4. The water system and sustainable agriculture: efficient use of water resources (which will also contribute to energy-saving), reduction of the need for desalination by advancing water-saving solutions and reconstitution of polluted water sources, reduction of fertilizer use and advancement of agriculture in conditions of water scarcity. There is a need to sustain agriculture, if only for environmental considerations. We must plan and develop agriculture that serves as a primary positive environmental factor, while using water carefully and judiciously.

5. **Sustainable transportation:** Transition to mass transit systems (railways, buses and other means), while adapting vehicle and fuel taxation to balance external costs, including conventional air pollutants and carbon emissions, setting standards for energy efficiency of transportation systems, and expanding the use of clean-burning fuels.
6. **National policy for the waste economy, emphasizing sustainable treatment of hazardous waste** – Reduction in quantity of waste produced at source; encouragement of re-use and recycling of materials for secondary use or returning them to the production cycle; increasing manufacturer responsibility, primarily as regards treatment of packaging waste; prohibition against transporting organic waste to landfills, as is accepted in Europe; and advancement of solutions based on separation at the source and recycling.
7. **Education and information campaigns** – Many of Israel's environmental activities depend on substantial life style changes. Investing in education is necessary from the earliest stages of schooling through changes in the habits of the adult population.
8. **Use of economic incentives**
 - Internalization of external costs involved in pollution and environmental damage.
 - Participation in international trade instruments on carbon emissions (Kyoto Protocol and others)
 - Support for R&D of clean technologies in all areas of environmental quality (water, air, land) and for projects to reduce greenhouse gas emissions.
 - Economic support for joint initiatives for implementation of clean technologies in Israel and export of Israeli developments abroad.

Required Investment

Like all other activities, environmental activity requires an appropriate public budget and significant individual expenditure. The current investment in environmental quality is lower than what is accepted in developed countries; in the future, however, it must increase to the rate of OECD states' investment (about 1.5% of the GNP). At the growth rates described in this program, the necessary allocation is feasible, but first and foremost there is a need to **formulate, set and enforce balanced policy**. The public budget must be itemized for the various environmental activities (water, energy, transportation, construction and so forth) and formulated in coordination with all relevant government ministries, such as the Ministry of the Interior; Ministry of Housing and Construction; Ministry of Transportation; the Ministry of Industry, as well as the municipal sector, through the local authorities.

Chapter XI: Physical Infrastructures

Introduction

This chapter addresses physical infrastructures in Israel, including land transportation (roads and of railways); seaports and airports; energy; water; as well as the engineering manpower infrastructure in construction and infrastructure sectors. Planning and budgeting for most of these areas are under the state's responsibility. Following discussions and consultation with experts, we decided not to address the subject of communications infrastructure in this chapter, as this field is developing primarily in the private market, and because the required investment for creating an advanced national communications infrastructure is significantly lower than that of other national infrastructure components.

Well-developed infrastructures are a prerequisite for the existence of a modern economy. Strategic planning of infrastructure development is crucial, because of the relatively long time periods involved in planning, obtaining licenses, funding and implementation, and the need to identify and keep open options for long-term development and preserving the rights of future generations. The infrastructure industry is a large economic sector in itself. Land transportation alone in the EU for example, encompasses about 8% of the continent's employment and accounts for 11.5% of its GDP.

Investment in infrastructures is an accelerating factor in economic growth, but accelerated growth requires broad integration of additional development policy components across economic, social and environmental realms and national planning policy. Israel's national infrastructures also have an important geo-political aspect vis-à-vis relations with neighboring countries and integration into European planning to ensure good accessibility between the EU and the Mediterranean countries.

In contrast to most of the world's developed countries, Israel has a number of unique characteristics that are directly linked with some of its infrastructure industries. First, Israel is one of the only developed countries with relatively high population growth, as opposed to the demographic standstill that characterizes most developed countries. This creates a great challenge, due to the need to expand and add infrastructures rather than merely make improvements in existing infrastructures. Second, Israel is a physically small country with high population density. Development of infrastructures has, therefore, a direct impact on quality of life and on maintaining environmental values.

The most influential factors in infrastructure development in Israel include the absence of long-term planning, the lack of national infrastructure strategy, and the absence of a central institutional structure responsible for planning, budgeting and implementation. There is no national body responsible for state infrastructures; rather, the responsibility is split among several government ministries.

Therefore, a "business as usual" approach (i.e., keeping development at the currently accepted level) for land transportation infrastructures, seaports, energy supply, water and industrial waste treatment, will constitute an **obstacle** to economic growth. By this script, the rate and manner of implementation of infrastructure development processes will not satisfy the projected rise in demand, and particularly will not respond to the challenges posed to Israel's economic and social development for the next twenty years.

In order to satisfy the expected demand until 2028, and to allow for a reasonable quality of life for Israel's residents, investments in infrastructure are required of a scope of nearly NIS 490 billion for the coming twenty years. We emphasize, however, that supplementing the budget is not the only lever for development. Serious factors that hinder and possibly prevent development, even when financial resources are available, include legislation, problematic institutional structure and bureaucracy. This chapter will present ideas for planning, technology and organization that should be promoted in the future, in order to respond to the needs of individuals and society as regards mobility and physical communications, water and energy.

Israel's Infrastructures: A View to 2028

According to the Central Bureau of Statistics' population forecast, Israel's population will reach over 9 million in twenty years' time. Currently, some 2.2 million vehicles use Israel's roadways; this number is expected to reach about 4 million by 2028. Israel's motorization rate is currently about 300 vehicles per thousand residents, at least 50% lower than that of the developed nations. Twenty years from now, assuming an annual economic growth rate of about 6%, it is expected to reach its saturation point of between 400-500 at least; the kilometrage rate will double. Even today, Israel's road density is among the highest in the world: about 115 vehicles per road kilometer. If we compare Israel to small, densely-populated countries in Europe, such as Holland and Belgium, we shall see that the gap is already vast: Belgium has about 39 vehicles per kilometer, and Holland has about 70. We emphasize that these countries, unlike Israel, have zero population growth and highly developed public transportation systems, especially railways. In the absence of substantial change in the "Modal Split" (travel distribution between means of transport) towards increased public transportation of all kinds, the practical meaning of these figures is the need to double Israel's roads system. In a small, densely-populated country such as Israel, whose land resources are dwindling, particularly in metropolitan areas, such a scenario is unfeasible for physical and environmental reasons. These constraints are even more prominent if we do not include the Negev area. Therefore, we have no choice but to invest a majority of resources in developing public transit systems, and to set as a guiding vision for 2028, a target whereby 50% of travel to large urban centers will be done via public transportation, accompanied by an increase in population density in population centers and peripheries around railway centers.

In the energy realm, according to an accelerated growth path, electricity consumption is expected to reach annual peak demand levels of 25 megawatts, as compared with current peak demand levels of under 10 megawatts. Increased electricity production until 2028 is planned in the framework of the Electric Company's five existing sites along the coastline, in addition to 33 working or planned units throughout the country run by various natural gas technologies. It appears that Israel will join world trends to attempt to develop sources of alternative energy, particularly in the realm of renewable energy, due to both the high cost of fossil fuel as well as increased monitoring of greenhouse gas emissions. At the same time, on the basis of our current knowledge, even if new developments occur over the next twenty years, they will not yield sufficient output to substantially replace today's dominant energy sources.

In the realm of seaports, Israel Ports' master plan for 2030 projects that 9.7 million containers (TEU) will reach Israel's ports, as opposed to 2.0 million containers in 2007. This expected increase requires building terminals for Haifa and Ashdod ports beyond their existing area. There exist, however, complex planning conflicts as regards the power plant site situated in the heart of Haifa port, the gas terminal and Haifa's northern coastline. Planning conflicts at Ashdod port are vis-à-vis the Eshkol and Rogozin power plants, a nature reserve and a free-fire zone north of the port. Furthermore, the air travel forecast exceeds the capacity of Ben Gurion airport; an additional international airport will be needed. Inquiries regarding its precise location are currently being made.

Among other factors, infrastructures' increased pressure on land resources caused the National Council for Planning and Building to issue a tender for artificial islands for infrastructure, some years ago. The winning project was presented before the Council's plenum, and provided it with tools for assessing future initiatives in this direction. At this stage, no plans exist for the creation of artificial islands for infrastructure on Israel's coastline.

Infrastructure: Integration

The various infrastructure components influence each other. There is a clear interaction, for example, between transportation and environment. A rise in the number of private vehicles and increased kilometrage augment the "external costs" of environmental damage, congestion and road accidents, all of which increase the "Social Cost". Motor vehicles are the primary "contributors" to air pollution. According to the US Department of Transportation, they are responsible for 70% of carbon monoxide (CO), 33% of ozone-damaging gases (O₃), 50% of nitrogen oxides (NO_x) and 21% of suspended particulates. Despite the significant reduction in pollutant emissions from vehicles due to engine improvements and the use of catalytic converters, overall pollutant emissions are expected to rise, due to the increased number of vehicles. In Israel, there has also been a rise in engine displacement, which exacerbates environmental damage (it is still difficult to assess the pace at which electric-run vehicles will penetrate the market, and their overall environmental impact).

Within the transportation realm as well, there is interdependency among various means of transport at the level of development. The need to increase the share of users of public transportation and its preference over private vehicle use must have implications for the priority given to developing rail transportation (light and conventional rails) at the expense of roads development, at least in metropolitan areas.

In the energy realm, mutual environmental influences are found along three axes: a) Sources: We require a policy to replace polluting energy sources with more environmentally-friendly sources. The plan for the Haifa power plant's transition to natural gas is one example. The use of renewable energy in Israel is in its initial stages. Without government intervention in the form of subsidies, it appears that the use of this form of energy will remain modest over the next two decades. b) Management of demand reduction: the potential for conservation is large, but this issue has hardly been addressed. c) Power plant distribution: the concentration of power plants near the coast burdens the state's coastline, and creates planning conflicts with other land uses that require direct contact with the coastline, such as ports. By 2028, production development will not exceed the currently-active coastal plants; subsequently, however, other solutions will be required.

In recent years, Israel has begun to promote water desalinization as a means to ensure its water supply. At the same time, however, we must remember that the desalination system is a polluting industry in terms of its energy-dependency and greenhouse gas emissions. It is reasonable to assume that Israel will participate in global trends as they were articulated in the 2007 Bali Conference; thus, in the framework of the overall balance of greenhouse gas emissions at the state level, the desalination process will have to compete with private vehicles, industry and home heating. It should not be viewed as method of water-supply that is restricted by cost considerations alone.

Infrastructures: A Multi-Lateral Problem

Lack of budgets is not necessarily the only obstacle to infrastructure development: problematic legislation; deficient institutional structure; lack of integration within the infrastructure world, particularly between it and other planning and implementing factors; lack of investment in human capital as regards professional training and research and development; shortage in implementation capabilities; excessive bureaucracy; and the lack of multi-annual budgeting for the infrastructures sector, are all serious factors in the failures. Continuation of these trends will intensify future failures and will constitute an obstacle to economic development.

The absence of basic principles for future national infrastructure development, such as a national perspective (the institutional aspect); a systemic approach; a long-term view and fulfillment of the need to set planning policy and strategy; integration between infrastructure systems and economic, social and environmental issues – will all lead to **development that is unplanned or short-sighted, which may create an irreversible negative physical situation in Israel and impede planning options for the coming generations. We must not leave our transportation-economic-social lag for future generations. We have an obligation to close the gap, through rational but determined measures, to lead the nation forward and maintain high-quality infrastructures in a state that aspires for a place in the society of leading countries.**

Recommendation for Changes in Institutional Structure

To facilitate coordination between planning, budgeting and implementation we propose to consider creating a body that will concentrate the powers and multi-annual budget for planning and implementation, following a government decision and the completion of statutory procedure at the national level. It may be appropriate and advisable to establish a cabinet for physical development, in which the relevant ministers will participate. Until such a body is created, we propose that the Ministry of Transportation establish a **supreme intra-ministerial committee for multi-disciplinary strategic planning**, in coordination with the Ministry of the Interior, the Ministry of Finance and other agencies, that will aim to take integrative action in all realms of infrastructure and overall physical planning. After preparing a national master plan that defines the image of the state of Israel, and in order to ensure its fulfillment, it will be important to take action towards encouraging development of physical and social systems conducive to the plan's realization, establishing projects and obtaining funding. Otherwise, it is reasonable to assume that national and local political and economic pressures will impose changes on the plan that will disintegrate its principles and goals. Therefore, **the task is not the frequent preparation of new plans, but rather the preparation of one plan to be implemented.**

Land Transportation

Vision and Strategy

Transportation deals both with individuals' day-to-day lives and with long-term economic, urban and demographic processes that are at the soul of the state. Israel's infrastructure road map is based on a vision that integrates the aspirations of the individual and society with the existing situation, including its physical, social and budgetary limitations. The integrated development of all systems that dictate life in Israel – for open and built-up areas, for roads and railways, and for additional infrastructure and communications systems - must take environmental factors into consideration and utilize all technical and technological means that are currently in initial stages of development and that will be available to the citizens in the future. **For the intermediate term, integrated planning will be based primarily on existing technologies, but without neglecting Israeli and international technological development, particularly "Intelligent Transportation Systems" (ITS).** The primary effort required is that of re-organization, not only of transportation issues, but also fundamentally of physical planning, distribution of land use and population, and coordination of development. **Physical development must be comprehensive and integrate policy for developing northern and southern Israel, while creating an urban-metropolitan structure that will satisfy the demands of individuals and society and respond to the accessibility needs of a technological economy, as expected and advisable for Israel.** Implementation of the plan will be done in coordinated, budgeted phases, and followed up and updated in an ongoing manner.

Priorities regarding mobility and travel behavior in Israel must be altered. We must recognize that in view of its small size, Israel cannot tolerate additional massive expansion of length- and width-wise roads systems, nor can our metropolitan areas contain the quantity of private vehicles expected to enter them daily. Our situation in this regard is similar to that of most of the world's metropolitan areas. Clear priority must be assigned to developing mass transport systems including railways, light rail, and high-capacity buses, or BRT systems (bus rapid transit). A target should be set for 2028, that half of the commuters to metropolitan areas will use the various types of public transportation.

Dilemmas and Problems

1. Physical Area

Israel is a physically small country. As opposed to other Western countries, its population is growing continually at a high rate, and its motorization rate, which is still low, is also rising at an accelerated pace. The density of central Israel (in terms of residents per square kilometer) is high, and will continue to increase at an accelerated pace in the coming years.

At the same time, the various transportation systems - city and inter-city roads as well as railways- lag considerably behind European countries (including the small countries, such as Belgium and Holland).

2. The "Business as Usual" Scenario

In this scenario, building is sparse, scattered and inappropriate for the transportation system; the mass transit system is developed too late and its influence on development of land use is also belated; there is no integration between the various systems; and there is no development or promotion of smart transportation or alternative communications systems. In this situation, despite the development of roads to the level of a national master plan (National Master Plan No. 3), they will not provide a high level of service for Israel's 4 million vehicles expected in about twenty years' time. The entrances to cities are congested with traffic, bringing about additional dispersal of land use and building on every empty space and in turn, increasing dependency on vehicles. Resources are wasted on long road delays, which significantly damage quality of life and indirectly cause increased air and other environmental pollution. This trend is almost irreversible, and changing it is a long, costly, ongoing process. As a result, both GDP growth and investments suffer. As in many countries in the world, Israeli planners have reached the conclusion that the trend must be changed and an alternative scenario adopted.

3. National Master Plan

National master plans for roads and railways exist in principle only. They determine what is permitted to build/pave and where, **but do not define priorities regarding advisable and advantageous timing, in terms of the overall national master plan.** In addition, the master plans cannot ascertain the allocation of required budgets for fulfilling the plan in its entirety. The Ministry of Transportation, the body responsible for developing transportation systems, has not yet adopted multi-annual budgets, and therefore has not had adequate opportunity to impact upon shaping Israel's image. Only now has the procedure begun to institute a five-year budget plan for Israel's overall land transportation system.

4. Shortage in Engineering Manpower (engineers and practical engineers) in recent years

This shortage may become a real bottleneck in other areas of development as well. Today, the shortage is felt more in infrastructure and less in construction, especially as regards implementing projects on the ground, which is the most difficult and demanding aspect. The shortage will worsen in coming years, because even if immediate action is taken, its initial results will be manifested only after five years or more (see appendix for more on this issue).

Recommendations

Primary Recommendations

1. Extensive development of mass transit systems: suburban and inter-city railways, light rail and BRT systems (high-capacity buses that use an exclusive path, similar to the light rail) and coordinated city bus service. This development requires a turn about in mind-set: expanding the railway network while investing less per unit of length and penetrating into city centers and to the level of pedestrian, i.e., more light trains on roads and streets, over longer distances, and fewer tunnels and heavy trains in metropolitan areas.
2. Using economic tools for regulating and limiting (via congestion tolls) private vehicle use in metropolitan areas, but only after supply of modern and competitive public transport systems has been augmented. Reducing the use of private vehicles and increasing transition to public transportation is a complex behavior change, which constitutes one of the greatest challenges in the realm of land transportation for the coming years.
3. Enhancing integrative planning and implementing, as regards to the following three spheres: a) among transportation systems (roads, various types of railways, seaports and airports); b) between transportation, land use and urban planning and c) between transportation systems and environmental and energy systems.
4. Creating or authorizing an official body to be responsible for taking a comprehensive national view of the state's physical infrastructures systems, including determining budget items, resolving conflicts of interest, and setting priorities for implementation.
5. Planning of transportation infrastructure systems that employs a broad regional perspective and takes into consideration the possibility of integration with the Palestinians and neighboring countries, even if its realization will occur in the intermediate or long term only.

Additional Recommendations:

1. Establishing metropolitan transportation authorities to be responsible for the entire realm of metropolitan transportation development. They will receive their powers from government ministries and (primarily) city municipalities. These authorities will deal with physical development and operations, and will manage traffic control centers and integrated transportation centers.
2. Restricting development of roads systems in central Israel (such as Ayalon Highway and Geha Road), at least until mass transit systems penetrate the market and travel behavior changes to the advantage of public transportation.
3. Using and promoting advanced technologies for the long term. Traffic control, traffic

management and "intelligent transportation systems" (ITS) will serve as professional tools for increasing road efficiency and safety.

4. City centers will be planned for user-friendliness; parking spaces will be restricted; whatever is necessary will be done in order to provide a competitive public transportation service and adequate pedestrian and bicycling systems.
5. Overall construction will be denser in certain areas. Existing areas, metropolitan areas and areas surrounding mass transit system terminals will all be augmented, and land use will be concentrated at interaction-intensive points.

Required Investment

The estimated public investment required for land transportation issues (not including private resources), is about NIS 350 billion for the next two decades.

This total is comprised of the following:

- | | |
|---|----------------|
| • Inter-city and suburban railways | NIS 86 billion |
| • Public transit systems including urban mass transit | NIS 86 billion |
| • Inter-city roads systems including maintenance | NIS 79 billion |
| • City and metropolitan road and street systems | NIS 94 billion |

This budgeting is reasonable for the current five-year period; its four parts are well-balanced, between developing inter-city roads networks and city and metropolitan transportation systems and the various means of public transportation and paving of roads.

