# Education, R & D And Quality of Life

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## Some Aspects of Quality of Life

- Formal Education- K-12
- Third Mission of Higher Education
- LLL- Life Long Learning
- Research and Development
- Innovation
- Socio Economic Aspects



## HDI- Human Development Index



## Welfare State Vs. Liberal Economy

#### **Liberal Economy**

- Small Government
- Low Taxation Welfare State Vs. Liberal Economy
- Low Regulation
- High Gini Index
- Low Welfare Expenditures

#### **Welfare State**

- Big Government
- High Taxation
- High Regulation
- Low Gini Index
- High welfare Expenditures

## The Genie Coefficient



## Measuring Quality of Life

- Material Living Conditions (Income & consumption)
- Health
- Education
- Leisure and Social Interaction
- Economic and Physical Safety
- Natural and Living Environment
- Overall Experience of Life

## Trickle Down Theory

- Economic growth
- The Flow of Wealth Distribution
- Inequity and Wealth Distribution
- Laissez Faire and Inequity
- Government Intervention
- Government Regulation

## Health related quality of life

Quality of Life Health Promotion Access to Medical Facilities Medical Infrastructure National Insurance Service General Accessibility to Medical Treatment

## OECD- Regional Well Being

- ♦Health
- Safety
- Income
- Environment
- Education
- Civic Engagement
- Community
- Jobs
- \*Housing
- Life Satisfaction
- Access to Services

## Well Being Topics (Source: OECD)

	Topics	Indicators	
Material conditions	Income	<ul> <li>Household disposable income per capita (in real USD PPP)</li> </ul>	
	Jobs	<ul> <li>Employment rate (%)</li> <li>Unemployment rate (%)</li> </ul>	
	Housing	<ul> <li>Number of rooms per person (ratio)</li> </ul>	
Quality of life	Health	<ul> <li>Life expectancy at birth (years)</li> <li>Age adjusted mortality rate (per 1 000 people)</li> </ul>	
	Education	<ul> <li>Share of labour force with at least secondary education (%)</li> </ul>	
	Environment	<ul> <li>Estimated average exposure to air pollution in PM2.5 (µg/m<sup>3</sup>), based on satellite imagery data</li> </ul>	
	Safety	<ul> <li>Homicide rate (per 100 000 people)</li> </ul>	
	Civic engagement	<ul> <li>Voter turnout (%)</li> </ul>	
	Accessibility of services	<ul> <li>Share of households with broadband access (%)</li> </ul>	
Subject ive well- being	Community	<ul> <li>Percentage of people who have friends or relatives to rely on in case of need</li> </ul>	
	Life satisfaction	<ul> <li>Average self-evaluation of life satisfaction on a scale from 0 to 10</li> </ul>	

## Indicators

- Disposable income of private households per capita
   Employment rate
- Life expectancy at birth
- labour force with at least upper secondary education
- □ Population exposure to air pollution
- Homicide rate
- □Voter turnout
- Percent of households with internet broadband access
- □Number of rooms per person in a dwelling
- Perceived social network support
- □Life satisfaction

## Innovation

- The Use of New Technology, Processes and Ideas to Improve Outputs and production and to Change the environment
- Dimensions of Innovation
- Diffusion
- Sources and funding

## The Bloomberg Innovation Index

- Research and Development
- Manufacturing
- Hi-tech Companies
- Education
- Research Personnel
- Patents





# Basic R&D Data Source: CBS









## 4. National Expenditure on Civilian R&D, by Financing Sector 2012



5. National Expenditure on Civilian Research and Development -International Comparison 2013 4.5 1,800 4.0 1,600 R&D as Percentage of GDP 3.5 1,400 R&D per capita Current Dollars\* 3.0 1,200 Percentages 1,000 2.5 2.0 800 1.5 600 1.0 400 0.5 200 0.0 0 South Korea United States Japan Finland France Spain Israe (average) Switzarland OECD

R&D and Quality of Life

## GOVERNMENT FUNDED R&D



## ISRAEL NATIONAL COUNCIL FOR RESEARCH AND DEVELOPMENT

#### **Setting Priorities Through :**

- Expert Committees
  - Surveys
  - Benchmarking
    - Assessments

## Structure & Definitions

- BASIC RESEARCH
- INDUSTRIAL RESEARCH
- APPLIED RESEARCH
- INFRASTRUCTURE
- GOVERNMENT RESEARCH AGENCIES
- INDUSTRY
- HOSPITALS RESEARCH CENTERS

