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OECD Reviews of Higher Education in Regional and City Development

The Galilee, Israel

SELF-EVALUATION REPORT

John E. Golub

Directorate for Education
Programme on Institutional Management
in Higher Education (IMHE

This report was prepared by John E. Golub for the Council for Higher Education in collaboration with a number of higher education institutions in the Galilee as an input to the OECD Review of Higher Education in Regional and City Development. It was prepared in response to guidelines provided by the OECD to all participating regions. The guidelines encouraged constructive and critical evaluation of the policies, practices and strategies in HEIs' regional engagement. The opinions expressed are not necessarily those of the Council for Higher Education, the OECD or its Member countries.

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Chapter 1

Overview of the Galilee Region

1.1 Geographic background

1.1.1 Description of the project region

1. The Central Bureau of Statistics (CBS) of the State of Israel defines the following seven geographic districts:

   - Jerusalem District
   - Tel Aviv District
   - Central District
   - Southern District
   - Northern District
   - Haifa District
   - Judea and Samaria.

   The Haifa District is further subdivided into two sub-districts:

   - Haifa sub-district
   - Hadera sub-district

   The map of Israel and its divisions into districts are shown in Map C.1.

2. This study covers the northern portion of Israel comprising the Northern District and Haifa Sub-district. This territory, taken together, shall be known as the *Project Region*, the *Galilee* or, simply, the *Region*. Statistical data for the Project Region has been obtained by aggregating data for the Northern District and Haifa Sub-District.

3. 6. For purposes of comparison, this study will also refer to the *Central Region* of Israel. By that term, we mean the Tel Aviv and Central Districts (in aggregate) comprising the greater Tel Aviv area including the coastal cities from about Rehovot in the south to Netanya in the north. Statistical data for the Central Region has been obtained by aggregating data for the Central District and Tel Aviv District. To be clear, districts and sub-districts are terms defined by the Central Bureau of Statistics; regions and sub-regions are terms defined in this report.

4. The Region, shown in Map 1.2, covers an area of approximately 7,000 square kilometers or about 700,000 hectares. It is bounded in the south by the broad Jezreel Valley and in the north by the political boundary with Lebanon. It runs from the Mediterranean Sea in the west to the Golan Heights massif and the Jordan River in the east with Syria and Jordan beyond. The Region comprises the following sub-regions:

    - Haifa
    - Lower Galilee
    - Upper Galilee
    - Galilee Panhandle
    - Golan Heights

5. Haifa lies on the Mediterranean Sea at the western boundary of the Region. It is geographically unique in Israel as the only place at which the mountains meet the sea. It is, by far, the largest city in the Region and an educational, cultural and economic anchor. Two towns lie north of Haifa, also on the coast: Acre and Nahariya. South of Haifa, the economic compass turns very quickly south toward the greater Tel Aviv area. Therefore, areas south of Haifa were not included in this study.

6. Moving inland from Haifa, one finds a region of rolling hills and low mountains-the Lower Galilee. The hill country of the Lower Galilee is cut by a number of valleys that run generally east-west. The southernmost of these is the broad Jezreel Valley, the breadbasket of the country. On the northern edge of the valley, the terrain climbs sharply into the mountains of the Lower Galilee with its principle city Nazareth.

7. Continuing north, the mountains subside into a second agricultural valley—the Beit Natofa Valley. Here, there is no principle town; instead, a large number of small agricultural towns and villages dot the perimeter of the valley. Further to the north, the Beit Hakerem Valley forms the northern boundary of the Lower Galilee zone. The valley lies along the main east-west road connecting Acre with Tibereas and its principle town is Carmiel. North of the Beit Hakerem Valley, the hills rise quickly into a highland region that continues unabated to and past the Lebanese border. This highland region is the Upper Galilee and its principle town is Safed, located toward the eastern limit of the highlands.

8. At the eastern edge of the Lower Galilee zone, at 210 meters below sea level, lies the Sea of Galilee, the only significant freshwater lake in Israel. The principle city in this area is Tiberias, a small resort town. To the east of the lake, the massif of the Golan Heights rises rapidly to heights of between 500 meters and 1,000 meters above sea level. The principles towns on the Heights are the towns of Katzrin and Masade.

9. The Golan in the east and the Upper Galilee in the west form the natural boundaries of the narrow, north-south running Hula Valley. The Hula, together with a narrow strip of mountains at its western boundary, protrudes northwards and forms the Galilee Panhandle. The principle town of the region is Kiryat Shmona.

10. As throughout the eastern Mediterranean basin, the climate is dominated by hot, dry breezes from the inland desert during the summer months; and by wet, cool westerlies from the ocean during the winter months. Rain is uncommon between May and September (inclusive) each year.

11. During the winter months, westerly winds bring saturated, wet air from the ocean to the eastern rim of the Mediterranean. Forced to higher altitudes by the mountains, the air cools and decompresses, leading to precipitation. Rates of precipitation are therefore strongly influenced by altitude. Being mountainous, the Galilee receives much of Israel's rainfall. Areas above about 700 meters receive snow. The average annual rainfall in the Region is 682 mm in about 70 rainy days.