Sea Transportation

Vision and Strategy

In the area of seaports, we have an opportunity to integrate between the needs of the domestic economy and sea transportation, and Israel's unique geographic location in the world maritime trade system. The Haifa and Ashdod ports are situated in very close proximity to one of the world's largest trade lines, between the Far East and Europe. The largest cargo ships currently go through the Suez Canal, adjacent to Israel's Mediterranean ports. On their way from Asia to Europe or to the East Coast of the US, these huge ships typically stop at one or two transshipment ports in the Mediterranean Sea, where cargo is transported by smaller feeder ships to the cargo's final destinations in the Mediterranean's eastern basin and the Black Sea.

Israel's ports combine an excellent strategic location with a market in the eastern Mediterranean basin. These two advantages are among the most important location factors that ship-owners consider when seeking a transshipment port. A controlled level of transshipment cargo, about 30% of total port cargo, integrates well into cargo terminal strategy. Supplementing seaport infrastructure will not only remove the existing risk of impeding economic development, but can even embody economic advantages for Israel, stemming from investments by global seaport operators or domestic factors, increased employment and realization of high economic multipliers.

Israel's ports already lack docks, operational rear yard areas, equipment and skilled manpower. Developing additional container terminals at Israel's Mediterranean ports will enable the absorption of hundreds of operations and maintenance workers at the ports, investment of billions of shekels, and employment of hundreds more employees in construction and port development in years-long projects.

Dilemmas and Problems

Seaports are the dominant gateway to Israel's economy. Nearly 98% of Israel import and export in terms of weight are transported by sea and go through seaports. In recent years, the seaports have had great difficulty to serve as an efficient gateway for cargo, and the seaports suffer – among other factors - from a severe shortage of infrastructure. The serious disruptions at the seaports, overcrowding and waiting ships, which characterize the seaports, cause enormous damage to importers, exporters and ship-owners. These damages are usually rolled back to the consumers and the Israeli economy.

Recommendations

- Additional development of port terminals, operational rear yard areas and improved accessibility of the land transportation system (roads and railways) to seaports are a prerequisite for Israel's economic growth.
- Developing transshipment services at seaports: In the short term, additional seaport infrastructure may exceed the domestic market's requirements; construction of breakwaters and docks are intended for long-term development. This is one of the advantages of transshipment based on international cargo in transit, which is added to domestic market cargo and contributes to the increasing profitability of investing in ports. In addition, transshipment will bring a high frequency of large, fast ships into Israel, with an expanding destination list, which will enhance competitiveness and improve import/export conditions in the Israeli market.

Required Investment

Forecasts for developments in cargo for the coming two decades require an investment of about NIS 6 billion to increase port capacity for each of the coming two decades – a total of NIS 12 billion.

Air Transportation

Vision and Strategy

Ben Gurion airport currently handles about 10 million passengers a year. According to the higher estimates, this airport may serve about 35 passengers in twenty years' time. If this forecast is realized, the capacity of the new Terminal 3, along with Terminal 2 (if it is renovated), will be insufficient for the demand for airport services. In addition, when *Natbag 2000* was opened, it was determined that due to noise and environmental restrictions, the airport would not handle more than 16 million passengers. In view of the projected demand (35 million passengers within twenty years), there will be a need to locate a site and plan another international airport.

Dilemmas and Problems

The projected scope of passengers exceeds the airport's capacity, but the alternatives for increasing capacity are complex and problematic:

- Placing a third runway in parallel to the existing runways is impossible due to space limitations.
- As far as the airport is concerned, it may be possible to create a perpendicular runway, but there is a significant danger as regards access to the runway.
- As per the demand of the National Planning Council, efforts have been made to locate a site for an additional international airport. Three sites have been chosen: Nevatim, Zaklag (near Beit Kama) and a sea area to be dried out, near Netanya. No decision has been made yet as to the site; objections have been raised to each of the sites proposed.

Recommendations

- Terminal 2 may be developed and its capacity expanded, so that along with the new Terminal 3, the airport will be able to provide solutions for the next 15 years.
- Toward the beginning of the 2020s, it will be necessary to discuss the creation of an additional international airport, whether in southern Israel, in a dried-out sea area, or in northern Israel (for a regional airport). Initial investments will be made before 2028.

Required Investment

The existing system is expected to reach the limits of its capacity vs. expected demand near the project's target year. However, in order to increase the system's output and to prepare and plan for increased capacity (and the possibility of an additional airport), investment will be required of the scope of about NIS 7 billion. If the option of drying out the sea is chosen for the additional airport, a significantly higher investment will be needed.

Energy

Introduction

To date, there has been no process of long-term strategic planning for Israel's energy infrastructure or overall energy system. Israel's energy system lacks an approved national energy master plan upon which to base assessment of infrastructure needs and that conforms to this plan's accelerated economic growth scenario of over 6% a year. There is no agreed-upon government policy regarding long-term development of the energy system, or even concerning the types of fuels that Israel should consume. The Ministry of National Infrastructures and Electric Company have made forecasts, typically for two or three scenarios (high, mid-range and low), but these have been based primarily on an extrapolation of past trends.

The electricity system has a significant impact on Israel's environment, affecting air, land and water sources, nature and landscape, sea and coastline, and electromagnetic fields. Thus environmental considerations have had an increasing impact on the location of infrastructure facilities in general and electricity infrastructure in particular, as well as electricity production processes (see Chapter X). As for future energy infrastructures, environmental considerations are not sufficiently powerful to significantly change the course of infrastructure development meant to provide the primary share of the economy's demands. On the other hand, environmental considerations may place limitations on power plants' potential location or determine emissions restrictions, thereby impacting upon the choice of production technology. In a collaborative paper written in 2005 by experts from the Ministry of the Environment and the Ministry of National Infrastructures, a number of specific sites were defined for creating integrated recycling units. An additional restriction on power plant placement is the proximity to water sources, such as the Kinneret basin, the mountain aquifer and the coastal aquifer, which were designated as sensitive areas. Clearly, power plants or transmission facilities cannot be placed in areas of special natural or scenic value, but it is impossible to define ahead of time where placement is prohibited due to these considerations. Environmental considerations for electricity production produce priorities as regards the following issues: use of natural gas vs. other fuels; use of renewable energy sources; strengthening existing production facilities by improving production efficiency and reducing toxic emissions; production of electricity using efficient technologies with low toxicity.

Electricity and natural gas are two sources of energy that require intensive government involvement, and there is considerable uncertainty regarding these industries' future. The issue of natural gas depends upon the needs of the electricity industry. The electricity industry's organizational structure and the government's role in this industry are not clear. Electricity network operations are expected to be taken over by new company separate from the Electric Company. Following the Czamanski Commission's report, "Sustainable Development in Israel's

Energy System", government decisions have been made and a law has been passed by the Knesset (1996), but implementation of structural changes is progressing at a very slow pace.

Vision and Strategy

Given the present technological system or that projected for this paper's time horizon, we do not expect that Israel be liberated from dependency on imported energy sources. Even accelerated development of renewable sources will not provide a response to the large increase in energy consumption. This notwithstanding, clean energy should be promoted, by full pricing of conventional energies. We expect that if Israel's energy system is run by consumers' and producers' responses to prices that reflect "marginal social costs", Israel's dependency on primary energy import will be reduced, as will pollution.

Aiming to diversify Israel's energy sources, we should consider establishing nuclear plants. These plants offer economic and environmental advantages, but clearly economic aspects are not the sole relevant aspects, due to the issue's political dependency on external energy sources. Nuclear power plants are very costly, and in terms of life-cycle cost, require government funding as well. However, considering the external influences of coal plants, nuclear plants offer economic advantages.

Dilemmas and Problems

1. In order to meet the projected demand under the accelerated scenario, an average capacity of about 1000 megawatts must be added each year, i.e., an additional 20,000 megawatts over the next twenty years.
2. A deficiency in Israel's electricity production capacity is expected for the first time in 2009. Existing plans for the system, including current efforts to set up additional power plants, cannot respond to the projected demands of the accelerated scenario in the short term. The main question as regards energy infrastructure policy is: who will set the future course of development? **In the absence of clear policy for the energy system, and of strategic planning for the electricity system in particular, we will experience a shortage in electricity production in the coming years, expected to cause real damage to nearly all sectors of Israel's economy, reaching hundreds of millions of shekels, and to curb economic growth.**
3. If a new company does not begin operating in the summer of 2008 as required by law, and if existing decisions are not changed, it is expected that the electricity industry's "rules of the game" will be unclear, and that new electricity producers will not begin to invest in additional production capacity. Adapting production and supply capacities requires investment over long time periods; the uncertainty will cause the electricity system serious damage. Therefore

the "rules of the game" in the electricity industry must be quickly set, in order to increase certainty and reduce risks.

4. Plans for international investments in Jordan, to be based on the Israeli market as well: In this plan, we have not taken into consideration the developments in neighboring countries' energy infrastructures, such as those in Jordan, which could provide some of Israel's needs. If a large power plant (for example, a nuclear or a natural gas-driven plant) is constructed in Jordan, the region will have surpluses in electricity production capacity, enabling a reduction in Israel's production needs. In such a case, we will have to invest in a transmission system.
5. There is a shortage of land designated for infrastructure development. Planning procedures and statutory decision-making in Israel are cumbersome, and go on for many years. There is a need to change decision-making processes in this realm and accelerate land allocation for infrastructure.
6. Israel's electricity system has a reciprocal relationship with its water economy: on the one hand, the water system provides water to power plants. On the other hand, the water system consumes electricity, especially for desalinization and waste-water treatment. According to the Electric Company's data, in 2010 the total output required for the water system, including *Mekorot*, private operators and desalinization facilities will be about 1,000 megawatts. This is about 8% of the Electric Company's production capacity for this year.
7. Gas – the existing pipeline satisfies projected demands of the accelerated scenario until 2013 only. The options of running a pipeline from Turkey or establishing a plant for import of liquefied natural gas (LNG) should be examined as alternative solutions for transporting gas from the north. The cost of doubling the existing pipeline vs. LNG solutions should be examined as well. There are two primary obstacles to developing a system to disperse natural gas as per the accelerated scenario:
 - Lack of strategic planning and policy-making that would enable Israel's Gas Authority to prepare development programs;
 - Lack of land as a result of faulty master planning and environmental considerations.

Recommendations

The electricity system is beginning a re-organizational process, by which a new company is supposed to start to manage the production system. The required changes and reforms should be implemented quickly, so as to reduce the uncertainty that damages the electricity system and investment decisions. One reason that electricity system reform is crucial is because of the need to reduce government involvement in the industry.

Primary Recommendations

1. "Rules of the Game" and incentives should be adopted to encourage investments in production capacity that will satisfy future demand. Modern electricity systems operating in competitive markets include an insurance policy and incentives to establish power plants that exceed capacity for projected demand. It is important to develop a doctrine of supervision over the new electricity transmission company to be set up.
2. There is a need for strategic planning of infrastructures by the new company that is expected to start operating the system, following the 2007 legislation. This planning should include making decisions in principle regarding the advisable formula **for types of fuels to be used for electricity generation** (especially coal vs. natural gas and nuclear) and the optimal course of development for electricity generation (presently in the hands of the Electric Company). On the basis of these decisions, development plans will be made and infrastructure facilities agreed upon, as required for satisfying the projected demand according the accelerated growth scenario.
3. We recommend supporting renewable energy programs (wind, solar, nuclear, pumped-storage hydroelectricity, etc.) and investing in new technologies that produce clean energy, although we do not expect that renewable energy will significantly change the supply-demand balance. Renewable energy represents a tiny proportion of total energy consumption. Where renewable energy consumption is state-funded, the growth rates are relatively high. In Israel, the only change expected in the energy formula is the significant entry of natural gas. In contrast, it makes sense to consider initiating nuclear power plants, for economic considerations and considerations of source diversification. The decision of the government and the private sector whether to participate in advancing new technological development in the energy context is no different from that regarding any other economic industry. The question is whether the proposed technology has economic potential and if so, whether government funding will accelerate development such that an advantage will be created vs. competitors. It does not appear at present that Israel has an advantage in this realm. On the other hand, in the very narrow realm of tertiary oil recovery it makes sense to utilize Israel's advantage as regards the high concentration of petrochemical engineers.

Additional Recommendations

1. Changes must be made in the Electricity Authority's supervisory authority, to create a basis for competition in electricity production. The Israeli Electric Company's supervisory method was constructed in a piecemeal fashion on a framework appropriate for a monopoly that never considered the possibility of competition. This is Bonbright's philosophy from the 1950s, according to which superfluous investment (gold-plating) is not a concern, and prices

do not reflect marginal costs. The supervisory method required for the age of competition must reflect real marginal costs on the basis of a future test year, taking all costs into consideration, including for the land below electric lines. The cost of capital must be real; unjustified costs, such as excess manpower, should be paid by owners, not rate payers.

2. Above all, supervision must establish a basis for competition by creating appropriate "rules of the game ". Towards this goal, a rate comprised of at least three parts is needed: separation of energy costs, insurance costs for providing production by "Capacity Charges", actual consumption vs. and potential consumption, etc. Naturally, there will be differentiation between different "qualities of electricity" and a basis for competition between companies dictated by technological considerations on the one hand, and service considerations on the other.
3. We must shape policy, manage demand and reduce burdens to prepare for a situation in which demand for electricity will exceed production capacity.
4. Decentralizing production facilities is a strategic/security issue. The Electricity Law authorizes the Ministry of National Infrastructures to locate sites and shape strategic planning for the electricity system. As the ministry has been unable to implement policy over the past eleven years, other ways should be considered for advancing the issue. In this context, we emphasize that the National Planning and Building Council is having difficulty dealing with the challenge of locating sites for different types of infrastructure, and there is a need to shorten the response time of planning decisions.
5. We should aspire to have the price of electricity reflect the marginal costs of electricity production and supply, in order to carry out efficient management of the system and to allow the demand to give a reliable indication of the required scope of capacity.
6. The issue of oil shale (heavy oil, oil sands and tar sands) should be examined in depth. Oil shale is produced in large quantity, especially in Canada and South America. It is not clear whether Israel's quantity of oil shale enables using the production methods used abroad, and what its costs are (relatively large-scale production is profitable as long as oil's market price exceeds \$30 a barrel).

Required Investments

1. Electricity

In order to meet the demand projected by the accelerated growth scenario, two alternative investment routes are proposed for electricity production (not including the infrastructure for electricity transmission).

- The 50% coal-50% natural gas alternative:
total cost of establishing the power plant - NIS 76 billion.
- The 60% coal-40% natural gas alternative:
total cost of establishing the power plant - NIS 80 billion.

2. Alternative Energy - Gas

Infrastructure for transmission of natural gas, currently under construction, is expected to satisfy the projected demand of the accelerated growth scenario until 2013 only. By 2028, additional investment will be needed for establishing a pipeline in the northern segment and doubling the existing pipeline in certain segments, at a total investment of about \$200 million.

Water

Introduction

Water has a horizontal impact and interaction with other realms such as: energy; agriculture; desalinization technologies; water-saving technologies; forecasts and scenarios for relations with Jordan, Syria and the Palestinian Authority; legislation; and population distribution in Israel.

1. Water Transport

The water system is currently based on transporting of water from the Kinneret and the north to the entire country. This water system provides water to all of Israel's territory and to a certain degree to that of the Palestinian Authority as well. We expect the water-collecting Kinneret basin to be disconnected from the Mediterranean area; its water supply will be directed to the eastern area: upper Galilee, Jordan Valley and Beit She'an, as well as territories of Jordan and the Palestinian Authority. From a planning perspective, this may be a relatively water-abundant area, perhaps enabling a different kind of agriculture than elsewhere in Israel.

The coastal plain will receive water for agriculture from the aquifer and desalinized urban water; the remainder of allocation of desalinized water and water for irrigation, needs to be based on an appropriate system of economic regulatory rules.

The southern area will be based on desalinized water (some from saltwater drilling), treated water, reclaimed water, and groundwater.

2. Water Consumers

Until recently, agriculture was the state's primary consumer of potable water. The agricultural sector impacted upon the planning of the water system, water prices, etc. Today, and even more so in the future, urban areas and industry will be the primary water consumers. As domestic water consumption is increasing, urban water consumption will utilize all or most of the potential of renewable water (measures may be taken to prevent increased consumption and perhaps even to reduce consumption). Treated water can be used for irrigation and other uses, depending upon the quality of water treatment. Israel has decided that its standard of water treatment will enable unlimited irrigation. However, this definition may be invalidated by a failure in the treatment system or the discovery of components in the water that cause illness, even cancer. An additional principle of Israel's water system is the provision of a reliable standard of drinking water at every point in the system, although much of it serves for irrigation. We recommend addressing the present conception and considering separate networks for drinking water and irrigation water.

Israel's water system has reciprocal relations with the electricity system: On the one hand,

the water system uses electricity, especially in desalinization and waste-water treatment facilities, and on the other, the water system provides water for power plants. In addition, new technologies such as pumped-storage hydroelectricity use large amounts of water in the electricity production process. The electricity system consumes water in two main processes: processing water for steam production and for cooling. Process water needs to be high-quality potable water. Cooling water consumed in considerable quantities by coal power plants is seawater, and the water system does not have the capacity to provide the required amounts at a distance from the sea. Power plants heated by liquefied fuel or natural gas consume much less water, about 10 million cubic meters a year. As far as the water system is concerned, it will be possible to provide an adequate amount of water for such power plants anywhere in Israel.

Vision and Strategy

Water system planning must take into consideration the extreme uncertainty that stems from climate conditions and the amount and distribution of precipitation. Great variability exists over the years, with years of abundance that yield surplus water, and years of drought, sometimes even a succession of drought years. The future carries even greater uncertainty. Evidence exists that global climate change will decrease the amount of precipitation, shorten the rainfall period and increase its intensity. In such a case, the amount of water available for use will decrease, while the amount of water required for sustenance will increase.

In view of the increased use of desalinized water, it is important and crucial to reduce dependency on climate conditions, but this has built-in limitations. Desalinization requires a great deal of electricity (some 5 kw/hour per cubic meter water). Projected increases in energy costs and severe world-wide restrictions on greenhouse gas emissions will create a close connection between the ability to provide sufficient water and progress in renewable/clean energy production. From the strategic perspective as well, the water system's increased dependency on imported energy is a factor that needs to be addressed.

Water for environmental needs should also be taken into consideration, for maintaining nature as well as agriculture, an essential element in Israel's environmental protection.

Dilemmas and Problems

Israel borders the desert, and its location offers limited water resources. The water system must be managed accordingly.

1. If no technological, educational, economic or legislative measures are taken to reduce residential water consumption, it is likely that all Israel's renewable potable water will be used for residential consumption. Potential reduction in water consumption should be considered.