Government ministries' expenditure is classified by objective, according to the recommendations of the *Frascati manual* 

- **Exploration and exploitation of the earth**
- Advancement of industrial technology
- Production and utilization of energy
- Infrastructure development
- Environmental protection
- Health
- **Social services** 
  - **Exploration and exploitation of space**
- Advancement of general knowledge
  - Development of agriculture, afforestation and fishing

## Publications Total By Country (2011- Neaman Institute)



## Israeli International collaboration (Total Publications)



## Citation Index- 1992-2011



## Sweden & Israel Citation Index- 2006-2011



Thomson Reuters עיבוד של מוסד שמואל נאמן לנתוני

## BASIC RESEARCH

- SETTING PRIORITIES IN BASIC RESEARCH
- COMPETITIVE FUNDS
- EVALUATION
- OUTPUT INDICATORS

## OTHER INDICATORS

- PHD STUDENTS
- PUBLIC AND PRIVATE RESEARCH FUNDS
- VISITING COMMITTEES
- **BIBLIOMETRICS**

## Infrastructure

- The Forum for National Research Infrastructures (TELEM)
- National Council for Research and Development (NCRD)
- The Office of the Chief Scientist (OCS)
- The Ministry of Science Culture and Sport
- Investment and Participation in European and other International Programmes
- The EU Framework Programme FP7
- Funding participation in CERN European Organization for Nuclear Research
- ESRF The European Synchrotron Radiation Facility

## The Impact of Research Infrastructures



#### JET Culham



#### The EIROforum

#### **EMBL** Heidelberg

#### ILL & ESRF Grenoble

#### **ESA** Paris

### Inspiring and world leading

#### **ESO** Garching

**CERN** Geneva

## IMPLIMENTED AND INDUSTRIAL R&D

- The Magnet Programme & Mini-Magnet (Magneton)
- University Technology Transfer Companies:
- **1.** Pre Incubation
- 2. Incubation
- 3. Early growth
- 4. Ongoing growth

## UNIVERSITIES AND INDUSTRY

#### MARKET DRIVEN UNIVERSITIES

#### • TRANSLATING BASIC RESEARCH INTO PRACTICAL OUTPUTS

#### • IP POLICY

## **GOVERNMENT RESEARCH**

#### MAIN CLUSTERS:

- AGRICULTURE
- OCEANOGRAPHY AND ENVIRONMENT
- GEOLOGY AND EARTH SCIENCES
- SOCIAL SCIENCES AND PUBLIC SAFETY
- TRANSPORTATION

## THE INTERFACE BETWEEN ACADEMIA AND INDUSTRY



## COMBINED MODEL





# Higher education funding model in Israel



## Higher education system in Israel Elite Universities









# The Impact of Higher Education



**Regional Socio-**

National level

### The direct allocation for teaching

#### The basic formula for direct allocation for teaching:

$$E(t) = C(t) * \frac{B(t-3)+B(t-4)+B(t-5)}{S(t-6)}$$

**Details:** 

E=Efficiency factor C=standard time for degree B=Degree recipients S=No of students in each field of study t= budget year

## **Research allocation**

The research components are proxy indicators for research quality. There are 4 major components:

Competitive funds grants=34% Other funds grants=15% PhD degrees =15% Publications=34% M.A graduates with thesis=2%

# The process for establishing new model

- Normative cost pricing.
- Breakdown of normative pricing for constructing the main teaching, research, economic and social outputs.
- Defining the different academic subjects and build a normative pricing structure to various higher education institutions.
- Building a set of indicators for each component in the formula.
- Defining the right budget pricing for each indicator.
- Calculating the state budget for each institution's outputs.
- Finalizing the budgeting formulae.

## Alternative Model

Component weight	Component sign	Components
α	Т	Teaching
eta	R	Research
γ	S	Society
$\delta$	Е	Economy

## HEBF= Higher Education **Budgeting Formula**

- T= Teaching
- R=Research
- S- Society
- E=Economy

 $HEBF=\boldsymbol{\alpha}\cdot T+\boldsymbol{\beta}\cdot R+\boldsymbol{\gamma}\cdot S+\boldsymbol{\delta}\cdot E$ 

## Indicators



# THANK YOU

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