1.1.2 National context

12. Jerusalem, the capital city of Israel and home to about 10% of Israelis, is the seat of the national government and a destination for tourists and pilgrims from around the world. It is not, however, the economic center of the country. After the government, its largest employers are the Hebrew University and the Hadassah Hospital system.

13. The greater Tel Aviv area is the economic and cultural engine of the country and home to over 40% of its population. The ground zero of Israel's hi-tech and financial industries, Tel Aviv has witnessed a surge in commercial real estate building. Where twenty years ago most buildings in Tel Aviv were 4 - 6 stories and the highest was 14 stories, today the sky-line is dominated by a number of 60-story buildings and dozens over 30 stories.

14. The remainder of Israel comprises two areas known together as Israel's periphery: the Negev wilderness in the south and the Galilee in the north. Though different in many ways, these two regions share two important characteristics: they are remote from the Central Region and its thriving economy.

15. The Galilee is a verdant region of rolling hills and rich agricultural valleys. Its vistas are dotted with vineyards, olive groves, and orchards; picturesque villages, towns, and kibbutzim. Its people are Jews and Arabs in nearly equal numbers with Druze and Circassians as well. The position of the Galilee has been remarkably stable over the last 20 years. Most demographic comparisons (e.g., Galilee vs. Center, Jews vs. Arabs) have not changed significantly despite overall population growth. For most Israelis, the Galilee is a vacation destination and the most beautiful part of Israel.

16. The main cities and towns in the Project Region and their populations as of the end of 2007 are shown in Table B.1. Three of the four largest (Haifa, Acre, and Nahariya) lie on the Mediterranean coast where they have access to rail transportation *inter alia*. Of the towns in the interior, the largest are Nazareth, an Arab town, and Upper Nazareth, a Jewish town. Beyond these, the size of towns in the interior quickly drops off. Of the Jewish towns, lake-side Tibereas is largest at 39.7 thousand followed by Safed (28.5 thousand) and Kiryat Shmona (22.1 thousand). Of the non-jewish towns, Arab Sakhnin in the Lower Galilee is largest followed by the Druze town of Carmel in the mountains by Haifa.

17. 1.748 million people live within the Project Region. Table B.1 shows that only about one-third of them live in towns and cities of 20,000 or larger. The remainder lives in the hundreds of towns, villages, and kibbutzim that dot the countryside. Figure C.3 shows that of 438 settlements in the Region, 345 (79%) are classified by the Central Bureau of Statistics as rural and only 93 (21%) urban. Figure C.4 breaks down the rural settlements by type and shows the preeminence of the agricultural communities (kibbutzim and moshavim) in the region. Figure C.5 breaks down the urban settlements by size. Over half the urban settlements have populations under 10,000.

1.1.3 Accessibility and deployment of HEI's

18. With most of the population of the Region living in small towns and villages, accessibility–both intra-regional and between rural and urban areas–is challenging. The area is serviced by the Egged Cooperative, the dominant bus provider, as well as by smaller bus companies. However, the hilly terrain together with the large number of villages requiring service means that bus travel can be time-consuming.

Car

19. The distances in kilometers from various towns in the Region to the two main cities in the center of the country are shown in Table B.2. In practice, a car trip to the center requires between two and three hours of driving each way.

Bus

20. The nominal trip duration for bus travel from various towns in the Region to the two main cities in the center of the country are shown in Table B.3. Travel from/to smaller towns or villages may require two buses and a correspondingly longer trip. In practice, bus travel from the Region to the center required between two and five hours.

Train

21. Train travel from the coastal cities of Haifa, Acre, and Nahariya to the center has be-come available. Travel times are approximately 33% faster than express bus. An increasingly common mode of travel is to travel by car or bus to one of the three cities mentioned and to continue by train to the center. The Israel Railway Authority has plans to expand train service into the interior of the Galilee.

Air

22. A number of towns of the Region are serviced by small airports. Currently, this mode of travel is not a significant factor in the region.

23. The 17 HEI's within the Project Region include 2 major universities:

    - Technion-Israel Institute of Technology
    - University of Haifa

    7 academic colleges:

    - Emek Yezreel College
    - Kinneret College
    - Mar Elias College
    - ORT-Braude College
    - Safed College
    - Tel Hai College
    - Western Galilee College

    6 academic colleges of education:

    - Arab College for Education
    - Gordon Teachers College
    - Ohalo College of Education
    - Oranim-The School of Education of the Kibbutz Movement
    - Sakhnin Teacher Training College

- WIZO-College of Design and Teacher Training

and 1 private research institute affiliated with a college:

- Migal-Galilee Technology Center.

24. Six of these HEI's—including both universities—are in Haifa at the western edge of the Region. The next largest, Tel Hai College, is located in Kiryat Shmona at the northern extreme of the region. Another large college, Emek Yezreel College, lies at the southern edge of the Project Region. The remainder is distributed about the interior.