2. The National Water Carrier, established in the early 1960s, is already obsolete from a planning perspective. We expect that in the not-distant future, investments will be required to renew the system. Investment will also be needed to establish and maintain lateral connection lines from desalinization facilities along the coastline to the municipal system.
3. We have almost certainly lost the battle over the protection of water quality in the coastal aquifer's groundwater reservoirs. The underground layer that feeds the groundwater has been polluted for decades, and this water will be polluted to some degree in the coming years. Pollution of the mountain aquifer, which is still in good condition, is also very possible, in the absence of infrastructures and adequate maintenance of the mountainous areas that feed the aquifer. In any case, we will have to prepare for careful treatment of the entire water supply system to remove pollutants from the water.
4. Desalinization is often cited as a solution to the water shortage, but it involves a number of problems that we must address:
 - Desalinization is an energy-intensive process. Assuming that overall energy costs will rise (due to the fuel shortage, global competition, and especially the demand for a carbon tax because of the greenhouse effect), then the overall price for desalinized water will increase considerably (cost needs to be calculated according to various alternative scenarios for energy costs). Therefore, planning the water system on the basis of today's prices may be misleading, even very much so. Expanding water desalinization will be contingent upon the existence of a renewable/clean energy only minimally dependent upon imports.
 - Another problem is that of the system's reliability. We are currently discussing the addition of desalinized water at a rate of 20-25% of potable water. The higher the proportion of desalinized water, the more vulnerable the Israeli economy will be to disrupted water supply in the event of war or other failures in fuel supply. As far as food safety, foodstuffs can be stored for a longer time period, but water cannot be stored. It will be difficult to establish a transport system for the event of failure of the desalinization system, if significant portions of Israel depend on the supply of desalinized water.

Data

The potential for renewable water in Israel (including the Palestinian Authority) is about 1.5 million cubic meters a year. Residential water consumption is increasing. Assuming a population of 12 million in the area of the land of Israel:

Yearly consumption	Treated*	Reclaimed
	<i>(In millions cubic meters)</i>	
For consumption of 80 cubic meters/ per person/year	960	672
For consumption of 100 cubic meters per person/year	1200	840
For consumption of 130 cubic meters per person/year	1560	1092

(Water Commissioner's estimates)

* The quantity of treated water was submitted on the assumption of 70% utilized for urban consumption (not including watering gardens and leaks).

- The above figures do not take into consideration that Jordan lacks any alternative water source. Jordan already has the lowest amount of water per capita in the Middle East. Israel will have no choice but to assist in supplying water to Jordan, apparently by desalinization of water in the Mediterranean Sea and transporting it to Jordan. **This will add about 600 million cubic meters of water consumption a year.**
- Israel's agriculture, which is needed to supply fresh produce to the populace and to protect the landscape, clean air, green spaces and more (Neaman Institute assesses the external benefit at about \$73 per dunam a year), **requires about a billion cubic meters of water**, some potable water but mostly high-level treated waste-water.

Recommendations

1. It is crucial to develop **technologies and policy** for reducing and making more efficient use of water, improving the quality of waste-water treatment and promoting desalinization technology (also as an industry capable of generating income for the country). Policy should be implemented to obligate and reward water conservation.
2. Water desalinization is cited as the solution to the water shortage (in Israel, the Palestinian Authority and Jordan), and has considerable quantitative and qualitative advantages: first, it is an addition to the deficient water balance. In addition, the added water is saline-free, thus diluting groundwater and decreasing the risk of salinity. Thus for example, treated water is currently saline (approximately: supply water + more than 100 mg/liter of chlorine). If the city's water source will be desalinated water, it will be treated water with a low saline concentration.

3. Treated water

- It should be specified that water be treated to the level at which irrigation and diverting the water into streams pose no environmental risk, while requiring that irrigation of sensitive crops (strawberries, parsley, etc.) be done with completely potable water.
 - Another option is that treated water be processed to the standard of drinking water (by desalinization). This is technologically and socially challenging, but should be considered.
 - Yet another option is separating the water network into water for residential use and water for irrigation, which may lead to establishing a completely separate system for mostly treated water.
4. There will be a need for treatment beyond chlorination of all water sources. This is not technically difficult or very costly, as far as treating water for urban use, but there may be a need to consider a water supply system for smaller communities that are not connected to the municipal network.
5. **Agriculture** – agriculture planning should include vegetable and other irrigated crops in the Eastern corridor (including winter/summer agricultural areas); in the south, appropriate crops are those that do not require large amounts of water such as field crops and olives, and pasture. State support of agriculture can be viewed as payment for the environmental services that agriculture provides. By the same token that justifies state support for agriculture's environmental services, it justifies directing agriculture towards the needs set forth above, including water limitations. Any discussion of water policy must address agricultural planning.

Required Investment

Investments in water are needed for rehabilitation or establishment of a transporting and redistribution system, a treatment system for water that has been polluted by years of economic activity (groundwater and above ground), waste-water treatment systems and desalinization facilities.

Water desalinization is a developing technology, and is becoming less costly in itself. However, in the absence of a low-cost alternative energy source, energy costs will rise significantly, due to competition over the world fuel market and the external cost of greenhouse gas emissions. (The direct cost of desalinization is about \$0.5 per cubic meter. Desalinating 500 million cubic meters of water requires 2.5 million kw/hour, which comprise about 5% of Israel's total energy production.) Total investment in water and waste-water treatment is estimated at about NIS 40 billion for the entire twenty year period.

Appendix to Chapter XI:

Engineering Manpower in the Construction & Infrastructure Sectors

Introduction

Construction is a leading economic industry that directly and indirectly impacts upon potential economic development in every other realm. We must make sure ahead of time, that the infrastructure and construction sector does not impede progress in other realms. This sector has a slow reaction time, for manpower training processes at the various levels; unique inputs of materials and equipment; and licensing, planning and building processes. Therefore, a good, thorough examination should be done to identify all potential obstacles, and to propose remedies and actions to remove them.

The goal of this appendix is to estimate the demand and supply for engineering manpower, in view of the expected increase in infrastructure work over the coming years, and the concern about a shortage of such manpower. For this purpose, it was necessary to address the similar industry of building construction, which competes for the same type of manpower, such that the forecast relates to the entire united sector of construction and infrastructure.

Risks and Warnings

For the past twenty years, there has been a shortage in domestic construction and infrastructure manpower, including basic-level workers, machinery operators and work managers. These jobs have been filled mostly by foreign workers. **In recent years, there has also been a shortage of engineering manpower – engineers and practical engineers – which may become a real bottleneck in the state's development in other areas as well.** The shortage is more prominent in infrastructures, less so in building construction, particularly as regards the most difficult and demanding task of executing projects on site. In the coming years, the shortage is expected to worsen, because even if immediate measures are taken, the initial results will take at least five years to be manifested.

Despite the developing shortage, the number of civil engineering graduates is lower than in the past, even though a number of colleges have recently begun training in civil and construction engineering. The number of students in the profession is still affected by the recession suffered in recent years by the construction and infrastructure sector, when many civil engineers could not find work in their field, and the pay was (and still is) relatively low. There has also been a decline in the number of students in the construction fields in practical engineering programs. We must remember that engineers' formal training period along with accumulating experience and knowledge, takes about a decade. Engineers require at least four years of training, and practical engineers require at least two to three years.

One of the study's surprising figures is that about half of Israel's civil engineers originate from the former Soviet Union, immigrants from the last wave of the 1990s. About one million immigrants brought with them more than 7,000 civil engineers (seven civil engineers per thousand immigrants), while among Israel's five million residents in the beginning of the 1990s, there were only 5,000 civil engineers (one civil engineer per thousand residents). It is not surprising, then, that on the one hand, a shortage of engineers has not been created in Israel despite the accelerated construction of the 1990s, and on the other hand, that engineers' pay has also decreased, as a result of the surplus of civil engineers in the labor market.

The study's important conclusion in terms of the state economy is that this situation is currently at a crossroads: almost all existing engineers (and practical engineers) are employed; the need for additional engineers and practical engineers is increasing; higher education institutions, chiefly the Technion, are not yet accepting a sufficient number of candidates to respond to the projected demand. The number of engineers reaching retirement age every year exceeds the number of yearly graduates. The considerable reinforcement provided by Soviet-trained engineers who joined Israel's labor force has been nearly exhausted, and now is the time that we, as a state, prepare ourselves for the task of training the required number of professionals for the state of Israel.

The resulting practical significance and recommendation is the urgent need to double or even triple the present output of about 250 engineers and 150 practical engineers a year. The projected rise in compensation due to the emerging shortage provides an excellent opportunity to improve the image of the civil engineering profession.

Primary Conclusions

1. Infrastructure Industry Activity

Most of the increase in the activity of the infrastructure industry is expected to occur over the next ten years. During these years, the economy's structural changes will be manifested, enabling the infrastructure bodies to operate at a scope more appropriate for the economy's needs. Add to this the business sector's increasing involvement in financing, planning and establishment of infrastructures, which will increase implementing capability from both a management and a financing perspective. In the longer term, sector activity will most likely increase at a more moderate pace, similar to the GDP growth rate.

2. Assessing the Sector's Needs for Engineers/Practical Engineers

Following is an estimate of the total inputs of engineer/practical engineer years for planning and executing a NIS 100 million investment.

- Phase I – job ordering phase 26.2
- Phase II - implementing phase 19.5

- Total input 45.7 engineering years

Beyond this, additional engineers are required for overall planning, statutory planning in planning authorities, licensing and management.

We estimate that **implementing infrastructure investments of a scope of NIS 100 million will require some 50 engineer/practical civil engineer years.**

According to the current formula, we assume that this includes about 60% engineers. **That is, the economy requires thirty engineers and twenty practical engineers per NIS 100 million in implementation value.**

3. Construction and Infrastructures Sector

As the building construction industry (as opposed to infrastructure) is a larger consumer of civil and construction engineers and practical engineers, and because building and infrastructure compete for the same manpower (except for unique specializations, such as transportation engineering, etc.), we must look at the demand that stems from the increase in overall activity of the united sector: construction plus infrastructure.

Table 1: Required addition of construction and infrastructure activity & required addition of engineers and civil engineers

Year	Total activity in billions NIS (2005)	Additional cumulative activity in billions NIS	Cumulative required additional engineers/practical engineers
2005	50.0		
2010	66.1	16.1	8,052
2015	76.3	26.3	13,157
2020	88.9	38.9	19,472
2025	103.7	53.7	26,857
2028	113.8	63.8	31,880

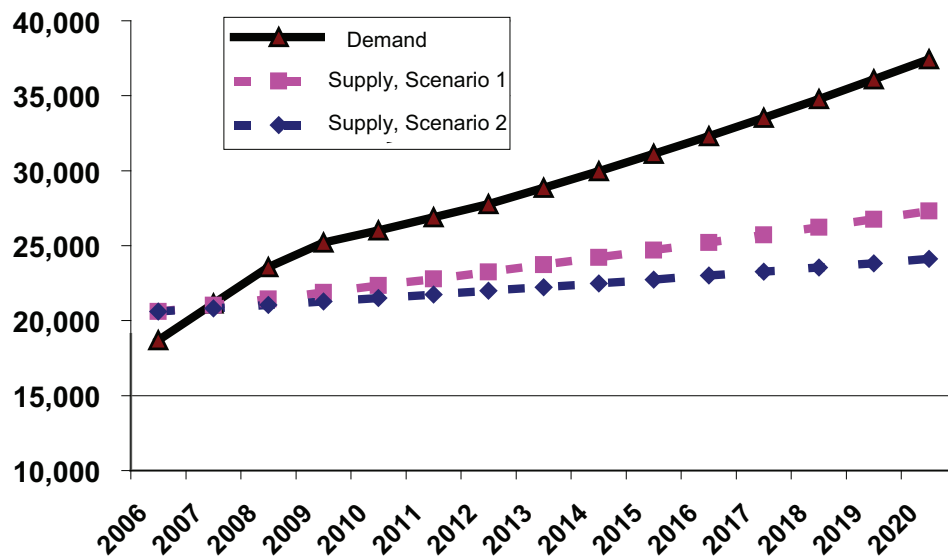
That is, until the target year of 2028, the number of engineers/practical engineers in Israel needs to be increased by 168% - an average net yearly change of 4.4% a year, given the current inventory of about 19,000. The required increase significantly exceeds the projected increase according to the present state of affairs: only 1.2% by the regular scenario, and 1.6% in the more optimistic scenario. In either scenario, the net increase in the number of engineers and practical engineers (that is, new professionals minus retirees) will be insufficient to cover the net increase in activity. The present scope of yearly training of engineers and practical engineers in Israel may perhaps hardly cover natural retirement from the sector, of about 500 individuals a year. It does not respond at all to the projected increase. A "business as usual" scenario is not possible. For the next twenty years, we must produce about 2,000 engineers and practical engineers a year every year, as opposed to only 500 today.

4. Comparing Demand and Supply

For the coming years, the data clearly project a shortage in engineers, and to a lesser degree, in practical engineers, in view of the expected increase in construction and infrastructure activity.

Especially high rates of increase are expected in the sector's activity during the coming decade (becoming more moderate in subsequent years), meaning that the engineer shortage will be felt increasingly in the coming years.

Chart 1: Supply & Demand of Engineering Manpower



Conclusions and Recommendations

In order to arrive at a balance between the projected demand and the supply, we must **triple the number of engineering graduates and double the number of practical engineering graduates** (vs. the present situation). A foundation exists for training sufficient numbers of engineers, but the emphasis needs to be on attracting appropriate manpower, in order to strike a real balance between demand and supply. This increase requires enhancing the profession's image and compensation, in order to attract high quality manpower to the industry. In the previous decade, about 7,000 immigrant engineers joined the construction sector, mostly from the former Soviet Union. This created a surplus of engineering manpower, especially in view of the low level of activity during the construction industry's decade-long recession. Now, as the industry is awakening, and increased activity is projected (alongside population growth and GDP growth), **there are not even sufficient new graduates to replace retiring engineers.** Local training institutions produce together less than 500 graduates a year.

A special emphasis should be placed on the infrastructures realm, particularly infrastructure project management, which is expected to increase more rapidly than the construction industry, especially in the coming decade, and in which a shortage is already felt.

Part III: Macro-Economic Developments

Chapter XII: Macro-Economic Developments

Overview

The aim of this chapter is to set economic objectives for the long-term development of the Israeli economy, in accordance with the "Vision and Strategy" plan, as detailed in the previous chapters. All the components of the vision are integrated here into one consistent, complete system with a high probability for attainment. Our simulations enabled us to calibrate the vision's objectives while taking into consideration existing limitations to growth potential. These limitations pertain to demography, investment, the balance of payments, the state budget and the domestic debt burden.

The model integrates the supply side with the demand side, and the labor market and the balance of payments, while maintaining complete equilibrium in all markets. On the supply side, the model is formulated according to the neo-classical growth model, and focuses on explaining the long-term GDP, combining the conditions for enabling an increase in the quantity of production factors (capital and labor) with components of modern growth theories such as human capital, R&D, knowledge, entrepreneurship and infrastructures. We divided the business product into eight major sectors, each of which contains several sub-sectors.

The final uses were constructed according to accepted national accounting definitions, from private consumption, public consumption, investments in the economy, and the export of goods and services. In this model, import was determined by development of demand and import components in the final uses. Private consumption is dependent upon disposable income (wages and employment), which is determined on the production side. Public consumption is a policy variable determined outside of the model. The tax burden was determined such that the budget deficit would not exceed 1% of the GDP. The demand for investments was determined by optimization of production processes. Investments in residential construction were determined by the housing stock model. The demand for export was based on a system of behavioral equations linking each sector's real export to world economic growth forecasts.

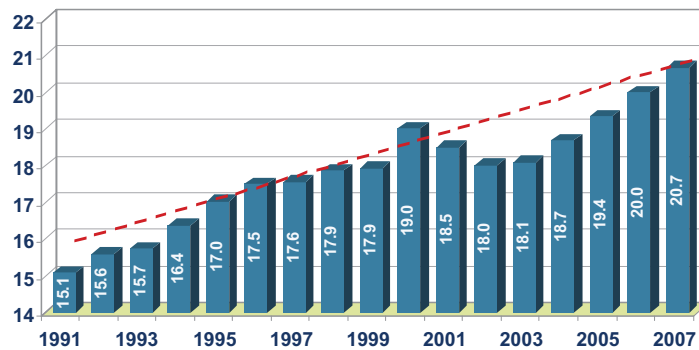
Background

Despite the accelerated growth of the last four years, an analysis of past decade's growth path indicates that growth per capita totaled only 2% during this period; the high growth over the past four years followed three years of the deepest recession the Israeli economy has known.

By international comparison, Israel ranks 22nd in product per capita among developed countries¹⁹. The Israeli economy has not improved its relative international standing in the last decade; the gap has, in fact, even widened as compared with competing countries as Spain, Greece, Cyprus, Korea, Slovenia, etc.

¹⁹ GDP per capita in market terms, not including Luxembourg, whose population is only 470,000.

**Chart 1: Past Decade's GDP Development,
in thousands of \$ (2006)**



According to the American forecasting firm Global Insight, accelerated world economic growth is projected for the next two decades, as a result of rapid growth in China, India, and Central and Eastern European countries. If per capita growth continues at its historic pace, Israel will descend several rungs in the world ranking by 2028, to the 26th-30th place. Such a scenario is liable to have serious social and economic consequences.

Analysis of Israel's demographic trends indicates the existence of large sectors that do not participate fully in the economic process. These groups are characterized by high birth rates, low participation rates in the labor force, and low levels of education incompatible with a modern economy.

The problem is most serious as regards two population groups: Arabs, comprising about 20% of the population and the ultra-Orthodox, comprising about 9%. Over 50% of families in these groups live below the poverty line. As a result, the majority population bears a heavy burden, which is expected to grow if the current path continues.

Over the last decade, the Israeli economy has been characterized by increasing inequality in income distribution, increased scope of poverty, and the development of a "**dual economy**". On the one hand, advanced technology sectors, the "engine" that pulls along the economy, boast an average growth rate of 9% and an increase in aggregate export from \$9 billion in 1995 to the current \$27 billion. These sectors demonstrate continued growth in productivity and output per worker. Traditional economic sectors, conversely, are experiencing a serious economic crisis, manifested by low productivity, low production per employee and low wages, as well as a negative rate of output growth over the last decade. As a result, Israel's social problems are exacerbated: the Gini coefficient, which measures inequalities in income distribution, and the relative poverty index indicate that income disparities in Israel are among the highest of developed countries, and have been on the increase during the last decade.

The Israeli economy's main problem over the past decades is that of low productivity. Over the past decade, overall productivity (the percentage change of real GDP per weighted unit of inputs), has increased only minimally, in contrast to a 1-3% increase seen in most of the OECD countries.

The Economy's Growth Potential

The simulations we conducted in our macro-economic model show that the Israeli economy has high growth potential, which enables its ascension on an accelerated growth path of 6% on average per year. This path will enable Israel to become one of the world's ten to fifteen leading countries in terms of GDP per capita, according to the objectives presented in the vision. This path is economically feasible, given capital inputs, labor, investment in education, the balance of payments limitation and the state budget. It is achievable even given the current geo-political conditions, but requires implementing the strategy proposed here.

According to our simulations, the Israeli economy will attain a GDP of over \$500 billion (2007 prices) by 2028. Israel's population will have reached about 9.8 million, yielding a GDP of about \$53,000 per capita by the end of this period. This level of GDP per capita will position Israel in tenth to fifteenth place in the world ranking. The accelerated growth path will enable allocating significant resources for investment in education, infrastructures, improvement of the standard and quality of living, welfare and reduction of inequalities, while integrating vulnerable groups into Israeli economy and society. All of this can be accomplished without compromising Israel's essential defense and employment interests. The increase in the level of income per capita and in the standard of living will be expressed by numerous quantitative measures; its economic benefits are presented in the table below.