25. Notable for its absence is Nazareth: The largest city in the interior of the Galilee region has no accredited college or university. However, there are plans to relocate Mar Elias College to Nazareth.

1.2 Demographic Background

1.2.1 National Overview

26. At the end of 2007, the population of the State of Israel was 7,243,600 of which 5,478,200 (75.6%) were Jews; 1,450,000 (20.0%) Arabs; and 315,400 (4.4%) others—mainly new immigrants not registered as Jews. In addition, some 110,000 foreign workers resided in Israel with legal work permits. The population lives in 2,051,600 million households. Of the Jewish population, 70% were born in Israel and 30% are immigrants. One in seven Israelis today was born in the former Soviet Union. (CBS-05).

27. Israel is a young society compared to the western economies. 28.4% of the population is in the 0-14 year age group (vs. 17% average for western countries). Similarly, 9.7% of Israelis were at least 65 years old at the end of 2007 (vs. 15% average for western countries). A primary driver for this age structure is the high fertility rate in Israel.

28. Approximately one quarter of Israelis live in one of the five cities with population of at least 200,000: Jerusalem, Tel Aviv-Jaffa, Haifa, Rishon Letziyon, Ashdod. 44% live in one of the 14 cities of at least 100,000. 41% of the population lives in the Central Region (Tel Aviv and Central Districts combined). For Jews, the portion living in the center of the country is 49%. 45% of the Arab population lives in the Northern District versus only 10% of the Jewish population.

29. Traditional nuclear families are the most common mode in Israel. Of 1.694 million families in Israel at the end of 2007, 64% include a married couple and children; 23% include a married couple without children; and 12% are single-parent families. In 57% of single-parent families, the parents are divorced. Rates of divorce and childless families are lower among Arabs than among Jews.

30. In 2007, the population grew by 1.8% or approximately 127,000 people. Most of this growth (*ca.* 111,600) was natural (151,679 births minus 39,813 deaths) while the remainder (*ca.* 15,400) is the net impact of immigration. The growth rate among Jews was 1.6% compared to 2.6% among Arabs. Among Moslems, the growth rate was 2.8%, down from 3.8% for that group in 2000.

Did you know...

- Israel is a young society with median age 29 years and a high level of tertiary education.
- With 44% Jews, 46% Arab, and 8% Druze, the Northern District is the most diverse in Israel.
- Anchored by Haifa on the coast, the interior of the Galilee is a verdant region of rolling hills and rich agricultural valleys.
- 25% of Israelis live in the Galilee.

1.2.2 Regional Features

Ethnic Landscape

31. The ethnic make-up of the Project Region differs markedly from that of the Center and is, by far, the most diverse in Israel. While the Center is over 90% Jewish, the Project Region as a whole is only 55.1% Jewish. 34.0% of the Region are Arab (Moslem and Christian combined) and another 6.8% Druze. Further breakdown of the Project Region into its component sub-regions shows that the Region is far from homogeneous. While the population of the coastal Haifa Sub-District is 81.7% Jewish, the interior Northern District is more nearly equally Jewish (43.6%) and Arab (45.5%, of these Moslem 38.1% and Christian 7.4%) with an additional 7.9% Druze. 40% of all Israeli Arabs live in the Project Region. Table B.4 compares the population breakdown by religion of the Central and Project Regions.

32. The 119,000 Druze of the Project Region (7% of the Region's population) are religiously and ethnically distinct from the Arab population and maintain an extremely strict code of conduct to assure non-assimilation. Circassians, Moslems who immigrated to Israel from the Caucus Mountains in the 18th century, similarly marry only within the sect. Nearly all Druze and Circassians in Israel live within the Project Region. The Region also includes a small number of Bedouin. Druze, Circassians, and Bedouin serve in the Israeli Army.

Age Structure and Population Growth

33. The age structure varies with type of locality as the rural population tends to have more children and a younger age structure. Thus, the median age in the Haifa Sub-District (35.5 years) is comparable to that of the Tel Aviv District (33.7 years). However, the median age in the interior Northern District is markedly lower (25.9 years) (CBS-03). Similarly, children aged 0-17 constitute 36.4% of the population of the Northern District compared to 25.1% in Tel Aviv and 33.2% nationwide (CBS-07).

34. Although natural increase is the main source of population growth in the Project Region, migration-both internal and international-plays a role in shaping the demographic and socio-economic landscape. Table B.5 shows the population change in the two sub-regions of this study between 1995 and 2007 together with national data for comparison.

35. Population growth in the rural Northern District mirrors the national trend and largely reflects natural increase. However, there is also significant population loss to the center of the country through internal migration balanced by new immigrants to Israel who settle in the district. In 2007, 2,400 persons left the district. According to some sources, skilled graduates frequently leave the region to pursue careers in the Center.

36. Population growth in the Haifa Sub-District over the same period was sharply lower. Data on sources of population growth is not available at the sub-district level. However, data for the Haifa District suggests that a high rate of emigration and low rate of immigration are significant factors.