Chart 2: GDP Growth Potential (compared with baseline path)
in billions \$ 2006

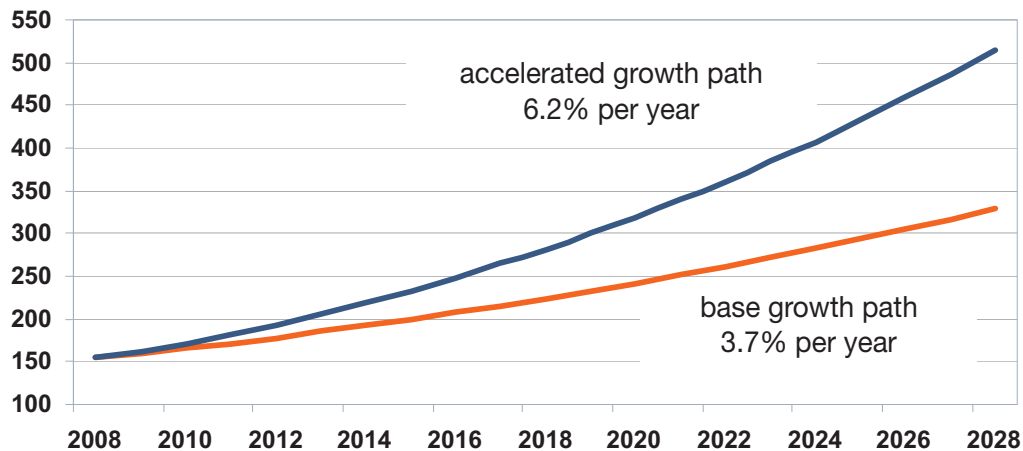


Table 3: Economic Advantages of Accelerated Growth Path

in thousands of \$, unless otherwise noted

	2007	2028	% change
GDP per capita	20.8	53.2	4.7%
Consumption per capita	11.4	30	4.9%
Gini index (%)	39%	32%	-0.9%
Unemployment rate (% of labor force)	7.5%	4.4%	-2.8%
Tax burden (% of GDP)	36%	30%	-1.0%
Education expenditure per capita	1,740	4,405	5.3%
Health expenditure per capita	1,480	4,424	4.5%
Electricity consumption (kw/hr) per capita	6,347	14,246	3.7%
Motorization (per 1,000 persons)	283	623	3.6%
Water consumption for domestic use (in cubic meters per capita)	101	232	3.9%

Electricity and water consumption, motorization – 2006 data

Israel's current comparative standing in terms of GDP per capita is 22nd world-wide (not including Luxembourg, whose population is extremely small). This ranking is done by exchange rate at market prices. Conversely, Israel's exchange rate ranking in terms of purchasing power parity (PPP) indicates that Israel's GDP per capita is about \$28,000; Israel is currently ranked 18th in the world. This is because the exchange rate by PPP (according to estimates of the Central Bureau of Statistics) was about NIS 3.19 per US\$ in 2006, in contrast to a market rate of NIS 4.46 per US\$ that year. This gap reflects the fact that most non-tradable goods in Israel are comparatively cheaper than tradable goods (on the basis of which the exchange rate is determined).

Table 4: Country Rankings by GDP Per Capita

in thousands of \$ in 2006, market prices

Rank	Current 2007		Forecast for 2028	
	Country	Product per capita	Country	Product per capita
1	Norway	75.3	Norway	111.7
2	Iceland	55.3	Ireland	95.9
3	Ireland	55.3	Iceland	83.9
4	Switzerland	53.0	Denmark	73.9
5	Denmark	51.7	USA	62.7
6	USA	44.4	Switzerland	65.7
7	Sweden	43.4	Finland	63.4
8	Holland	42.0	Sweden	62.0
9	Finland	41.6	Holland	59.4
10	Britain	40.6	Britain	56.5
11	Austria	40.2	Australia	59.6
12	Canada	39.8	Belgium	56.8
13	Belgium	38.7	Austria	55.7
14	Australia	38.2	Canada	54.7
15	France	37.2	Israel	53.2
16	Germany	36.4	Germany	52.3
17	Japan	34.8	France	54.5
18	Italy	31.9	Greece	45.9
19	Spain	28.9	Japan	45.3
20	Greece	28.6	Italy	43.3
21	New Zealand	26.4	New Zealand	42.3
22	Israel	20.8	Spain	41.3

Source: Based on growth forecasts by the Global Insight forecasting firm.

Dilemmas and Problems

Achieving a growth path of 6% on average per year for the next twenty years requires comprehensive government policy that addresses a number of major bottlenecks discussed in preceding chapters of this paper, which include:

- The problem of demographic structure
- Insufficient investment in economic sectors
- Lack of adequate infrastructure
- Low labor force participation rate
- Education and higher education issues
- Continued utilization of high-tech's comparative advantage and increased investments in R&D capital while improving the state of traditional industries

1. The Demographic Issue

Israel's population is made up of three sub-groups, which are significantly distinct from demographic and economic perspectives: a) the majority population; b) Arabs, and c) ultra-Orthodox. The ultra-Orthodox and Arab populations are characterized by a high birth rate, low participation in the labor force, low productivity and low education level. Due to these populations' high birth rates, remaining on the current path would considerably reduce the economy's growth potential.

2. Insufficient Investment

Israel's capital is about half the level of capital per employee in the US. Consequently, labor productivity (production per employee) in Israel is only about 60% of that in the US. The problem of capital intensity is prominent in trade and services sectors, which perpetuates income and wage gaps and precludes acceleration of growth.

Israel's investment rate (not including housing) accounts in 2007 for about 13% of the GDP, which is significantly low as compared with such countries as Greece, Spain and Slovakia. As a result of the low investment rate, there is no increase in capital stock.

3. Lack of Infrastructures

While Israel is, in certain areas, at the forefront of research and technology, it has a low standard of physical infrastructures, which hinders growth and rise in the standard of living. Neglected areas include transportation (roads and railways), seaports and airports, energy, water, environment, and pollution. The lag in infrastructure causes the economy continuous losses in terms of GDP, work hours, leisure time and road accidents (see Chapter XI).

The lack of adequate transportation infrastructure causes an increase in unemployment in the periphery, as residents lack access to employment centers in the central economic area, and prevents establishing factories in the periphery, which would be potentially advantageous. The lack of adequate transportation infrastructure also creates an increase in housing costs in central areas and distances the periphery, thus expanding social gaps. It also seriously impairs productivity and serves as a growth-hindering factor.

4. Low Participation Rate in the Labor Force

The participation rate in the labor force is about 56%, as compared with about 67% in the US. A participation rate of 60% would provide Israel's economy with an additional 200,000 potential employees, who at present may be counted as unofficially unemployed (see Chapter IX).

Israel's unemployment rate, currently over 7%, is high both relative to the past and by international comparison (particularly relative to the US, Britain and Japan). It indicates

partial utilization of the economy's production potential and a hidden potential for rapid increases in employment and GDP.

5. Education Issues

Israel's education services and national expenditure rank high among developed countries. In most measures of education, Israel is ranked at the top of the industrialized countries. However, despite the considerable expenditure on education, the system's output is poor. Israel ranks high world-wide in adult education, but its achievements in elementary and high school education are very low. The accelerated development of the technology sector creates demand surpluses for technologically-educated manpower, which the economy has difficulty providing.

6. Continued Growth of Advanced Technology Sectors

In the past decade, advanced technology sectors were the engine that carried the economy, growing rapidly and significantly increasing the foreign currency supply to the economy. The defense industry was of crucial importance in building the technological field in Israel, followed by civilian R&D policy and the sharp decline in military R&D investments along with inadequate investments in civilian R&D may cause a significant slowdown in technological development.

Economic Strategy

1. Encouraging Employment and Increasing the Participation Rate

An average population increase of about 1.5% a year is projected for the next two decades, based on birth rates and forecasts for Israel's population by sector (ultra-Orthodox, Arabs, majority). Accordingly, action needs to be taken to increase the participation rate, particularly among the Arab and ultra-Orthodox populations. According to our estimates, a participation rate of about 60% can be attained by means of encouraging the participation rate in the Arab and ultra-Orthodox groups.

The number of foreign workers must be significantly reduced. A cap should be set at 3% of the labor force, or less than 100,000 workers in 2010, as opposed to the current 190,000.

2. Encouraging Investment, including Foreign Investment in Israel

Attaining a growth path of 6% requires significant increase in capital stock per worker. We can achieve an investment share (not including investment in residential housing) of about 19% of the GDP within a number of years. This high level of investment will facilitate an increase in capital stock per employee and accelerated growth. The primary requirement is increased investment in traditional industries and services sectors. Improving the levels of

human capital, physical infrastructures and R&D, and removing bureaucratic obstacles, will lead to increased investments in the economy.

3. Policy and Funding for Infrastructure Investments

Existing development programs should be implemented at an accelerated pace, and aggressive investments should be continued in additional development programs, with an emphasis on land transportation (roads and railways). Achieving the accelerated growth path requires cumulative investments in transportation infrastructure of more than NIS 150 billion over the next decade, and nearly NIS 350 billion over the next twenty years.

Twenty percent of the investment in transportation infrastructure should be funded by the private sector (currently, nearly all investment in transportation infrastructure is publicly funded). Carrying out infrastructure investments through the business sector will enable the state not to deviate from budget deficit principles. Alternately, the state budget's deficit should be obligated for depreciation and interest only, not for the full cost of the investment.

4. Investment in Education as a Long-Term Growth Engine

Israel's scores on the international PISA reading comprehension and science exams indicate its decline to 39th place, the long-term negative impact being the loss of Israel's comparative "human capital advantage". This situation is the result of many years of neglect, and the necessary remedy is an integral part of increasing investments in national infrastructures. Continuation of the current state will bring about the loss of Israel's comparative advantage vis-à-vis its competitors. Israel's education system requires increased efficiency and elevation of teachers' status and the level of instruction and training, as recommended by the Dovrat Report. In the realm of higher education (see Chapter VII), we require a revolution in order to reach our target of about 600,000 post-secondary students and over 18,000 hard sciences and engineering graduates a year, needed for technology sectors (as compared with the current 9,000 graduates a year).

5. Encouraging Investment in R&D

A system of civilian incentives is needed to give Israel priority as a base for development and production of technological innovations (see Chapter VI). High-tech growth is to be accelerated through:

- Government support for R&D investments in Israel by providing R&D grants to anchor companies, constituting 20% of the additional expenditure for R&D in Israel
- A gradual increase in tax credits and incentives for R&D activity

6. Budget Policy

The year 2017 should be set as the target for compliance with the Maastricht public debt convergence criteria. Emphasis should be placed on increasing public sector efficiency and expanding outsourcing. A growth-supporting tax policy should be instituted, while continuing to significantly cut direct and indirect tax rates, including corporate taxes, down to a rate of 10-15%; gradually reducing VAT, down to 10-12%; and instituting additional tax cuts for middle and high income thresholds (as tax rates on lower incomes are already very low). Significantly lowering tax rates, along with reducing the rate of public debt and ensuring large-scale public investments, all depend upon the achievement of rapid economic growth that will provide the needed resources.

Primary Forecast Data

1. The Forecast's Basic Assumptions

- **The political/security situation:** The study's initial assumption is that progress will continue to be made in the political process between Israel and the Palestinian Authority, and that a system of interim agreements enabling coexistence, may be reached. We assume that Israel will advance toward a full peace agreement with the Palestinians and the Arab countries over the next two decades. Substantial progress in the political process, and a sustainable final agreement with the Arab countries and the Palestinians, may bring about accelerated growth beyond the path presented here. Conversely, a return to the level of terrorism seen in 2001-2003 will preclude Israel's ascending on the accelerated growth path.
- **Immigration:** After almost complete exhaustion of the immigrant reservoir of the former Soviet Union, which made up the absolute majority of the immigrant population during the 1990s, we assume that immigration to Israel will stabilize at a yearly level of about 10,000 immigrants, or 200,000 over the entire projected time period (including from the former Soviet Union).
- **Defense budget:** The war in Lebanon, the Iranian nuclear threat and threats from Syria, all demonstrate the complexity of Israel's security reality. This complexity, on the backdrop of international Islamic terrorism and the arming of radical Islamic groups, alongside a possible American withdrawal from Iraq, precludes a policy of reducing the defense budget. Accordingly, we assume that the defense budget (including foreign aid) will increase over the next two decades by about 1.2-1.5% per year on average. We assume that the military system will have to become significantly more efficient, requiring a new security outlook regarding issues such as national service, military outsourcing, and the optimal magnitude of the defense burden.

- **World economy and international trade:** Based on a forecast by Global Insight, the world growth rate is expected to be around 3.1% (weighted in dollar terms). The developed (OECD) countries are expected to grow at a rate of 2.1% a year, while the developing countries will grow at a yearly rate of 5%. The emerging markets are expected to continue to grow at an accelerated pace.
- The acceleration in China, India and Southeast Asia will decline, and the rapid growth rate of world trade will also slow down. China will not be able to continue to increase its exports to the US at a rate of 20% a year, and most of the increase in Chinese output will be directed to its internal needs (raising its very low standard of living). We take into account that world business cycles occurring during this period will also impact upon Israel, as part of the "price" of globalization.
- **Oil prices:** Oil prices increased sharply during 2005-2007, but the impact on economic activity until now has been limited. We estimate that at current oil prices, supply is expected to rise (due to intensive oil drillings) and the demand to fall (due to oil-conserving technologies, decreased demand for vehicles), creating a supply surplus and reduced prices. This process is likely to continue for a number of years. Ultimately, according to estimates by international research groups²⁰, oil prices will stabilize at around \$40-50/barrel (2007 prices). This forecast is consistent with those of most international organizations.

2. Demographic Forecast

The demographic forecast is based on a model developed by the International Institute for Applied Systems Analysis, which serves most of the world's large organizations, including the UN. On the basis of external parameters, this model makes estimates and forecasts for the development of various populations by gender, age and population sector (majority, Arab and ultra-Orthodox). The parameters integrated in the model are birth rate, mortality rate, emigration rate and life expectancy. Beyond the forecast for population size and composition, the projected number of households, labor force participation rate and level of education are derived from the demographic model.

Following are the model's results:

- **Population structure:** As stated, Israel's population is comprised of three groups, characterized by significant variance between their demographic and economic features: a) ultra-Orthodox²¹; b) Arabs; and c) the majority group. Population forecasts

²⁰ According to Global Insight forecasting firm, oil prices will reach \$56/barrel (2005 prices) in 2020. The US Department of Energy projects oil prices at \$52/barrel. According to the World Bank, prices will reach \$40/barrel in 2015.

²¹ The estimates regarding the ultra-Orthodox population are based on the Central Bureau of Statistics 2005 survey of household expenditures. Ultra-orthodox families were defined as follows: Families that do not own a television set, and whose head of household studies at "kollel" and/or that have children under age 18.

were conducted for each of the three groups separately, on the basis of each group's characteristics.

- Birth rate:** Israel's average birth rate is 2.8: approximately 2.2 among the majority population, approximately 3.6 among the Arab population and approximately 6.0 among the ultra-Orthodox population. In comparison to Western countries, Israel's overall birth rate is very high; even the majority group's birth rate is high, although it is close to that of the US (2.1). Mostly cultural and social factors affect birth rates, while economic factors (income and education level) have a weaker impact. We assume, therefore, that change will not occur in the ultra-Orthodox birth rate, and it will remain at 6.0 children per woman. This notwithstanding, we assume that part of the ultra-Orthodox population (some 25%) will adopt the employment and education characteristics of the majority population and practically speaking, will be included in the majority population (it is assumed that by 2028, 25% of the ultra-Orthodox population will be economically and socially characterized as part of the majority population). Conversely, as regards the current birth rate of 3.6 among the Arab population, we expect it to decline to 2.2, in accordance with the growth path presented in this document.
- Life expectancy:** Life expectancy was determined in accordance with the assumptions of the Central Bureau of Statistics. Accordingly, the trend of increased life expectancy will continue, albeit at a gradually decreasing pace, while maintaining the differences between the different populations. According to the forecast, the average life expectancy will increase from about 80 years at present, to about 81.7 years in 2028.
- Population and labor force:** Based on the forecast, Israel's population will be about 9.8 million in 2028, including 22% Arabs and 11% ultra-Orthodox. The birth rate will decline gradually from 2.7 to about 2.4 children per woman. The large part of the decline is expected in the birth rate of the Arab population (currently 3.6; expected to fall to 2.2 on the accelerated path).

Table 5: Israel Population Profile - 2008

	Total	Majority	Ultra-Orthodox	Arabs
Population in thousands	7,296	5,143	687	1,466
% of total	100%	70%	9%	20%
Population growth rate	1.7%	1.2%	3.9%	2.4%
Birth rate (# of children per woman)	2.7	2.1	6.0	3.6
Life expectancy (years)	80.1	81.0	81.0	76.7
Population in 0-14 age group	28.2%	21.9%	51.9%	39.3%
Households (thousands)	2,088	1,669	132	286
Household size (individuals)	3.3	3.0	5.2	4.9

Table 6: Forecast for Israel's Population Development - 2028

	Total	Majority	Ultra-Orthodox	Arabs
Population (thousands)	9,747	6,538	1,052	2,158
% of total	100%	67%	11%	22%
Rate of population growth	1.3%	1.2%	2.1%	1.5%
Birth rate (# of children per woman)	2.4	1.9	6.0	2.2
Life expectancy (years)	80.4	82.1	82.1	81.7
Population 0-14	24.4%	20.0%	44.4%	27.9%
Households (thousands)	3,064	2,277	218	568
Household size (individuals)	3.0	2.8	4.8	3.6

The participation rate in Israel (nearly 56%) is significantly lower than that in the US (66%), due to low participation rates among the 15-24 year-old age group (attributable primarily to military service and zero participation among the 16-17-year-old age group); a relatively lower participation rate (as compared with the US) among the primary working age group (25-64); and low participation rates among the ultra-Orthodox and Arab populations. Downscaling regular army forces and instituting an active policy to integrate Arab and ultra-Orthodox populations into the labor force will bring about an increase in the participation rate to 60%.

Table 7: Forecast Summary for the Labor Force, in thousands

	Total	Majority	Ultra-Orthodox	Arabs
2008				
Population 15+	5,239	4,019	331	889
Labor force	2,960	2,472	138	350
Participation rate	56.5%	61.5%	41.6%	39.3%
2028				
Population 15+	7,372	5,232	585	1,556
Labor force	4,399	3,266	312	821
Participation rate	59.7%	62.4%	53.3%	52.8%

3. Education

The projected path adopts an active policy of investment in education, according to the recommendations of Chapter VIII, which includes two primary target variables:

- Increasing the number of high school graduates who meet university entrance requirements (matriculation certificate, three points mathematics, four points English, and an additional major) to about 65% (of the 18-year-old age group). Currently about 44% of the majority population meet these requirements. We

expect this number to increase to about 69%, while among the Arab population we believe we can reach about 40%.

- About 82% of high school graduates who meet the minimum requirements for university entrance do indeed go on to complete their Bachelors degree (the remainder either do not enroll or do not graduate). About 50% go on to complete an Masters, about 36% complete their PhD. We assume that the Bachelors rate will reach 90%, and that the Masters and PhD rates will remain constant.

Based on these assumptions, the number of students will increase from the current 233,000 to about 610,000, about 370,000 of whom will be studying towards their Bachelors degree.

Projection of these developments was based on the forecasted increase in students. According to this forecast, the average number of years of education will increase by about 0.58 a year until 2028, reaching approximately 13.3 years. The number of degree-holders will rise from 27% in the baseline year to 36% in 2028. The proportion of Bachelors graduates will increase from 15% to 20% and of Masters graduates from 9% to 14%. The rate of PhDs will remain at 3%.

Table 8: Forecast for Higher Education in Israel (in thousands)

	2008	2018	2028
Holders of degrees ages 21-64	1,081.8	1,515.4	2,156.3
% of 21-64 year age group	28%	31%	36%

In thousands

	2008	2018	2028
Population (ages 25-64)	3,914	4,926	5,929
No higher education	2,832	3,410	3,773
Hold BA degree	594	860	1,165
Hold MA degree	371	527	838
Hold PhD degree	117	128	153
Average # of years of education	12.66	12.83	13.23

% of total relevant population

Population (ages 25-64)	100%	100%	100%
No higher education	72%	69%	63%
Hold BA degree	15%	17%	20%
Hold MA degree	9%	11%	14%
Hold PhD degree	3%	3%	3%

4. The Production Side

The growth forecast is based on accelerated growth of the business sector (7%), alongside a reduction in the public sector's relative share in the GDP. According to the forecast, the public product will increase by 2.5% a year (a real increase of 1% a year), and its share in the total GDP will decline to only 8-10%. The growth of the public sector's product is lower than the growth of government consumption, due to outsourcing of services from the government to the private sector. Housing services (which are included in the GDP) will grow by about 4% a year, 2% beyond population growth, and will reflect improvements in housing standards (larger, higher quality dwellings).

Table 9: GDP in billions of NIS (2006) and %

	2008	2018	2028
GDP	691	1,264	2,312
Business sector product	515	1,029	1,973
Public sector product	107	137	178
Housing services*	69	98	161
Distribution			
GDP	100%	100%	100%
Business sector product	75%	82%	85%
Public sector product	15%	11%	8%
Housing services*	10%	8%	7%

*income attributed to housing services is considered part of the GDP

We divided the business product into eight main sectors, each comprising a number of sub-sectors, by the following break-down:

Chart 10: Breakdown of Economic Sectors

1. Advanced Technology	3. Agriculture
Electronics	4. Infrastructures
Chemistry	Transportation
Equipment and Machinery	Electricity and Water
Transport vehicles	Communications
Software and R&D services	5. Construction
2. Traditional Technology	6. Trade
Food and beverages	7. Financial and Business services
Metals	8. Other Services
Mining and quarrying	
Textiles, apparel	
Rubber and plastic	
Other industry sectors	

Advanced Technology industry is our definition for the group of sectors characterized by high added value and use of advanced technologies; it includes electronics, software, chemistry, pharmaceuticals and aviation. The high-tech sectors are expected to continue to utilize their comparative advantage and lead economic development, facilitated by the relative importance of human capital in contrast to the limited importance of raw materials and proximity to target markets.

The **Traditional Industry** sectors include food and beverages, textile and clothing, wood and wood products, rubber and plastic, metal products, minerals, mining and quarrying. This sector is experiencing a continual decline, resulting from a low rate of increase in local demand, alongside significant exposure to competitive imports and the recession in the construction sector. On the accelerated growth path, domestic demand for traditional industries' output is expected to increase by about 4.5% a year. We believe that this demand can be satisfied by means of a very moderate increase in the number of sector employees, and a sharp increase in investments in capital stock and productivity. Through this policy, wages can be significantly increased in traditional sectors.

The **Trade and Services** sectors include a broad range of economic activity, such as trade, food services, accommodations services, private education and health services, financial and business services, leisure, recreation, culture, sports and personal services. Increased relative share of services generally characterizes a process of economic growth, and is expected to continue in the next two decades. The factors involved in this process are high elasticity of services demand relative to income; increased leisure time, which accelerates consumption of services, such as culture and entertainment, sports, television, etc.; demographic changes such as the aging of the population, which increases the demand for health care, personal assistance and nursing services; and increased participation in the labor force, which accelerates consumption of services, such as food services away from home, home cleaning services, laundry services and more. These factors are expected to continue to facilitate accelerated growth of the business services sector, in addition to structural factors, such as the outsourcing of services from the companies themselves to external suppliers as well as the reduction of the public sector's relative share in service provision.

In view of the disparity in capital per worker in trade and services sectors in Israel and the US, we estimate that investments can be accelerated in order to bring about improvements in the sectors' output and productivity. Primarily, action must be taken to promote computerization processes and investments in physical capital, which may save manpower.

**Table 11:
Forecast Summary for GDP Development by Economic Sector**

	2008 billions NIS (2006 terms)	2008 % of GDP	2028 billions NIS (2006 terms)	2028 % of GDP	% annual change
GDP	691	100	2,312	100	6.2
Public sector product	107	15	178	8	2.6
Housing services	69	10	161	7	4.3
Business sector product	515	75	1,973	85	6.9
Advanced technology	105	15	494	21	8.1
Traditional industry	51	7	134	6	4.9
Agriculture	12	2	16	1	1.7
Infrastructure	67	10	248	11	6.7
Construction	35	5	173	7	8.3
Trade	64	9	236	10	6.7
Financial and business services	111	16	422	18	6.9
Other services	70	10	264	11	6.9

Table 12: Forecast Summary for Employment by Sector

	2008 thousands	2008 % of total	2028 thousands	2028 % of total	% annual change
Employees	2,732	100%	4,205	100%	2.2%
Public sector	625	23%	705	17%	0.6%
Business sector	2,107	77%	3,500	83%	2.6%
Advanced technology	280	10%	585	14%	3.7%
Traditional industries	244	9%	278	7%	0.6%
Agriculture	47	2%	48	1%	0.1%
Infrastructures	197	7%	304	7%	2.2%
Construction	140	5%	397	9%	5.4%
Trade	368	13%	638	15%	2.8%
Financial & business services	373	14%	591	14%	2.3%
Other services	459	17%	702	17%	2.1%

Sources of Business Sector Growth

From the production inputs side, accelerated growth will be based on rapid growth in capital stock and a significant increase in total factor productivity (TFP). According to our simulation, 6% annual growth (and 7% increase in business product) requires the business sector TFP (output per weighted unit of inputs – capital and labor) to increase at a rate of nearly 2.9% a year, on the backdrop of the past decade's minimal increase. **International comparison shows that**

this increase is exceptional but feasible. According to this plan, this is one of the primary tasks of economic policy for the coming years.

Sources of TFP growth will be an increase in capital stock of infrastructure per unit of product, accelerated expansion of R&D investment and a rise in the average education level, alongside continued increase in capital stock per worker.

Table 13:
Sources of Growth in Business Sector Product
(in billions of NIS, 2006)

	2008	2018	2028
Business sector product	515	1,029	1,973
Employees (thousands)	2,107	2,783	3,500
Capital (billions NIS)	763	1,367	2,497
Product per worker (thousands NIS)	244	370	564
Capital per worker (thousands NIS)	362	491	713
Total factor productivity (index, 100=2006)	103	139	184

5. Investments in the Economy

A policy for accelerating investment in the economy is necessary, in view of the shortage in investments and the low level of capital per employee, especially in traditional industries and the trade and services sector. We estimate that some \$1,060 billion in cumulative investments will be required during 2009-2028. If this policy is implemented, capital stock is expected to increase by about \$560 billion, with half of the investments designated to offset depreciation. On this path, capital stock per worker in 2028 will reach about 79% of the capital stock per worker expected in the US the same year. Capital stock per worker in the US is currently about \$149,000²² (market prices), and is projected to reach about \$230,000 in 2028.

Table 14:
Capital Stock and Product per Employee, Israel vs. the US, 2006 and 2028
(in thousands of \$, 2006)

2006	Israel	US	Gap
Product per employee	55	92	60%
Capital per employee	81	149	55%
2028			
Product per employee	123	136	90%
Capital per employee	178	230	77%

Source: For Israel: Bank of Israel and Economic Models; for the US: US Dept. of Commerce, Bureau of Economic Analysis.

5.1 Investments in Infrastructure

National infrastructure is the foundation of economic production potential, increased productivity, economic competitiveness, a higher standard and quality of life. As long as investments in infrastructures encourage growth and the rate of return on capital significantly exceeds the cost of interest, we must continue to invest, even if this means taking out long-term loans.

Massive investment in infrastructure has been a central tier in the growth acceleration programs of countries that have experienced accelerated growth (e.g., Ireland).

The Israeli economy's main shortcomings are in the areas of transportation infrastructure, water management and the environment (see Chapters X and XI). In contrast, the communications and electricity infrastructures are relatively advanced, and require lesser government intervention. The infrastructure problem is significantly prominent on the backdrop of Israel's high technological standard. Israel lags significantly in its standard of physical infrastructures, while technologically, it is among the world's leaders. Accordingly, accelerated growth necessitates accelerated implementation of existing development programs with abridged timetables, and continued aggressive investment in additional development programs. Substantial investment is particularly

²² International comparison of capital stock per worker was calculated by the normal exchange rate, not the PPP exchange rate, as investments are a highly tradable product and a large share of them comes from import.

essential for transportation infrastructures.

Table 15: Forecast Summary for Water & Electricity Infrastructure Investment
(in billions NIS 2006)

	2008	2018	2028	cumulative
Total	12.4	26.2	47.9	490
% of GDP	1.8%	2.0%	2.0%	2.0%
1. Transportation infrastructure	7.17	18.5	36.0	350
% of GDP	1.0%	1.4%	1.5%	1.4%
Roads	4.3	10.2	21.7	210
Intercity roads	2.7	6.4	13.6	145
City roads	1.2	3.1	6.5	65
Israel Train	1.6	5.2	9.3	90
Light trains	0.7	2.3	4.1	40
Seaports	0.5	0.6	0.7	10
Airports	0.1	0.1	0.1	1
2. Water/sewage	2.1	3.0	4.9	50
Desalination	0.3	0.3	0.3	5
Water/sewage pumping	1.1	2.8	4.7	40
3. Electricity	3.2	4.7	6.9	80

According to the program's estimates (see Chapter XI), some NIS 350 billion in investments is required over the next two decades for roads, railways, airports and seaports. We believe that a comprehensive national development master plan for infrastructure investments for the next ten years, with clear targets, should be submitted for government approval.

- **Airports and Seaports:** In view of the projected growth path and the expected increase and changes in foreign trade, a forecast was conducted regarding the demand for loading and unloading of cargo in Israel's ports. Unloading of containers is expected to increase by an average rate of 5.9%, reaching 29 million tons a year by 2028, more than three times the current amount. Based on these forecasts, we estimate that significant investments are needed in seaports, including completion of Carmel Port's first phase and development of new docks for Ashdod or Haifa. The cumulative cost of this three-stage investment will be about NIS 10 billion by 2028.

According to the forecast, by 2028 passenger traffic in Israel's airports will reach about 34 million passengers a year, as compared with the current 9 million. Passenger capacity has increased significantly since the completion of the **Natbag (Ben-Gurion airport) 2000** project, but it appears that further investment will be needed for a passenger terminal and additional take-off and landing runways. Accordingly, significant investments will be required

for airports within ten years.

- **Water System:** The forecast for 2028 projects that Israeli demand for water along with the Palestinian demand (assuming that Israel's water sources will serve both entities) will reach about 3.1 billion cubic meters. From the supply side, water sources available to both economies comprise about 2.1 billion cubic meters. Technologically speaking, Israel does not have a real water problem, because any amount of water can be desalinated for a cost of \$0.5 per cubic meter. The annual cost of adding the needed 1000 million cubic meters is \$500 million a year. The cumulative scope of investment needed for creating desalination facilities is about \$1.0 billion.
- **Energy System:** According to Economic Models' demand forecasts, the demand for electricity is expected to increase by 5.2% annually over the next two decades, given an accelerated growth path. This means a nearly three-fold increase in demand for electricity, which will require increasing production capability by about 18 GW within about 20 years (from 10 GW to about 28 GW).

In our assessment, current reserves (about 10%) must be doubled to reach the European average (about 20%), in order for electricity production to be adequately reliable. By our estimate, the direct and indirect damage caused by power outages significantly exceeds the cost of increasing reserves. We believe that it is possible to route old production units by technology of open-cycle units at a very low alternative cost, to be used on days of surplus demand (such as especially hot summer days). The marginal cost of maintaining these units is very low (cost of capital only).

An analysis of world electric production demonstrates that in large Western countries, base power plants' (coal + hydro + nuclear) production capacity exceeds 50%. From the strategic and economic perspectives, it makes sense to diversify sources of energy supply for electricity production.

According to this model, we estimate that by 2028, two additional coal plants will be needed, and that coal production capability will reach only about 20% of the specified capacity for electricity production.

6. Analysis of Total Factor Productivity

Considering the limitations of the projected labor force, and the increase in capital stock, an average TFP increase of 2.9% a year must be achieved in the business sector. This is an ambitious goal, but international comparison shows that countries have been able to achieve similar rates in the past decade.

Table 16: Components of Increase and Rate of Change in Factors Driving Business Sector TFP (in %)

	Average annual growth rate	Components of TFP increase
Business TFP	2.9%	2.9%
Education	0.3%	0.3%
Infrastructures	0.9%	0.6%
R&D investments	7.3%	0.6%
Capital/worker ratio	3.9%	1.4%

Education - years of education of working-age population

Infrastructures - increase in transportation capital stock beyond increase in capital/labor inputs

R&D investments - cumulative investments in R&D over past seven years

Capital/worker ratio - physical capital per worker

The productivity model employed four primary macro variables:

- R&D investments:** R&D growth impacts primarily upon the advanced technology sectors, which serve as the primary engine for growth. The elasticity is about 0.15 per every percent of increase in investment in R&D (cumulative investment over the past seven years). For traditional industry sectors and trade and services sectors we assumed significantly low elasticity – about 0.05. On the model's path, we assumed that investment in business and government R&D is expected to increase from \$6 billion in 2005 (about 4.7 percentage points of the product), to about \$13 billion in 2015 (about 6% of the product), and to about \$28 billion in 2028.
- Infrastructures:** Improving transportation infrastructures is a prerequisite for acceleration of growth. For our model, we compared the growth surplus in roads capital stock per weighted unit of capital and labor in the business sector. We assume a nearly unity elasticity.
- Education:** Research shows an expected increase of 8% in TFP per each average year of education of the population of working age. Investments in human capital are expected to be a central component in the growth process, although their primary impact will be manifested beyond the time range of the forecast presented below.
- Increase in capital stock per employee:** In addition to its direct impact on sector product (through capital stock), the increase in capital stock per employee will also affect overall productivity, through assimilation of new technologies and improvements in production efficiency. Doubling capital stock per employee will bring about a significant increase in total factor productivity.

7. Employment

The Israeli economy is characterized by a high unemployment rate: about 7% of the labor force. This rate is particularly high, both relative to Israel's unemployment rates in the 1970s and 1980s, and in international comparison, especially with countries such as US, Britain and Japan.

In the path presented below, increased demand for workers enables a return to full employment already by 2012. We assumed a natural rate of unemployment (e.g., a full-employment unemployment rate) of 4.5%.

According to the forecast, in 2028 Israel will have about 4.2 million employees. About 43% of the population 15 and over will be employed.

Table 17: Forecast Summary for the Labor Market (in thousands)

	2008	2018	2028
Population	7,297	8,520	9,747
Population age 15+	5,239	6,288	7,372
Civil labor force	2,960	3,603	4,399
Participation rate as % of labor force	56.5%	57.3%	59.7%
Employed	2,732	3,445	4,205
Employed as % of labor force	37.4%	40.4%	43.1%
Unemployed	228	159	194
Unemployment rate as % of labor force	7%	4.4%	4.4%

8. Net Disposable Income, Savings and Private Consumption

Disposable income is the factor that determines the extent and makeup of private consumption and the standard of living. Taxes (income taxes, national insurance), transfer payments, and unilateral transfers from abroad determine the extent of households' disposable income.

Table 18: Forecast for Private Savings Development in Israel, in billions NIS

	2008	2018	2028
Private savings, billions NIS	65	122	234
As % of disposable income	14.5%	14.3%	14.8%
As % of GDP	9.4%	9.6%	10.1%

According to the model, tax cuts are expected to produce an increase in disposable income remaining in the hands of individuals, in contrast to the last decade, when annual product growth was 3.2% and disposable income rate was only 3%. Income from unilateral transfers, which constitute a significant share of disposable income, is expected to decrease.

Private savings in Israel came to about NIS 50 billion in 2006, about 13.5% of the disposable income. The savings rate has been rising since 2002, when it fell to a low of 7%. By international comparison, Israel has a high private savings rate.

The sharp decline in public expenditure and the tax burden will enable accelerated growth of private consumption. On the other hand, increased savings rates will produce a decline in consumption (which will free up sources for increased investment). Thus consumption is expected to increase by an average rate of 6.4%. Non-durable goods consumption (food and beverages, textile and clothing, pharmaceuticals, cleaning products, water and electricity) makes up about 38% of total private consumption. Service consumption makes up about 54% of consumption. Consumption of durable goods (electric equipment and furniture, not including vehicles) makes up only about 5%, and personal transport equipment consumption makes up about 3% of consumption.

Funding of gross domestic capital formation will come primarily from increased rates of savings and the significant reduction of the current account surplus. According to the model's outcomes, a high savings rate should be maintained (and action should be taken to moderately increase this rate), with a policy of increasing investments in the economy, even at the price of reducing the current account surplus.

9. Foreign Trade and Balance of Payments

Import and export forecasts for the Israeli economy are an integral part of the general economic model. They are derived directly from development of demand for private consumption, business investment and import of inputs for branches of the economy. According to the growth forecast, Israel's foreign trade is expected to increase during 2006-2028 by an average of 5% a year, while import and export of goods (not including diamonds) are expected to increase at an average rate of 5.5% a year.

Massive growth of export is necessary for transition to a rapid path of economic growth. Increased export is designated to finance the growth of import, which results from increased consumption, investments and raw materials.

Advanced technology sectors are expected to lead the increase in export; we assume that these sectors can grow in the future at a rapid pace comparable to that of world trade in technological products, thus maintaining the Israeli market share at a constant level (in contrast to the past decade, when the share of Israeli tech exports increased).

The advanced technology sectors need to grow by about 8.0% a year over the next two decades; according to the forecast they will comprise about 59% of the total export, as compared with 43% today. The technology sectors are expected to be led by the electronics and software sub-sectors, which will grow on average by 9% a year.

On the other hand, rapid growth of some traditional export sectors erodes Israel's comparative advantage. The process of globalization, which involves reduced duties, abolishment of quota restrictions, and transferring production to developing countries with very low labor costs, poses a great challenge to these sectors' survival. By our estimates, the share of traditional exports in the total of industrial export will continue to decrease, and its composition will change, with an increased share for traditional sectors that adopt progressive technologies and management and marketing methods.