Health and Wellbeing

37. Israel has a superb public health system including universal insurance coverage. Coverage is provided by five sick funds and health insurance premiums vary with the individual's level of income. Mobility between the sick funds, guaranteed by law, creates competition be-tween providers. Despite these positive features, there is significant variability throughout the country in the public health landscape, in medical infrastructure and in the accessibility to medical services. According to one expert (BIS-01), there are three important differences be-tween health care and wellbeing in the Northern Region compared to the country's center.

    - Whereas public health in the center of the country is similar to that of other industrialized western countries (low infant mortality, cancer, diabetes, heart disease, etc.), the picture in the Galilee contains also elements found in the third world (higher infant mortality, infectious diseases, brucellosis, hepatitis, etc.).

- The hospital infrastructure in the Galilee is inferior to that of the Center. For example, Table B.6 shows between 2.50 and 2.70 beds per 1,000 population in the major cities but only 1.58 beds per 1,000 in the Galilee. In certain areas such as rehabilitation, the difference is even more extreme.
- Accessibility to medical specialties is inferior to that found in the Center. Often, residents have to travel to Haifa for specialized care.

38. In light of the above, it is important to note that the State of Israel is planning to open a new medical school. According to a recent decision by the government (PMO-01), Israel's fifth medical school will be located in the Galilee city of Safed. This project, should it be realized, is intended not only to improve medical care in the Galilee, but to stimulate capacity building and economic growth throughout the Region. The new medical school and its regional implications are discussed further in Section TBD.

Levels of Deprivation

39. According to Israel's National Institute of Insurance, poverty levels in Israel are significant and have significant geographical and demographic variations. Whereas in the Center, 13% of people (and 20% of children) live below the poverty level, the corresponding numbers are 18% (31% children) in Haifa and 32% (45% children) in the Galilee (BTL-01). Arabs tend to have higher rates of poverty than Jews. In the Northern District 16% of Jews are poor versus 51% of Arabs according to the National Institute of Insurance.

40. Several factors may mitigate this profile of deprivation in Israel in general and the Project Region in particular.

- There is significant undeclared and in-kind income (BOI-01).
- Universal health insurance means that even the poor receive health care.
- Income maintenance allowances usually assure that the poor do not become destitute.
- Home ownership, multi-family living, and a social structure based on extended families provide a further safety net against destitution.

1.2.3 Internal migration

41. The rate of internal immigration was positive in the Central District alone among Israel's districts. In all other districts-including the Project Region-internal immigration was negative, i.e., more people moved out of the region than moved in. More than 500,000 residents (7% of the population) changed address in 2007. Most (52%) moved within their town while less

than half (48%) moved to a different town. 88% of those who changed towns were Jews while only 6% Arabs. Among people who relocated to a new town, 42% remained within the same district. In the Northern District, the figure is 51%. Among Arabs who relocated in 2007, 68% remained in the same district versus 42% for the general population.

1.3 Economic and Social Base

1.3.1 Social and cultural characteristics of the region

42. The region is a rich patchwork of different social and cultural traditions spanning the spectrum from very traditional societies to modern, western modes of living. This richness is further enhanced by lifestyles that vary from urban to village and from private to communal.

43. Among the traditional, rural populations, an important characteristic is the low mobility. For example, in the case of the Druze, young people almost always return to the village after army service and/or tertiary studies. Among other reasons, Druze must live in the village in order to marry. Consequently, private sector work opportunities for young Druze are limited to the vicinity of the village. Since these opportunities are few, and since the Druze are valued in the security services as loyal citizens and native Arabic speakers, many Druze men pursue careers in the army, police, and border police. The low rate of internal migration among Israeli Arabs indicates that similar considerations may apply to this group, as well. The higher rate of internal migration among Jews in the Northern District may indicate in in-creased ability/willingness to relocate in pursuit of career.

44. Thus, the region appears to suffer from at least two problems relative to its educated population: a brain drain as educated people move to the center of the country in pursuit of careers; and educated local people who seek work below their qualification level due to scarce demand for knowledge-based jobs in their area.

1.4 Governance Structure

1.4.1 No regional government

45. Israel has a central (national) government system and a local government system. There is no regional government. Within the national government, there is a ministry for the development of the peripheral regions (Ministry for the Development of the Negev and Galilee). Within this

ministry, there is an authority for the Galilee (Galilee Development Authority).

Did you know...

- The Galilee is not a state or administrative region; there is no Galilee government.
- There are approximately 50 city, local, and area councils in the Galilee.
- At the national level, the Galilee Development Authority is specifically tasked with regional development.

1.4.2 Local government

46. There are three forms of local government. Cities are governed by a city council. Towns are similarly governed by a local council. Regional councils aggregate several small towns and villages. With only a handful of exceptions, councils are either wholly Jewish, Arab, or Druze, etc. In total, there are 251 local governments in Israel. Their different types in relation to one another are shown in Figure C.6 and Figure C.7.