**Table 19: Export of Goods and Services by Balance of Payments
(in billions of \$ 2006)**

	2008	2018	2028
Export of goods and services	83	160	278
Advanced technology	31	74	146
% of total	38%	46%	53%
Traditional industry	8	13	19
% of total	10%	8%	7%
Agriculture	1	2	3
% of total	1.6%	1.4%	1.2%
Tourism	2	4	6
% of total	2.7%	2.6%	2.3%
Diamonds	11	18	27
% of total	13%	11%	10%
Other	29	49	77
% of total	35%	30%	28%

The importance of the tourism sector to Israel's balance of payments is diminishing, following the sharp increase in export of advanced technology products. We estimate the growth potential of tourism to Israel at about 4.0% a year, corresponding with tourism trends in Israel over the past twenty years (meaning a smaller share for Israel in world tourism). Accordingly, income from tourism is expected to increase by about 5.2% a year. According to the forecast, a gradual increase is expected in tourists' average spending in Israel.

9.1 Import of Goods and Services

The forecast for increased consumption (private consumption, raw materials and investment products), determines the expected increase in imports to Israel. In terms of uses, growth will be led by private consumption and investments. In terms of economic sectors, acceleration is expected in the field of advanced technologies versus a moderate increase in traditional industry sectors.

The projected distribution of uses determines the make-up of and intensity of imports. According to the forecast, acceleration is expected in import of investment products and

products for consumption, while import of raw materials for production is expected to grow at a more moderate pace, following the increase in high-tech's share in export (characterized by high value per unit of weight). The scope of import also depends upon the real exchange rate of imports. We assume no decline in the real exchange rate; therefore the share of imports out of total demand will not increase.

9.2 Current Account

In 2006, there was a surplus of about \$6.8 billion in export of goods and services and unilateral transfers. Following revaluation and the proximity to full employment in 2006-2007, the surplus decreased; it is projected to be about \$4.5 billion in 2007 and about \$2.5 billion in 2008.

**Table 20: Forecast Summary for the Current Account
(in billions of current \$)**

	2008	2018	2028
Current account	2.5	1.2	0.2
% of GDP	1.4%	0.3%	0.0%
Import (exc. military)	89	200	402
Military imports	2.7	3.0	2.8
Export	87	196	396
Surplus assets vs. net external debt	42.0	57.6	65.1
% of GDP	24%	15%	8%

The severe shortage in investments in the economy's sectors reduced imports (by \$4 billion in 2006) and produced a surplus in the balance of payments. Acceleration of investments during the forecasted period is expected to erode the surplus in the current account and to serve as a source of increasing investments in the economy.)

The combination of selling assets abroad and transferring returns abroad, along with the increase in financial investments abroad, technically produces a huge increase in income from investments abroad, totaling about \$6.5 billion (as opposed to \$2.5 billion in 1999, for example).

**Table 21: Import of Goods and Services by Balance of Payments
(in billions of \$, 2006)**

	2008	2018	2028
Imports (exc. military)	82	157	274
Consumption goods	8	15	27
Production inputs	40	74	126
Investment products	9	23	42
Tourism	3	7	10
Other services	14	26	47
% of total	% of total	% of total	% of total
Imports (exc. military)	100%	100%	100%
Consumption goods	9%	9%	10%
Production inputs	49%	47%	46%
Investment products	11%	14%	15%
Tourism	4%	5%	4%
Other services	17%	17%	17%

10. Public Sector

In 2007, overall public expenditure was about 46% of the GDP, as compared with 49.7% in 1999 and 51.5% during 1995-1998. On the accelerated path, public expenditure is expected to decline to about 39%. By international comparison, public expenditure in OECD countries is about 44.5% and in the EU countries about 47.3%. The rate of public expenditure of the GDP in the US is about 36.5%.

Table 22: Public Expenditure as % of GDP - International Comparison, 2006

Israel 2006	Israel 2028	OECD	EU	US
46.5%	39%	45%	47%	37%

The increase in the public sector's expenditure reflects a number of processes, including:

- An increase of about 0.6% a year in the number of employees in the public sector
- A real wage increase of about 4.5% in the public sector to prevent wage erosion in the public sector as compared with wages in the private sector
- Increase in government purchasing by 5% a year along with significantly increased outsourcing
- Allocation of resources for treatment of vulnerable populations such the elderly, disabled and handicapped
- Exclusive allocation of resources and grants for released and reserve soldiers

The major components of public expenditure are defense (19%), education (17%), health (12%), governance and administration (10%), and social insurance and welfare (27%).

Table 23: Expenditure and Income of Broad Government, % of GDP

	2008	2018	2028
Expenditures of broad government	45%	40%	39%
Civilian consumption	18%	15%	13%
Of which: Education	7%	6%	6%
Health	5%	5%	5%
Defense consumption	6%	4%	3%
Transfer payments	12%	12%	12%
Other*	10%	10%	10%
Government income	42%	38%	36%
Tax burden	35%	34%	32%
Direct taxes	19%	19%	17%
Indirect taxes	15%	15%	15%
Public sector deficit	-3.1%	-1.7%	-2.1%

*including interest payments in Israel and abroad, security imports, investment and other

10.1 Tax Burden

The total tax burden in Israel is somewhat higher than the average in OECD countries and certainly high as compared with the US. In most of these countries, the tax rate includes transfers to pension funds, while in Israel this constitutes an independent transfer.

Table 24: Tax Burden as % of GDP – International Comparison

Israel 2006	Israel 2028	US 2004	OECD average
36%	32%	27%	36%

Source: State Revenue Administration, 2006 report

Continued reduction of the tax rate is crucial for entering an accelerated growth path. On the accelerated path, the tax rate is expected to reach about 32%, five percentage points higher than the current tax rate in the US.

Table 25: Statutory Tax Rates

	2008	2018	2028
Income taxes	21%	20%	18%
Corporate taxes	29%	20%	15%
VAT	15%	13%	13%

Table 26: Tax Burden as % of GDP

	2008	2018	2028
Total taxes	35%	34%	32%
Direct tax	19.2%	18.4%	16.9%
Tax on wages	7.8%	7.3%	6.6%
Deduction at source (on wages)	1.4%	1.4%	1.1%
Corporate taxes	3.6%	3.4%	3.2%
National Insurance	5.7%	5.7%	5.6%
Fees	0.7%	0.5%	0.3%
Indirect tax	16.2%	15.5%	15.5%
VAT	7.1%	7.1%	6.6%
Retail tax	4.6%	5.0%	5.3%
Import tax	16.2%	15.5%	15.5%

10.2 Defense Budget:

The gross defense budget (including foreign aid) is currently \$12 billion, about 8% of the GDP. Based on agreements signed in 2007, we assume that US aid will increase, in current dollar values, until 2018, and remain constant in dollar values over the following decade (real value will be eroded). The model also assumes that Israel's defense budget will increase by 1.5% a year in the first decade, while the budget taken from domestic sources is expected to increase by about 2% a year.

Table 27: Defense Budget (gross)

	2008	2018	2028
	billions NIS (2006)	billions NIS (2006)	billions NIS (2006)
Defense expenditures	49.2	58.1	66.8
Defense Ministry budget	31.1	38.7	47.3
From foreign aid	10.4	10.1	8.3
Other	7.7	9.3	11.2
	% of GDP		
Defense expenditures	7.1%	4.6%	2.9%
Defense Ministry budget	4.5%	3.0%	2.0%
From foreign aid	1.5%	0.8%	0.4%
Other	1.1%	0.7%	0.5%

10.3 Public Expenditure on Education

The expenditure on public and private education in 2006 (the last year for which data is available), was about 8.3% of the GDP. After standardization of this expenditure for age (Israel's population is younger than that of Western countries), it is slightly higher than that of the US and of the EU countries' average (6.1% vs. about 5.6% and 5.4%, respectively).

**Table 28: National and Public Expenditure on Education
(in billions NIS and % of GDP)**

	2008	2018	2028
National expenditure on education	56	100	176
Public expenditure on education	42	79	146
	% of GDP	% of GDP	% of GDP
National expenditure on education	8.1%	7.8%	7.6%
Public expenditure on education	6.1%	6.2%	6.3%

Historical data indicate that Israel's expenditure on education increases proportionately to the increase in the relevant population (ages 0-18) and the standard of living (measured in terms of product per capita, the expenditure's elasticity is close to unity). The projected increase in education expenditures was determined by this equation. It is projected that public expenditure's share out of the national expenditure on education will increase. By 2028, 83% of the expenditure will be funded by public sources, up from 75% in 2008. A large degree of substitution exists between private and public expenditure on education.

10.4 Expenditure on Health

The national expenditure on health makes up about 7.8% of the GDP (2006). Standardization of this expenditure by age indicates that the expenditure on health in Israel is in fact about 11.1% of the GDP, similar to that of the average of OECD countries. Weighted capitation expresses the relative expenditure for health by age group. Capitation allows neutralizing age differences among countries, which affect the expenditures on health.

The public expenditure on health currently constitutes only about 45% of the national expenditure on health; the remainder is financed by household funds. Thus, inequity is increased in health services provision to the population.

The forecast is based on our assumption that a shortage exists in health services, which are characterized by high income elasticity. The aging of the population and the rise in the standard of living are expected to produce a significant increase in resources dedicated to health services (improved "health basket", etc.). The forecast was based on a measure of population, standardized according to the share of health expenditure for each age group (capitation). We estimate that the expenditure on health can be increased by 3.5% per capita (standardized).

**Table 29: National and Public Expenditure on Health
(in billions of NIS and % of GDP)**

	2008	2018	2028
National expenditure on health	50	99	192
Public expenditure on health	31	63	126
	% of GDP	% of GDP	% of GDP
National expenditure on health	7.2%	7.8%	8.3%
Public expenditure on health	4.5%	5.0%	5.5%

10.5 Government Deficit and the Debt Burden

The estimated public sector deficit (broad government) for 2006 is about 1.8% of the GDP, and is not expected to deviate from this rate in 2007, as compared with the average 0.8% deficit of EU countries. Israel's public debt is indeed higher than that of the EU countries (84% of the GDP in Israel vs. 68% of GDP in EU); however, Europe completed building its infrastructure long ago (especially structures and transportation infrastructure), and has zero population growth (vs. about 1.5% in Israel). We can, therefore, enter the European debt path at a slower pace.

In addition, Israel's government still holds numerous assets whose privatization is likely to facilitate a decrease in public expenditure (the Electric Company, Israel Aerospace Industries, state lands).

Convergence of public debt (as % of the GDP) according to Maastricht criteria (60%) was set for 2017, and the debt-to-product ratio will decrease by the end of the forecasted period to about 45% of the GDP.

11. The Significance of the Continued Path (Approximately 3.7% Annual Growth)

An analysis of the growth path of the past twenty years indicates that over this period, growth per capita totaled only 1.8%, and Israel did not improve its relative standing as compared with other nations. The acceleration of world growth over the next two decades, resulting from rapid growth in China, India and central and eastern European nations, is expected to make it more difficult for the Israeli economy to maintain its competitiveness and its relative international standing.

In order to estimate the impact of various growth paths on economic development, we examined a scenario by which economic growth continues at its historic pace²³ of 3.7% a year for the next twenty years. The significance of such a growth path is an increase of 2.2% in GDP per capita.

This path is very disappointing, as it does not produce an improvement in Israel's economic standing nor utilize the Israeli economy's potential. In our estimation, on this path, income gaps and the relative poverty rate will increase, which may bring about a serious social crisis.

The main outcomes of this scenario are presented below:

²³ Adapted to the population growth rate.

Demography: Only partial improvement in trends of birth rates, productivity and labor force participation. On this path, the birth rates of the Arab and ultra-Orthodox populations will remain high (three children per woman) and the share of the majority population will decline to about 64% vs. the present 71%. The labor force participation rate will rise to about 57% vs. about 56% currently.

Growth: The long-term GDP growth rate is only about 3.7%. On this path, growth per capita is only 2.2%. Israel will not be able to keep its relative standing (22), but rather will fall to the 25-26th place among developed nations. On the baseline path, advanced technology branches will grow at the rapid rate of about 6.5%, thanks to their integration into the global economy, while the traditional sectors, which make up about 90% of the economy, will increase by only about 3.5% (as compared with the last decade's increase rates of 10% and 2.5%, respectively). As a result, the wage gaps in the economy are projected to increase, and probably, along with them, the relative poverty rate as well.

Table 30: Main Outcomes of the Baseline Path

	2008	2018	2028
Population, thousands	7296	8548	9891
Birth rate, children per woman	2.7	2.7	2.7
Participation rate, % of labor force	56%	56%	57%
Employees, thousands	2732	3295	3931
Employment rate, % of labor force	7%	7%	7%
GDP per capita, thousands \$	21	26	34
GDP per employee, thousands \$	57	68	84
Capital per employee, thousands \$	82	102	130
TFP, index 100=1996	103	116	132
Broad gov't expenditures, % of GDP	45%	43%	40%
Tax burden, % GDP	35%	34%	34%
Public debt, % GDP	82%	79%	60%

Path of Continued Demographic Trends

In order to learn of the possible impact of current demographic trends, we examined a path by which present birth rate and labor force participation trends continue. On this path, the birth rate will be about 6 children per woman in the ultra-Orthodox sector, 3.7 children per woman in the Arab sector, and 2.7 children per woman in the majority sector. The majority group's share will be only 61% by 2028, while the Arab and ultra-Orthodox sectors' proportion will reach about 24% and 15%, respectively.

If current demographic trends are maintained as regards labor force participation, the total participation rate is expected to decline from the present 56% to about 53% by 2028. Among the Arab and ultra-Orthodox groups, a decline is also projected for the average participation rate, as a result of changes in the populations' composition and the rise in the proportion of the younger group (ages 0-14).

The high birth rate in the ultra-Orthodox community will mean a sharp rise in the number of children. By our estimates, while the ultra-Orthodox's proportion in Israel's population will reach about 14% on this path, this population's share within the children's group (ages 0-14) will be about 24% (i.e., every fourth child will be ultra-Orthodox). Arabs (Arab children) will comprise about 32% of the majority group, while the proportion of children from the majority group will decline to under 50%.

Household size is derived, among other factors, from birth rates, and subsequently is large in the ultra-Orthodox and Arab communities. On the continued path, the ultra-Orthodox family size remains the same, while family size will decline somewhat among both the majority and the Arab population. Although only a small decline is expected in Arab women's birth rates, adult children's moving out of the family home earlier will somewhat reduce household size in the Arab community.

Appendix 1: The Experience of Six Small Successful Nations

Introduction

Towards formulating a strategic plan for Israel for 2028, we conducted best-practice benchmarking in six dynamic, prosperous nations, in order to learn important policy lessons which Israel may adopt to improve its level of competitiveness and to enhance its economic achievements.

This appendix summarizes our extensive study and benchmarking visits to six economies as regards international competitiveness and economic achievements, conducted in the framework of the strategic plan for 2028. The nations studied in this survey were Estonia, Finland, Ireland, Singapore, Sweden and Taiwan. These nations were chosen for their success in achieving high international economic competitiveness rankings in a global world, as well as for the relatively small size of their economies. Examining the reasons behind their success is very inspiring, and can illuminate ways to formulate national strategies and growth-producing policy measures. We must be careful, however, not to blindly apply the case of any given economically-successful nation to that of Israel, as regards its decision-making system, for example, or its export policy, or its methods for advancing technology. While the successful nations have much in common, each has its own unique national, social and institutional characteristics, which preclude the complete reproduction of strategy and policy from one nation to another. Therefore, only some of the lessons that were learned from the nations we benchmarked and which are summarized in this appendix, have been adopted for the strategic plan that has been outlined for Israel's economy and society. Some of the recommendations were not integrated into the plan, because Israel's social and cultural conditions and accepted value systems are fundamentally different from those of some of the benchmarked nations. One example is the authoritative regime of Singapore, which is quite a distance away from Israel's system of governance. While we do emphasize the differences, this does not mean that important changes cannot be made in Israel's policy that will alter its course of development. On the contrary: there is, in our opinion, considerable room for change in the Israeli economy. But the required changes must be gleaned carefully, to fit Israel's character, its democratic values, the characteristics of its labor force and its geopolitical environment. Some of the recommendations for economic and industrial policy are relevant for Israel, but do not comply with the perceptions upon which the plan was founded. For example, the proposed plan does not recommend making sweeping changes in Israel's R&D support policy from a neutral policy to one that concentrates all its resources on targeting preferred sectors.

While learning from others' experience is interesting and beneficial, not all the recommendations that appear below are part of the strategic plan for Israel's economy and society. At the same

time, it is important to recognize the processes that occur in economically-prosperous and socially-successful nations, so that we may learn those lessons that are to be taken and applied in Israel as well.

The Link Between Global Competitiveness and Wellbeing

A long-run strategy for Israel, built on a powerful vision, is not an end but a means. The ultimate objective is to enhance the wellbeing of the people of Israel.

In order for Israel to become more prosperous and for its economy to join the ranks of the leading nations in terms of living standards, Israel must become more globally competitive in world markets. Nations grow wealthy by selling in world markets goods and services that other nations need and want. This is how Israel has grown wealthy in recent years, and it is how it must further progress and build. But competition is becoming fierce. Israel must build a focused strategy to increase its level of competitiveness. .

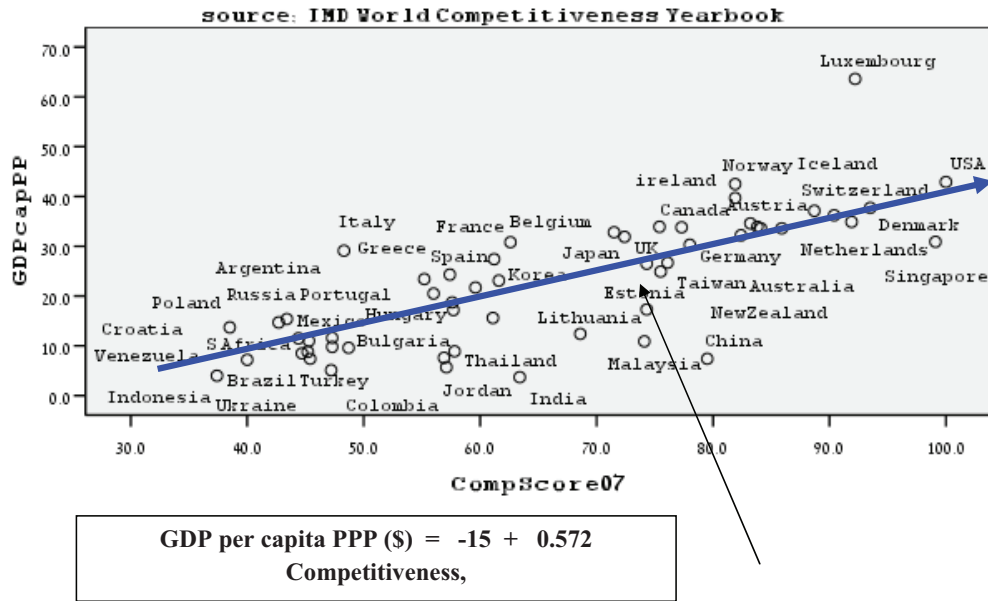
First, we present the findings of research published in the IMD World Competitiveness Yearbook of June 2007, which indicates the existence of a link between level of competitiveness and GDP per capita.

The graph below plots GDP per capita, 2006, measured in dollars and using Purchasing Power Parity exchange rates, against the Global Competitiveness Score for 2007.

The findings presented in the graph show that the adjusted squared correlation coefficient is 60 per cent (0.596), showing that 60 per cent of all variation in GDP per capita is 'explained' by only one variable: global competitiveness (the Competitiveness Score was computed on the basis of a broad array of measures that indicate the various aspects of competitiveness). To the best of our knowledge, there is no other single variable that can explain this large a proportion of cross-country variation in living standards.

Global Competitiveness vs. GDP pcap PPP \$

2006 and 2007



The graph shows that for every increase of a single point in the competitiveness score (measured on a scale of 1 to 100, with the most competitive country scoring 100), GDP per capita rises by \$572. This means that for Israel to advance from, say, today's \$26,000 per capita GDP to \$33,000, or about 30 % increase, and **to remain in that relative position**, it will need to boost its competitiveness by about 14 points, from 74.3 to about 88, roughly the score of the small dynamic nations that we benchmarked.

The question we shall address is: How did these six countries, Estonia, Finland, Ireland, Singapore, Sweden, Taiwan, all of which are more competitive than Israel (or, in the case of Estonia, approximately tied), become so successful in recent years? What can Israel learn from them, imitate, adopt and adapt, to enhance its citizens' wellbeing? How can Israel act strategically in order to capture those vital **14 points of added global competitiveness**, in an age when at least 55 nations of the world are similarly striving to improve, applying long-run strategic planning?

Below we present mini-case studies of the six nations we visited. We then conclude with six key principles Israel should adopt from these nations' experience. Adopting these principles may well bring about significant improvement in Israel's global competitiveness ranking.

The Experience of Estonia, Finland, Ireland, Singapore, Sweden and Taiwan

ESTONIA

Following the collapse of the Soviet Union, Estonia was reborn as an independent state in 1991. Much of its subsequent economic success has been due to the good choices made in the initial stages of independence. Faced with a blank slate, the Estonians installed young technocrats in key government positions after purging the old apparatchiks. These reformers instituted policies including limited government, balanced budgets, openness to international trade and investment, flat taxes, a currency board, minimal regulation, and clean and efficient regulations and services. A boom in foreign investment (largely from neighboring Finland and Sweden) brought modern management expertise and technologies.

In the waning days of the Soviet Union, Estonia began a series of moves that laid the groundwork for its future independence and economic growth. Taking advantage of the relative openness allowed by Perestroika, Estonians began to open small businesses and open trade and transportation links with Finland and Western Europe. In the late 1980's, the Estonian Supreme Soviet began transforming itself into a real government, passing decrees that reasserted Estonian sovereignty and control over economic matters and establishing Estonian as the official language.

Estonia is known for its simple, straightforward, and low-tax regime. Estonia's first post-independence tax code ran to roughly 20 pages in length, established a flat tax scheme with no exemptions, and abolished all international trade tariffs. This tax revolution was a key factor in Estonia's rapid economic growth and rapid influx of foreign investment. It initially encountered severe opposition among the public, who preferred to 'soak the rich'. While the tax code has since been amended several times and in the case of tariffs changed to match EU rules, it is still relatively simple and straightforward. The tax system has, apparently, contributed to the international competitiveness of the Estonian economy and improved the speed and efficiency of certain public services in the country.

The flat income tax rate of 22% applies to both individuals and corporations, and there is no tax on reinvested earnings. In general, the tax regime makes no exemptions or exceptions. Last year, 83% of Estonians filed their taxes online. No papers are involved – it is entirely electronic. If you are owed money, the state must pay you within two weeks, and usually the check is deposited directly in your bank account electronically.

One notable aspect of the Estonian experience is that it managed to maintain a high degree of policy continuity and consensus despite being saddled with a series of short-lived coalition governments. But despite frequent changes in personnel, the Estonian governments managed

to agree on many basic policy goals and strategies, and these were not changed. In part, this reflected the high degree of optimism and responsibility that characterized the small independent nation after so many years of Soviet domination. It also reflected the political landscape in Estonia, where the left-right divide does not correspond to those of Western Europe or the United States. In Estonia, political cleavages are based on what happened during the Soviet occupation. Those who joined the Communist Party or served in senior administrative positions in the Soviet era belong to one set of parties, while dissidents and reformers set up their own parties.

Estonia's Nordic neighbors have invested heavily in its telecommunications infrastructure and manufacturing sector, both providing economic growth and allowing Estonia to 'free-ride' on the innovation and high tech investments they have previously made. It should also be noted that tourism, especially from the Nordic countries, has been a big source of job growth for the less skilled sectors of the Estonian population, helping to keep labor force participation rates high and smoothing the transition from a communist system to a capitalist economy. Estonia has achieved major success in integrating within the ecosystems of its immediate neighbors, the Nordic system and the EU, which have generated most of Estonia's economic growth.

Israel can learn three key lessons from Estonia's experience:

- **Tax reform:** simplicity of the tax code is as important as Estonia's low rates (to be adapted to Israel's unique situation).
- **Regional integration:** Estonia has benefited from becoming a key player in the Nordic economy, as well as the European economy. Due to its unique geopolitical situation, Israel too must integrate into the economic systems of Mediterranean nations and Europe.
- **The key role of an efficient public service:** Estonia's public sector is notable for its transparency, lack of corruption, and efficient provision of public services, and has been a leader in modern IT implementation.

FINLAND

At the beginning of the 1990's, the Finnish economy suffered from a severe recession, due to the dissolution of the USSR and the downfall of the Soviet market, which was the natural market for Finnish products. This development had far-reaching implications for traditional industries, particularly its forestry and metals industries. But by the end of the decade, high-tech innovation, particularly in ICT sectors, and Finland's economic competitiveness improved substantially. This amazing turnaround merits careful study. The crisis became Finland's 'lever' for implementing a complete restructuring of its economy.

Starting in the 1980's, Finland started implementing a series of structural reforms that liberalized the financial sector, joined the European Monetary Union, reoriented the country away from the Soviet Union and towards Europe, and most importantly, began using state money and institutions to invest in high technology and innovation. The Finnish state has been extremely proactive and forward thinking with regards to innovation policy and economic competitiveness. Of all the countries in our study, post-war Finland has been perhaps the most successful in creating human capital and then harnessing those skills and creating new technologies and industries. In Finland, this success has not been due to luck or the importation of foreign skills and investment (although these two factors haven't hurt). Rather, the Finnish state has actively promoted the development of modern industries and created a culture of innovation through a series of public policies and institutions that have transformed Finnish society from a largely agrarian and natural resource-based economy to one of the most modern and competitive high tech economies in the world. Finland does not have just a strategic innovation policy – rather, it has something far more important: a strategic environment of innovation, which has been carefully crafted and is constantly fine-tuned.

Finland's innovation policy is based on its Science and Technology Policy Council, an advisory body for the government that is chaired directly by the Prime Minister and also includes key cabinet ministers (in particular the Education and Trade and Industry Ministers who serve as vice-chairs of the Council) and senior representatives from academia, private industry and labor. Senior representatives of Tekes and the Academy of Finland also have seats on the Council. The Council provides an informal platform for interactions among all the players in the system to reach consensus on important policy goals and the methods for implementation. Many of the most important initiatives of Finnish innovation policy have emanated from the Council and have been planned and implemented through it: the decision to create Tekes, the plan to boost national R&D investment, establishment of university level science and technology programs, and leading regulatory reforms and liberalizations.

Much of Finland's recovery was due to the explosive growth of Nokia, a prime example of a flourishing progressive industry and the champion of the Finnish business sector. But despite the headline-grabbing emergence of Nokia and the ITC sector as engines of Finnish growth over the last two decades, **a large proportion of Finnish jobs and economic production remain in traditional industries – especially the forestry, shipbuilding, chemicals and energy sectors.** These sectors have faced intense challenges from international competitors – often developing countries with much lower labor costs and tax regimes. And yet Finland has managed to leverage technology and sustained productivity increases to keep these industries internationally competitive and exploit new niches where midsize Finnish firms can integrate well in the global marketplace.

Israel can learn three key lessons from Finland's experience:

- Finland is an excellent example of what a 21st century industrial policy looks like and what such a policy can achieve. A forward-thinking industrial policy is not about protecting existing industries or having the state manage the economy. **Public policy promotes new technologies and innovations that have the power to create new industries or help existing ones move up the value chain by transforming themselves into more advanced, more competitive businesses.**
- **Finland has proven particularly successful at promoting strong links between universities and the private sector**, building a science and technology-focused educational system that is good at preparing students for private sector jobs and takes into account industry's long-term needs for skilled engineers, technicians and business managers. These links have resulted in high-level skilled manpower that meets the ever-changing needs of Finland's leading companies, as well as a smooth technology transfer process in which basic research generates market-driven innovation.
- **Finland has an extremely well organized public infrastructure for promoting R&D and innovation** generally. Finland's innovation policy is aimed at incremental improvements that retain market leadership, in contrast with efforts at radical breakthroughs.

IRELAND

In its edition of January 1988, The Economist titled its survey of Ireland "Poorest of the Rich". The survey emphasized that Ireland was the poorest country in north-west Europe, with a GDP of only 64 percent of the European Community average. Nearly ten years later, the cover story of The Economist was "Europe's Shining Light." It noted that Ireland had caught up to the European average GDP and was getting steadily richer. Today, Ireland is the second richest country in Europe with a GDP that is 30 percent over the European Union Average. **How this came about is one of the great stories of economic history.**

Ireland focused single-mindedly on creating a newly attractive environment for foreign investors, through its IDA – Ireland Development Authority. At the dawn of the 1990s, Ireland had created a favorable environment for growth that then benefited from the coming together of a number of external events plus one internal development. Ireland also elected to join the European Union and the European Monetary Union which eventually led to its adoption of the Euro as its currency. This had a huge positive impact. As one of the poorer countries of Europe, Ireland was eligible to receive EU structural funds, agricultural payments under the Common Agriculture Policy, and substantial R&D funding under various EU development programs. At one point, nearly 4 percent of its GDP was coming to Ireland in payments from the EU. As important was the

discipline imposed by the EU's Acqui Communautaire (the body of regulations and laws governing the single market) particularly in terms of responsible fiscal and monetary policies. The advent of the single market gave Irish producers free access to the world's biggest market.

Most importantly, however, by electing to join the Euro zone, Ireland put itself in the position of being **the only English speaking country in the zone in addition to being the country with the lowest corporate taxes, lowest wages for engineers and highly skilled technicians, the least pressure for unionization, the lowest health care and pension benefits, the best telecommunications infrastructure, a favorable exchange rate at the time, and the most generous investment incentives in Europe.** For foreign companies, and especially for American MNCs looking for a way to get inside the EU and Euro zone, a zone they feared might become a protectionist "fortress Europe", this was an offer they couldn't refuse.

Ireland's positioning was unique: for those wishing to invest inside Europe, Ireland was the best choice. The new reality drove Ireland to completely reshape its economic and social structure.

Perhaps the most important single element in Ireland's success has been its Social Partnership Agreements. Since the first one in 1987, there have been five additional national pay agreements between employees, employers, and the government. These are achieved through extensive continuing analysis by and discussion between the Irish Congress of Trade Unions, the employers association, and the government. They are undertakings to set wage levels and working conditions in accord with agreed estimates of productivity and inflation.

Israel can learn three key lessons from Ireland's experience:

- **The role of vision:** Ireland's experience demonstrates the significance of strategic planning and coordination, as well as the speed with which positive results can be realized when strategic planning is implemented. It shows how powerful a sweeping, challenging vision can be, when accompanied by practical measures on the ground to implement it.
- **The vital importance of re-invention:** Ireland faced some of the same challenges as Israel. The issue of maintaining competitiveness as a low-cost commodity manufacturer and exporter compelled Ireland to move to advance its technological capability and its new venture activity on the one hand, while also using technology to leverage its lower tech industries. Ireland's process of strategic re-invention is as important as the industrial policy itself.
- **The key role of human capital:** Ireland built its success on its excellent educational system, in which excellence is not confined to a handful of universities but spread throughout the system and through age groups, including K through 12. Its educated workforce attracted multinational companies from all over the world.

SINGAPORE

When Singapore declared its independence in 1965, few gave it much chance of survival. Its GDP per capita (in US \$ 2000 prices) was under \$2,000. Today Singapore is a wealthy country with per capita GDP substantially higher than that of Israel.

Singapore has built competitiveness strategies and then revised them on several occasions, to attract global companies, factories, technology and capital. It funds those strategies with enormous (compulsory) national savings. It accepts nothing less than world-class in key areas such as infrastructure, education and productivity.

It was generally believed in 1965 that multinational companies (MNCs) would only do labor intensive, low value added work in places like Singapore. But the government believed that fast, reliable, and inexpensive air and sea transport made it possible to move any kind of industry to a new location if there were skilled, disciplined workers and a stable, efficient government to facilitate the process. So Singapore's strategy became to **attract MNCs that would transfer technology and training and constantly upgrade their operations.**

Since the Japanese, Hong Kong, and Korean businesses were hesitant about this, **Singapore targeted the American business world.** The government wanted to create a First World oasis in a Third World region. It reasoned that if Singapore could establish First World standards in public and personal security, health, education, telecommunications, transportation, and services, it would become a base camp for entrepreneurs, engineers, managers, and other professionals who had business to do in the region.

Singapore's competitiveness strategy is defined, led and implemented by its EDB – Economic Development Board, a body whose nature and structure has been studied by many nations carefully. By the early 1970's EDB saw that the challenge for Singapore was no longer creating jobs, but what kind of jobs. EDB began to become selective about the kinds of MNCs and investment it sought to attract. From about 1973 to the early 1980's, the theme was technological catch-up, and the focus was on attracting investment from skill and technology intensive sectors such as electronics, pharmaceuticals, computers, precision engineering, and other industries that generated higher value-added per worker. In addition to the provision of ready-made industrial infrastructure, the main incentives were targeted exemptions from taxes on profits on specific investments or on income streams from certain products or from exports. Also very important was the establishment of state-subsidized training centers that were operated jointly with the MNCs to build engineering and other skills.

The government made great effort to upgrade production and to move from mere production to complex production, design, R&D, and to overall logistics management. Thus, Singapore remains today the largest disk drive manufacturing country despite having much higher wage

levels than other competing countries. The logical extension of this trend since 2000 has been to drive toward an integrated innovation economy based on what is known as the CORE strategy. The acronym CORE summarizes the key elements of Singapore's current strategy. They are: Connectivity – Openness – Reliability – Enterprise.

Singapore aims to maintain itself as the key connecting hub in Asia. The 27 million containers handled annually by the Port of Singapore make it the world's busiest port and dwarf the 10 million handled by Rotterdam. Singapore has also become a major gateway to India because it can get cargo to destinations in India faster than Indian ports. Singapore also clears 2,000 flights a week through Changi Airport to 50 cities in China and has a total Internet bandwidth of 26 terabits/second.

Singapore has shown remarkable skill and alacrity in revising and redirecting its global competitiveness strategy. Some of this effort has been led by committees that redefined Singapore's focus and built roadmaps to show how to implement the plans.

Israel can learn three key lessons from Singapore's experience:

- **Single-minded dedication to engineering a competitive, first-world oasis in Southeast Asia:** The top priority of Singapore's leaders over forty years has been to make Singapore competitive, through a variety of policies. Singapore created an efficient port and a world-class air hub with the world's best airline.
- **Emphasis on world class education:** Singapore ranks near the top in PISA international tests in science and math. Early in its history Singapore decided that it needed excellence in math, in its schools, as a foundation for educating engineers, and created such excellence.
- **Excellent infrastructures:** Singapore's ports, airport and communications are outstanding. This makes Singapore a site of choice for locating headquarters and production, even though wages are high.

SWEDEN

Following World War II, the Swedish economy entered a golden age of high growth, technological innovation, and rapidly-rising living standards. By 1970, Sweden had the fourth highest GDP per capita in the world, and was a model of the modern social welfare state. The foundations of this wealth were a number of world class multi-national corporations, a well-educated workforce, a strong social safety net and a political culture that valued consensus and egalitarianism. Eventually, Sweden lost these advantages, among other factors, due to debilitatingly high tax rates, unaffordable social welfare spending, a restrictive regulatory regime, a rigid and inflexible labor market, a bloated public sector, and an excessive number of state-owned corporations that were too often given monopoly powers in the markets. As a result, major crisis ensued,

which came to a head in the early 1990's. A massive recession hit the Swedish economy and its public debt grew to dangerous levels. Ten percent of all jobs were lost.

Sweden then 'reinvented' itself with a new strategic direction.

Following the crisis, the sense of urgency in the country was palpable, and there was recognition that the country needed wide-ranging reforms to restore its international competitiveness. This focus on competitiveness led to several major reforms of Sweden's social welfare model and its approach towards the global economy. Boosting productivity growth, encouraging high technology, opening the country up to foreign investment, tax reform and liberalizing certain product and services markets were all given high priorities during the reform era of the 1990's.

Sweden's economic success has been built on its strategic plan for building world-class human capital. Approximately 45% of Swedish students go on to university after completing high school. There is no tuition (university is free for all, even for foreigners who come to Sweden to study). In recent years, Sweden has made an effort to increase the number of students attending university. It has also tried to encourage more students to major in science and engineering programs, and although funding for these departments has been increased (and the number of students taking technical degrees doubled from 1994 to 2004), the government has fallen short of its goals due to a lack of demand.

One area where the Swedish educational system does lead the world is in adult education and life long learning. **Sweden boasts the highest levels of adult education rates in the world, which helped it through its economic and unemployment crisis.**

Despite the size of the Swedish state and budget, it is relatively free from corruption or overt politicization. **Sweden has a professional bureaucracy that is insulated from overt political manipulation through a system that maintains administrative autonomy in most Swedish government agencies.** Once a government has been formed, the Prime Minister and the cabinet set the goals, guidelines, and allocation of funding for each specific ministry and agency, but they may not decide how each agency interprets or implements laws, or how the day-to-day administrative issues (like staffing) are resolved. These decisions are variously made by the Director General of each agency (who is usually appointed from within the ranks of the agency) or the Board of Directors of each agency, which includes the Director as well as senior administrators, and sometimes representatives of the special interest groups that are affected by the agencies' operations.

Israel can learn three key lessons from Sweden's experience:

- **Share the wealth:** Sweden has been very successful in ensuring that the benefits of its economic growth and technological development are spread widely throughout its society. There have been sustained and generous investments in human capital that have produced one

the most highly skilled and educated labor forces in the world. This has been the key instrument in ensuring that competitiveness ‘fruits’ were widespread.

- **Build large corporations:** Sweden’s openness to international trade, investment and technology has allowed the country’s corporate sector to make the most of these investments in human capital, and the country’s consensus-driven political system has enabled the Swedish economy to adjust to the increased competition arising from globalization. That Sweden has done so by nurturing its large corporations at the expense of new start-ups speaks more to Swedish cultural and social values than to any fundamental weakness in its economy.
- **Governments pick winners:** Public policies in Sweden play a huge role in determining what types of companies, and what business sectors, will prosper and grow. International competitiveness and technological innovation have always been at the forefront of Sweden’s economic policy goals. The country’s business labor and political leaders have usually managed to set aside their parochial interests and work together **towards outcomes that are in the best interests of the country as a whole**. It is this national consensus that has helped Sweden to prosper and compete in global markets.

TAIWAN

Taiwan is similar to Israel from a security and defense standpoint, with a significant security problem. Its neighbor China continually threatens to take back by force what it regards as a province of mainland China. Despite this, Taiwan has achieved outstanding economic success in world markets and remarkable economic growth – its GDP grew by 5 per cent or more a year for two decades. Taiwan today ranks well ahead of Israel in global competitiveness. How is Taiwan able to focus both on its security issues and its defense, and on its global competitiveness strategy?