47. Local government is funded through a combination of local taxes and national fund-ing. Local revenues vary greatly depending on the socio-economic level of the population. At the high end, local revenues of Tel Aviv-Jaffa constituted 85% of total income in 2007. In Shagur, an Arab town in central Galilee, only 30.8% of total income was derived from local sources. The balance is provided by the national government. In 2007, 43% of local authorities reported operating deficits. Thus, local government is substantially–often critically–dependent on funding from the national government (CBS-02).

48. Responsibility for primary and secondary education is similarly divided among four stakeholders. The Ministry of Education is responsible for overall policy including curriculum and matriculation examinations. Schools are administered locally; however, teachers may be employees of either the local authorities or the Ministry. In addition, there is a strong teacher's union and a system of life-long tenure. These factors, coupled with a chronically low rate of teacher pay, contribute to a negative trend in primary and secondary education throughout Israel.

49. Local authorities have no formal influence over the provision of tertiary level education and research and development. Nevertheless, there are

numerous examples of interaction and responsiveness among the parties. For example, Tel Hai College recently introduced a program on viticulture in support of the local wine industry. However, there is no formal channel or mechanism through which local authorities affect such initiatives. The influence of local authorities over higher education policy is mainly a matter of direct contact with HEI management or lobbying the CHE and PBC for desired changes. Influence on research pro-grams is non-existent as research is driven from the bottom up and assessed based on excellence.

1.4.3 National government

50. The primary national stakeholder in regional development is the:

    - Ministry for the Development of the Negev and Galilee

    within which there operates the:

    - Galilee Development Authority (GDA).

    Other national stakeholders include

    - Ministry of the Interior;
    - Ministry of Infrastructure;
    - Ministry of Industry, Trade and Labor;
    - Ministry of Education;
    - Ministry of Science and Technology; and
    - Prime Minister's Office - Desk for Arab Affairs

    In addition, one ministry is tasked with development of the non-Jewish populations. Since nearly half of these reside in the Project Region, this ministry has a special interest in regional development. It is the:

    - Ministry for Minority Affairs.

    To this list, we must add the two bodies responsible for planning and implementation of higher education policy. They are the:

    - Council for Higher Education; and
    - Planning and Budget Committee.

    There is no single forum to facilitate planning, coordination, or communication between these bodies. However, once per year, the GDA organizes a national conference attended, typically, by ministers and high-level stakeholders.

51. Israel's national commitment to development of the Galilee region is driven by several factors. Among them:

- Desire to wisely exploit a major land reserve in a small country;
- Desire to improve Israel's economic position;
- Desire to reduce socio-economic disparities and share opportunities within Israel.

It is widely agreed by stakeholders that higher education can and should play a role in development of the Galilee region. However, regional development has mainly entered higher education policy-making in relation to the decision if/when/where to open new institutions.

Chapter 2

Characteristics of the Higher Education System

2.1 Overview of the Israeli national system of higher education

2.1.1 Enrollment

52. As of 2007, 219,157 students were enrolled in 62 HEI's in 7 universities, 27 academic colleges, and 27 academic teachers colleges in Israel (CHE-01). Their breakdown by degree program and HEI type is shown in Table B.7. In addition, 40,006 students were enrolled in the Open University and 6,705 in Israeli branches of 10 foreign universities. (CHE-01)

53. Overall, the number of students enrolled in HEI's increased by 1.8% in the 2006/7 academic year compared to an annual growth rate of of 8.4% between 1989/90 and 1999/2000.

54. The clearest trend is the rise to prominence of the academic colleges. In 2006/7 the enrollment in first degree programs at the academic colleges increased by 8.7%, down from an annual rate of 24.7% between 1989/90 and 1999/2000. By contrast, first degree enrollment at universities dropped by 0.7% in 2006/7 (compared with an average annual increase of 4.8% over the previous decade). In academic colleges of education, there was also a decline of 3.0% in first degree students in 2006/7 compared to an average annual increas of 18.8% during the 1990's. (CHE-01)

55. The gain of market share by the academic colleges is similarly reflected in data on second degree enrollments. The number of students enrolled in second degree programs at universities declined by 3.2% between 2005/6 and 2006/7 compared with an average annual increase of 6.5% during

the previous decade. By contrast, second degree enrollment is up at the academic colleges: In 1998/99, academic colleges began granting second degrees an din 2006/7, 4,120 students were rerolled in second degree programs at those institutions–an increase of 11.1% compared with 2005/6. At academic colleges of education, enrollment of second degree students increased by 69.9% over the past year.

56. Academic colleges now grant more first degrees than universities in Israel. In 1989/90, the number of students enrolled in first degree programs at universities was five times the number enrolled in academic colleges and academic colleges of education. By 1999/2000 only 56% of first degree students were at universities. And in 2006/7, the university percentage dropped to 45%. Consequently, academic colleges and academic colleges of education are now the dominant provider of first degrees in Israel.

57. There are important differences between the colleges and the universities with regard to field of study. In the 2006/7 academic year, the academic colleges and academic colleges of education captured 92.2% of education students, 80.6% of law students, and 84.1% of students of business and management studies. By contrast, the universities dominate in the arts and sciences: humanities (73.6%), social sciences (85.2%), medicine and related fields (100%), mathematics, statistics, and computer sciences (96.5%), physical sciences (79.1%), biological sciences (100%), agriculture (100%). The students in these fields constituted 72.8% of all first-degree students at universities.

Did you know...

- As of 2007, 219,157 students were enrolled in 62 HEI's in Israel.
- Overall, the number of students enrolled in HEI's increased by 1.8% in the 2006/7 academic year compared to an annual growth rate of of 8.4% between 1989/90 and 1999/2000.
- Academic colleges now grant more first degrees than universities in Israel.

2.1.2 Demographics

58. Women constitute 55.7% of all students: 54.8% at universities, 47.1% at academic colleges, 54.9% at the Open University, and 80.9% at colleges of education.

59. One-third of all Arab students in first degree programs were enrolled in colleges of education and approximately one-third at universities. Arab students constitute 11.2% of the student population at universities, 5.7% at academic colleges, and 30.9% at colleges of education.

60. Nearly half of students live in the Central District or the Tel Aviv District; 27.9% of students at HEI's live in the Haifa and Northern Districts; 12.4% in the Souther District; 8.2% in the Jerusalem District; and 4.5% elsewhere.

61. Half of all students lived in localities with high socio-economic clusters: 7 – 10. By contrast, 29% of students lived in localities at the low end of the spectrum: 1 – 4.

2.1.3 Research and teaching missions

62. The stated mission of the seven research universities is excellence. According to the CHE annual report,

> "The research universities shall maintain and develop scientific excellence; create knowledge at an international scientific level; create focal points of scientific knowledge and infrastructure; train the scientific reserve of Israel; train academic staff for a growing higher education system; train professional leaders at the highest level in engineer-ing, medicine, law, and management; train teachers at the highest level; maintain and develop a culture of the arts and sciences." (PBC-01)

63. Teachers at the academic colleges and academic colleges of education teach longer hours than university staff. This difference reflects the Council's desire that the colleges fill first and foremost a teaching mission. Moreover, colleges receive no PBC funding for research infrastructure. Nevertheless, college teaching staff perform independent research. In fact, research activity and excellence is an important factor for college staff to advance in academic rank as for the tenure process.

64. The CHE decided against the creation of a new research university during the five-year plan that began in 2006. (PBC-01, Ch. 2, pg. 3)) However, on May 2, 2005, the Government decided in principle on a research university in the Galilee. This decision reflects in part the positive perception surrounding the expansion in recent years of Ben Gurion University of the Negev in Israel's southern periphery. A desire to replicate the successful experience in the Negev was clearly one factor in the Government's decision.

2.1.4 Management structure

65. Whereas primary and secondary education is handled by the Ministry of Education, the government sought to achieve a degree of insulation of the higher education system from the political process by creating a Council for Higher Education (CHE). The Council is chaired by the Minister of Education and composed of 25 members appointed by the President of the State of Israel. Two-thirds of the Council members are senior figures in the academic community; the remainder comes from outside the academic system. In a further effort to avoid conflicts, the government created a committee of the Council called the Policy and Budget Committee (PBC) whose responsibility it is to plan and administer funds. The PBC is uniquely authorized to determine and administer funding policy for HEI's. It negotiates a lump-sum funding level for the entire system with the Treasury and then allocates funds to HEI's according to its policies and formulae. In recent years, the PBC's total funding was approximately NIS 6 billion, about 2% of the total budget of the State of Israel.

66. HEI's are funded according to a formula that is based mainly on headcount. Approximately 75% of costs are covered by PBC funding while 25% of costs are collected through student tuition fees of about NIS 10,000 per year, comparable to one monthly gross salary or two monthly net salaries.

2.2 Access

67. Admission to an HEI is based on a weighted average of scores on three sets of exami-nations:

    - National matriculation examinations;
    - High school grade point averages;
    - National psychometric examinations.

    Admission is on a per-department basis with each HEI and each department setting its own acceptance threshold based on a weighted average of scores.

68. In its most recent report, the PBC lists the following reasons for low enrollment rates in Israel's northern and southern peripheral regions:

    - Low motivation due to psychological barrier or low self-esteem;
    - Fears due to concerns about direct and opportunity costs;
    - Many young people from the periphery believe that higher education is beyond them or that they are not suited for higher education;

In response, the PBC in collaboration with the Hesegim program a program to encourage enrollment. The program began working in 2003 and operated in 31 communities as of 2006. The program provides information and advisory services through a series of community centers. Each community has a community program leader who is tasked with locating potential students and counseling them throughout the enrollment process and the entire degree.

69. Most HEI's run pre-academic preparatory study programs. These programs are meant to increase access by providing students an opportunity to improve grades and meet admission requirements.

70. The CHE and PBC have recognized a trend toward higher education in the ultra-orthodox population. In response, they have funded several pre-academic institutes tailored to the cultural needs of this population and located in centers of the population. In the project region, the Technion has recently opened a pre-academic program for ultra-religious. The importance of providing access to a segment of the population that has been historically under-represented in Israel's hi-tech economy cannot be overstated.