Like Israel, Taiwan became a place of refuge after the Communist Revolution. Two million refugees descended upon Taiwan, and the economic situation was dire. Per capital GDP was about \$100, over half the people worked on farms, the balance of trade was in huge deficit, and the whole economy was heavily dependent on U.S. aid contributions that amounted to nearly 10% of the GDP.

The economic philosophy was strongly oriented toward a state-controlled and planned economy, but the policy at this time has been well-described as the “Whatsoever Policy”, meaning whatsoever could be done was being done. In effect, there was no coherent policy, but rather a drive for survival. Yet, from these unlikely beginnings Taiwan recorded the world’s second fastest economic growth from 1952-2005 with an annual average real rate of increase of 7%, just behind Singapore’s 7.5%.

The island of Taiwan had no natural resources, and was cut off economically from its hinterland.

But like Singapore, it had a favorable colonial legacy. The Japanese had developed an educational system, trained a skilled class, and developed water reservoirs, ports, railroads, and other public infrastructure, along with a few basic industries and very productive sugar, rice, and fruit plantations. All this had been badly damaged in the war, but by 1951 production was back to pre-war levels and by 1952-53 the situation stabilized. From there the economic strategy was very similar to that of Singapore, driven by a strong government that provided complete political stability and predictability and that relied on extensive bureaucratic planning as well as market forces to develop what it called the planned free economy. The plan proceeded in four distinct stages, each with its distinctive strategic plan.

Stage Four, the latest, involved a degree of economic liberalization (particularly in the financial sector) and a shift toward competitiveness based on science and technology. Circumstances for this were favorable because the upgraded school system was just sending a large cohort of young people with a high degree of technical training into the work place. Thus, Taiwan had an abundance of young, well trained, and relatively inexpensive engineers at a moment when technology industries were globalizing rapidly. Particularly noteworthy is the emphasis Taiwan places on science and engineering education. Nearly half of all bachelor degrees are in technology, and Taiwan ranks second in the world (just behind Finland) in the percent of 24-year-olds with first university degrees in science or engineering.

That a majority of the government's top officials were trained as engineers was a significant factor in Taiwan's success. Thus, Taiwan established an integrated circuit development project as early as 1975, on the basis of American technology. Through government drive and support, the semi-conductor industry grew into Taiwan's leading, most important sector.

Israel can learn three key lessons from Taiwan's experience:

- **Security and business:** Taiwan draws a clear distinction between its defense, foreign policy and security leadership, and its business and economic leadership. The President of Taiwan focuses on the former, while the Prime Minister focuses almost exclusively on the latter. The fact that the head of Taiwan's Government defines his mandate as the advancement of Taiwan's global competitiveness and GDP growth is of great importance.
- **Extending Older Technologies:** Taiwan seems to have found the secret of using new technology to enhance and extend older and lower technology while also moving its own level of technology up.
- **New Strategic Focus:** Taiwan has developed a very strong competitive base centered on its educational and engineering/manufacturing strengths. It has done this by moving aggressively to enhance these strengths and to move upscale to do more innovative and fundamental research work. Taiwan is now investing massively in biotechnology, creating new government-sponsored institutes, despite its lacking in basic research capability in this field.

Six Key Principles For a Long-Run Strategy

1. Meta-strategy, not Strategy: It takes more than a winning strategy to build global competitiveness. It requires, rather, what may be called a “meta-strategy” – a strategic process, in which nations are capable of transforming their underlying competitiveness strategy and re-inventing themselves and their capabilities.

2. High-Level Champions: All the six dynamic countries we visited had a high-level political champion for their long-run strategy, typically the Prime Minister. The leader of the strategic process does so in an ongoing, determined manner.

3. Continuity Over Time: Every country we visited had continuity in their strategic plans. Despite changes in governments, it is essential to arrive at a consensus on strategic directions and the measures to implement them, which must not be altered when coalition governments change their leadership and composition.

4. Innovation Ecosystem: The countries we benchmarked all had a powerful innovation ecosystem, linking universities, research institutes, government ministries, corporations and the educational system in general. The systems were all well thought-out, well-funded, and well-led.

5. Social Contract: All six countries we visited had a high degree of social cohesion, built painstakingly through consensus among labor, management and government. This social cohesion made it possible to build a long-run strategic plan that shared the gains from globalization and competitiveness fairly among workers, shareholders and people in general. Without such cohesion, social strife inevitably erodes the very foundation on which global competitiveness rests. None of the six countries we benchmarked had labor strife or significant industrial strikes.

6. Focus and Specialization: Leading competitive global businesses all have a compelling value proposition – a simple one-sentence statement showing how they create value for their global customers and how they gain competitive advantage in world markets. Each of the countries we benchmarked has such a simple value proposition. A necessary condition for becoming more globally competitive is focus – a strategic plan that focuses on, say, three key industries or technologies and builds world-class capabilities in each, while setting aside the quest for excellence in others. All the countries we benchmarked had such a focus. Of course, from time to time, it changed, in line with changes in the global business environment.

Appendix II: U.S. – Israel Science and Technology Collaboration 2028

"Israel 2028: Vision and Strategy for Economy and Society in a Global World", initiated and sponsored by the U.S.-Israel Science and Technology Commission and Foundation, paints an ambitious vision of sustained economic growth and prosperity for Israel over the next 20 years. For Israel to be among the top 15 nations in terms of GDP per capita and to excel in knowledge-intensive industries, strategic cooperation between the governments of the US and Israel must continue, including academic and research collaboration. Robust cooperation will contribute significantly to the bedrock of close strategic, economic and geo-political relations between the two nations.

Following, we project a vision for US-Israel collaboration for 2028, to parallel the vision outlined in the "Israel 2028: Vision and Strategy for Economy and Society in a Global World" strategic plan:

The US will continue to be ranked as the most competitive economy in the world and in the top five in terms of GDP per capita. Israel will be ranked between 10-15 in the world in GDP per capita, and will succeed in significantly reducing income disparities and eliminating poverty.

The US will be Israel's largest trading partner. Academic exchanges will flourish. Extensive long-term research collaborations between US and Israeli scientists, involving dozens of research institutions and national laboratories will contribute to the development of innovative convergent technologies that will continue to lead the global transition to the new renewable energy-based economy and personalized health care.

More than twenty-five US multi-national industries, in ICT, biotechnology and cleantech will maintain R&D centers of excellence in Israel. Alongside robust bilateral programs at the federal level, such as BIRD, BARD and BSF, several US States will have parallel support R&D collaboration agreements with Israel. The number of Israeli firms traded on US capital markets will rank second only to Canada among the world's nations. Mergers and acquisitions between American and Israeli companies will exceed over \$5B per annum.

US-Israel economic relations will be diverse and deep, based on mutual benefit and contributing significantly to economic growth, societal well-being, job creation and the global competitiveness of both nations' economies.

"Israel 2028: Vision and Strategy", a strategic plan to place Israel among the top 10-15 nations in the world in terms of per capita GDP, calls upon Israel to enhance its competitiveness within

the dynamic process of globalization. Israeli policy makers and companies will be presented with a wide range of choices as to where they should place their emphasis in seeking global strategic relationships over the course of the next 20 years. Traditionally, Israel has looked to the US for science and technology collaboration, as well as for capital and market access. For much of its recent history, the US has been Israel's largest market, only recently challenged by Europe. In response to the opportunities offered by the EU R&D Framework programs, Israel has increasingly turned to Europe for academic and industrial science and technology collaboration. Now the emergence of the China and India as economic powers offers Israel new promising outlets for trade, and alongside Europe poses challenges to increasing US-Israel ties.

Continuing to foster US-Israel linkages for both nations' mutual economic and social benefit that will reinforce the strategic geo-political alliance, requires adopting policies to strengthen existing successful frameworks and develop new programs, in response to rapid, dynamic processes associated with global economic competitiveness. By promoting an environment of cooperation and collaboration, Israeli and US companies have been able to move exciting new technologies from mere concepts in a lab to products that strengthen both countries' positions in an increasingly competitive global setting.

Today, a diverse group of American companies maintain flourishing R&D centers in Israel, which have made significant contributions to these companies' global competitiveness. These companies include: Intel, IBM, Motorola, HP, Applied Materials, and GE Medical Systems. In addition to these models of cooperation primarily in the ICT field, strong US-Israel industrial and corporate ties are also evidenced by the extensive activities of companies like Teva in the US and Johnson & Johnson and Genzyme in Israel. Israel ranks second in the world in the number of its companies traded on NASDAQ. In addition to continuously expanding US-Israel trade and strategic industrial collaboration, there are four ongoing binational frameworks for cooperation: Binational Industrial R&D Foundation (BIRD), Binational Agricultural R&D Foundation (BARD), Binational Science Foundation (BSF) and US-Israel Science and Technology Commission (USISTC).

But the existence of these relationships today is not enough. Taking the structure and recommendations of the "Israel 2028: Vision and Strategy" as a foundation, we provide a series of policy recommendations as to how the implementation of the recommendations in "Israel 2028", if adopted, can contribute to US-Israel economic relations. And the corollary proposition: how US-Israel collaboration can contribute to the realization of the vision set forth in the plan. We believe that the following recommendations will anchor and strengthen future US-Israel collaboration by and between governments, industry and academia for the mutual benefit of both nations.

1 Government to Government

The role of governments should be focused on the creation of necessary conditions and promoting infrastructure in its broadest sense to facilitate collaboration between and among government agencies, industry and academia.

A. “Israel 2028: Vision and Strategy” recommends the establishment of an Israeli National Council for Competitiveness adjacent to the Ministry of Industry, Trade and Labor, to be responsible for competitiveness in the economy. This National Council would conduct annual international benchmarking, i.e., a rigorous process of comparative economic, social, technological and scientific measures in relation to other globally competitive nations on an annual basis. It is recommended that the US-Israel Science and Technology Commission, through the US-Israel Science and Technology Foundation, perform a similar benchmarking with respect to the status of US-Israel collaboration, as well as to recommend policies and administer programs to expand and enhance such collaboration for mutual benefit.

B. The MAGNET program of the Office of the Chief Scientist (OCS) in the Ministry of Industry, Trade and Labor supports a consortium between industry and R&D institutions that deal with generic, pre-competitive technologies. **MAGNET should be opened to participation of academic researchers and industrial partners from the US and consideration should be given to developing joint funding mechanisms for inclusion of US industrial companies as full partners in MAGNET consortia.**

C. The plan also recommends that Israeli government support policies aimed at encouraging research and development via the OCS be based on a new balance between targeting preferred sectors and continuing the policy of neutrality among the various sectors, which is the current practice to date. Target sectors would be selected on the basis of their degree of innovation and their chances for producing breakthroughs leading to activity with high business potential. **We recommend that in selecting technology targets, the OCS take into consideration the synergy between US and Israeli potential to jointly develop innovative intellectual property, as well as to acquire and implement the developments, particularly with respect to the emerging convergent technology landscape.**

D. The US has recently passed legislation to create new frameworks for binational government support for R&D in targeted fields. One such example is the US-Israel Energy Cooperation Act. A similar program for international cooperation in Homeland Security, mandated by the U.S. Congress, specifically identifies Israel as a partner, among other U.S. allies. **It is highly desirable that both governments provide adequate matching funds to underwrite these cooperation frameworks. In addition, the two governments should mandate and fund the US-Israel Science and Technology Commission and Foundation to annually monitor and measure the**

success of such targeted technology cooperation frameworks and make future-oriented policy recommendations for targeting additional areas for strategic cooperation.

E. A number of US Government agencies can be described as centers for competitiveness offering a variety of opportunities for funding, as well as facilitating international intellectual property linkages. These include the Department of Transportation, Department of Commerce (International Trade Administration, National Telecommunications and Information Administration, Economic Development Administration), Export-Import Bank, Overseas Private Investment Corporation, Office of the US Trade Representative, Department of Energy, Department of Homeland Security (S&T Directorate), SBIR (Small Business Innovation Research), etc. **It is recommended that an in-depth detailed survey of existing US government programs be performed by the US-Israel Science and Technology Foundation to determine the potential for US-Israel linkages that may be found in existing government programs.**

F. The US-Israel Science and Technology Commission and Foundation seek to identify impediments and barriers to cooperation. **It is recommended that binational funding be provided to perform an in-depth study of impediments and recommend ways and means for their removal in specifically targeted fields to be annually recommended by binational advisory panels selected by the US-Israel Science Technology Commission, such as encryption technologies, human genome research and development of stem cell technologies.**

G. The mandate of the US-Israel Science and Technology Commission and Foundation is to foster and enhance opportunities for collaboration for the mutual benefit of the peoples and economies of both nations. Bilateral US- Israel programs should target preferred areas for collaboration. Programs would be funded by the Foundation and/or other binational support mechanisms or by way of parallel support from each government for to its respective participants. Such programs should focus on two key areas: building the infrastructure for expanded collaboration between and among government, industry and academia; and grants for basic and applied research, particularly in fields likely to be impacted by the synergies in a broad range of novel, convergent technologies, such as healthcare, cleantech and biotechnology, as well as in energy, water, desert agriculture and security (physical and cyber).

H. There are four binational U.S.-Israel programs at the federal level which are actively involved in the various fields of science and technology development. These organizations include three binational Research and Development Funds - BARD, BSF and BIRD - established in the mid-1970s to foster science and technology cooperation, and the US-Israel Science Technology Commission, established in the mid-1990s. In addition to our recommendation to increase endowments for binational R&D funds, we propose that each of the two governments allocate budgets for the purpose of creating an endowment for the US-Israel Science and Technology Commission and its Washington D.C.-based implementation arm, the US-Israel Science and Technology Foundation.

2 Industry to Industry Collaboration

Israeli and American business and industry have developed extensive mutually beneficial ties. Israeli high tech industry in particular has looked to the US for strategic marketing alliances, and US companies continue to benefit from technology development and entrepreneurial talent in Israel. We seek to encourage and broaden the opportunities for mutual benefit in industry to industry linkages.

"Israel 2028: Vision and Strategy" proposes significant infrastructure investment for upgrading and advancing Israeli infrastructures over the next twenty years: about NIS 350 billion for land transportation, about NIS 20 billion for sea and air transportation, about NIS 80 billion for energy, and some NIS 40 billion for water and sewage. **Israel government tenders should be open, transparent and competitive, in particular so as to enable US companies to collaborate with Israeli companies, as well as to compete directly for contracts in this field.**

A. The Binational Industrial Research and Development Foundation (BIRD) is a good example of a long-standing program deserving of expansion that should be pushed to focus on new areas of future technology collaboration. BIRD has played a major role with US industry in championing the importance of public-private partnerships to enable innovation and competitiveness in both countries; however, the existing level of endowment does not allow it to meet current demand, let alone expand to support for larger-scale projects in alternative energy or promising new convergent technologies. **A specific policy step would be to increase the current \$110M endowment to no less than \$330M to allow it to support more that \$50 worth of joint venture industrial R&D projects per annum. Similarly, an increase in the endowment of BARD would enhance the collaboration opportunities in pre-competitive R&D in agriculture.**

B. Encouraging the creation of large **global companies** in the Israeli economy is one of the most prominent tasks in the realm of globalization for the next twenty years. In pursuing new policies to harmonize Israeli legal, tax and other corporate policies with best international practices, particular prominence should be given to the impact of Israeli companies doing business in the US. **Both governments should strive to reduce bureaucratic impediments, increase transparency, and encourage harmonization in company taxation, registration, finance, technical standards, etc.**

C. Over the coming decades, the technology landscape will be dominated by a broad range of novel, convergent technologies. ICT (where US-Israel industrial collaboration has been particularly successful) and new emerging science-intensive bio/nano/chemistry/material oriented technologies are closely intertwined and, in fact, the former enables development of the latter. A recent, important study at the Rand Corporation analyzes the unfolding technological landscape for 2020 and identifies both the US and Israel prominently as possessing the potential of countries to acquire and implement these converging new, exciting technologies. **The US and**

Israel should examine ways and means to promote and foster necessary interdisciplinary collaboration, with the active involvement of both academia and industry, that leverages Israel's strength in innovation and systems integration with US discipline and management of the technology transfer and commercialization processes.

D. The US and Israel should partner in regional economic cooperation programs in targeted areas such as water and energy. Significant economic and geo-political advantages can be generated from the establishment of solar energy power stations, involving US-Israel joint ventures in both Jordan and Egypt, and subsequent linkages in the regional electricity transmission grids.

E. The US and Israel should examine ways and means of jointly exploiting opportunities in the emerging Chinese market based on a strategic alliance US-Israel interests. Through Israel, the US may gain strategic entry into China in fields that China has defined as national imperatives, e.g., water technology, renewable energy, personalized health care and long-distance communications infrastructure.

3. Academic Collaboration

Broadening the opportunities for educational exchanges, from high school through university to graduate school and post-doctorate can provide the infrastructure to build bridges of familiarity and trust, leading to collaboration for scientific innovation. With an emphasis on excellence and quality, “Israel 2028: Vision and Strategy” envisions two Israeli research institutions in the top twenty in the world, with room for scientists from the US, with a second tier system of universities granting all levels of degrees.

A. In order to raise the international standing of Israeli universities, the number of positions for foreign post-doctorates and academic visitors must be increased, with US academics being a preferred target. Funding should be provided for programs that provide for long-term academic exchanges, establishment of centers of excellence for targeted research (perhaps co-endowed by industry) coupled with technology transfer mechanisms for taking the applied research into industry.

B. The Binational Science Foundation (BSF) is a long-standing successful program with a current endowment of \$110M. In recent years, however, the level of grants has become less attractive and not competitive with grants available within the EU Framework programs. It is recommended that the endowment be significantly increased by a factor of three, so that alongside the expanded BIRD Foundation, there will be a comprehensive answer to the challenge posed by the EU R&D Framework program.

C. The US-Israel Educational Foundation which administers the Fulbright program in Israel should be expanded so as to accommodate a significantly greater number of US post-doctorate positions at Israel universities.

D. To gain equal footing to EU Framework programs that offer funding for networking and for bringing lecturers to academic and academic/industry conferences, a program should be developed and funded to provide grants to bring US researchers to lecture at Israeli academic, professional and industry conferences.

E. Academic collaboration should also be encouraged prior to the higher education “research” stage, i.e., it should be pursued in the broadest sense through educational exchanges between high school students and teachers, and include collaboration between educational systems.

F. Establish a program to bring US engineering graduate students to Israeli universities in targeted areas, e.g., environment, cleantech, signal processing, mechanical and electrical engineering. Student’s grants would be covered and not be subject to taxation. The program could include a mentoring component with local industry.

G. Israeli universities should seriously consider offering a broad range of degree granting programs in English, perhaps in partnership with US academic institutions to attract American, particularly Jewish students. In parallel, one-year education abroad programs at Israeli universities for American students should be expanded, and similar opportunities should be developed for Israeli students who desire to spend a year studying at US universities. Funding for scholarships to enable such year-long opportunities should be raised through a public-private partnership, that might involve the Jewish Federations in the US.

Implementation of these recommendations through a variety of sustained programmatic efforts, perhaps under a coordinated umbrella organization like the US-Israel Science and Technology Foundation, will enable the realization of the vision for mutually beneficial flourishing US-Israel economic relations.