71. In 2000, the PBC created a budgeted framework to encourage enrollment by Arab students. The relevant steering committee, chaired by Prof. Dan Amir, solicited projects in the areas of:

    - Support courses for Arab students directed at reducing the drop-out rate;
    - Mentorship programs;
    - Arab-speaking advisorship;
    - Arab-speaking pre-academic institutes;
    - Information centers in the Northern District;
    - Scholarships for Arab doctoral students.

72. Alternatively, a student may be admitted to second year university studies by success-fully completing a first year at the Open University. Each HEI and each department sets its own requirements for study at the Open University.

2.3 Regional dimension within the national higher education policy

73. The primary mechanism through which national education policy makers have influenced regional development is through the decision to open new HEI's. In the Galilee, this has been a two-step process. Initially, a number of colleges were opened in the interior of the Galilee as branches of

established universities. Subsequently, the colleges became independent, degree-granting, accredited institutions. In this way, there have been a number of new colleges added to the Project Region in recent years. These new additions seek to increase the geographical footprint in the Region. They also address demand for Arabic-language programs. Noteworthy in that respect are Sakhnin College for Teachers and Mar Elias College.

74. As indicated above, there has been a government decision to create a new, fifth medical school in Israel and to locate it in the Galilee. The decision to place the school in the Galilee is manifestly an attempt to repeat the success achieved in the southern Negev region through the opening of Ben Gurion University of the Negev and a major hospital in the city of Be'er Sheva. While the government has taken the decision in principle to create the school, the project has not yet been funded, nor is there a committed schedule.

75. In light of the anticipated fifth medical school, the Council has taken a decision to prioritize and encourage the development of study programs in related fields. Safed College, located in proximity to the anticipated medical campus, has applied for programs in health, social work, and medical imaging. The new medical school intends to pioneer a new, community-based approach to health care. Safed College, consequently, anticipates a need for workers trained paramedical workers who are comfortable in the Galilee's highly diverse cultural landscape.

76. A critical component in the incentive system for faculty members is the promotion process. In all HEI's—colleges as well as universities—applications for promotion to professor rank (Associate Professor or Professor) or for tenure are handled centrally by a committee of the CHE. A main criteria are excellence as measured by quality and quantity of publications, it being understood that the output of a college faculty member will be less than that of university faculty because of the difference in teaching load and research infrastructure. Thus, in the colleges as in the universities, academic research is the essential measuring rod for advancement.

77. There have been several attempts to encourage collaboration and enhance competitiveness nationally. The Israel Export Institute offers information, workshops, and training to enhance the transition from local to international trade. It has opened a branch office on the campus of ORT-Braude College in the Galilee. The new MALMOP program of the Ministry of Science intends to serve as a clearinghouse to encourage business-to-business collaboration in areas of relative strength. Similarly, the Israeli Technology Transfer Organization presents, in a single website, information about commercialization of technologies developed in Israeli universities. However, none of these programs has a regional dimension and only the MAL-MOP program, now in its infancy, addresses collaboration of any kind.

Did you know...

- HEI's in the Galilee include 2 universities, 8 academic colleges, and 5 academic teaching colleges.
- 28% of Israel's HEI students live in the Galilee.
- Nationwide, women constitute 55.7% of all students: 54.8% at universities, 47.1% at academic colleges, 54.9% at the Open University, and 80.9% at colleges of education.
- Nationwide, Arabs constitute 11.2% of the student population at universities, 5.7% at academic colleges, and 30.9% at colleges of education.

2.4 Regional higher education system and governance

78. Higher education in the region is provided by two major research universities (Technion and University of Haifa) that form the flagships of the system and an additional 14 colleges. About half of these—including both universities—are on the coast and the remainder in the interior. Five of the colleges (Oranim, Sakhnin, Arab, Kinneret, Safed) began life as teacher's seminars and grew to become accredited academic colleges in recent years. Others began as branches of large universities in the center of the country and grew to become independent institutions.

79. Historically, the University of Haifa has produced many of the region's leaders and educated elite in areas of social and political science. The University's focus on these areas (it defers to the Technion in science and engineering) together with its location make it a regional hub for non-technical higher education.

80. The Technion is a magnet for the best science and engineering students in the north as throughout the country. Its role is primarily national and international. However, there exist historical ties to the region and a tradition of practical engineering research and development using the Haifa and Galilee regions as laboratories.

81. The former teacher seminars have a long history of supporting the region by providing trained teachers. The region suffers a chronic shortage of

teachers compared to the center of the country. The particular requirements of a career teaching in the Galilee—multi-lingual, multi-cultural—explain in part the unique connection these institutions have with the region.

82. As at all publicly funded HEI's in Israel, approximately 25% of costs are covered by students through tuition payments. The remainder is funded at the national level. There is no funding or management at the regional level. Similarly, there are no NGO's or other regional organization with strategic responsibilities or interests in the higher education system.

2.5 HEI's in the Project Region

83. The 17 HEI's in the Project Region are shown in Table B.8.

Chapter 3

Contribution of Research to Regional Innovation

3.1 Framework conditions for promoting research and innovation

84. Since the early 1990's, Israel, a small country poor in natural resources, has pursued an economic strategy based on exports driven by technical innovation. As of 2007, Israel exports 43% of its GDP led by diamonds, pharmaceuticals, electrical apparatus, aircraft parts, and electronic integrated circuits. 13.9% of its workforce is academic professionals. Of the 332 non-US companies traded on the NASDAQ in 2006, nearly one in four were Israeli (NAS-01).

3.1.1 The national investment in civilian research and development

85. Israel invests heavily in civilian research and development (CBS-11) and, since 2001, has been recognized as the world leader in civilian R&D investment measured as a percentage of per capita GDP. The national investment in R&D by operating sector and financing sector is shown in Table B.10. In 2007, the total investment in R&D was NIS 29.5 billion or 3.9% of GDP compared to 2.1% for an average of OECD countries. By comparison, other countries with small populations, a GDP comparable to Israel's, and that have attained high economic development had lesser rates of R&D investment as of 2007: Ireland (1.29%), Denmark (2.55%), and Finland (3.44%).

86. Most of Israel's R&D is carried out by the business sector—76.5%. An additional 14.2% was carried out within the higher education system. In-

vestment in civilian R&D grew between 1995 and 2007 at an average annual rate of 8.3%. During that period, the national R&D investment grew-both in absolute terms and as a percentage of total-in every year except 2003.

87. Most of Israel's R&D is funded privately—75.5%. Only 17.7% of the national R&D investment comes from government sources. By comparison, 64% of R&D is funded by the private sector in OECD countries, on average, and 70% in Japan and Finland, countries with innovation-driven economies.

Did you know...

- National framework conditions for innovation are highly developed.
- Israel leads the work in civilian R&D investment measured as a percentage of *per capita* GDP.
- 76.5% of R&D occurs in the business sector; 14.2% within the higher education system.
- 75.5% of Israel's R&D is privately funded.
- Israelis received 1,496 US patents in 2008, 208 patents per million inhabitants.
- Israel was ranked 3rd worldwide in scientific publications with 1,334 per million inhabitants.
- In 2008, Israeli high-tech companies raised $2.08 billion in venture investments.

3.1.2 Labor participation in research and development

88. As of 2005, approximately 47,000 people worked in R&D (exclusive of HEI staff) corresponding to 6.5 per 1,000 population, comparable to Sweden, Finland, and Japan. By comparison, OECD countries have an average of 3 researchers per thousand inhabitants.

89. The Israel Defense Forces have traditionally been a supplier of highly skilled engineers to the R&D labor force. Many soldiers emerge from three years or more of army service as trained and experienced engineers before even entering the higher education system. Others combine extended military service with a bachelor's degree. The army creates a steady stream

of personnel skilled in electro-optics, radio-frequency engineering, computer science, information technology, cryptography, applied mathematics, industrial management, human resources, system integration, project management, and more.

3.1.3 Rates of patenting and scientific publication

90. Rates of patenting are also indicative of framework conditions for research and innovation. In 2008, the US Patent and Trademark Office issued 1,496 patents to Israeli inventors, corresponding to 208 patents per million inhabitants. By comparison, OECD countries patent at a rate of 43 per million inhabitants per year. (The comparison neglects patents issued in Europe and Japan to Israeli inventors.)

91. Rates of scientific publication are similarly indicative of framework conditions for research and innovation. According to a 2003 report by the Institute of Scientific Information (ISI), Israel is ranked 3rd (after Switzerland and Sweden) with 1,334 publications per million inhabitants.

3.1.4 Intellectual property ownership

92. Under Israeli law, the intellectual property rights in any invention are held by the inventor's employer. That is, inventions by an employee are treated as "works made for hire." Thus, HEI staff must commercialize their inventions through the HEI technology transfer organization. Each HEI has its own policy and formula regarding profit sharing. According to a typical arrangement, revenues from the commercialization of a university-developed technology are divided in three equal parts to the inventor, the inventor's research laboratory, and to the institution.

3.1.5 Venture (Risk) capital

93. Israel has a thriving venture (risk) capital community. According to the Global Competitiveness Report, Israel is ranked 2nd worldwide (after the United States) for availability of venture capital. In 2008, Israeli high-tech companies raised $2.08 billion in venture investments according to the Israel Venture Association (IVA-01).

94. The Technion (along with other major universities outside the Project Region) has created a seed investment fund to facilitate commercialization. The Technion also operates a technology incubator where qualified early-stage companies get office space, mentorship, and support.

3.1.6 Office of the Chief Scientist of the Ministry of Industry, Trade and Labor

Overview

95. The primary state vehicle for driving innovation is the Office of the Chief Scientist (OCS) of the Ministry of Industry, Trade, and Labor. The OCS operates under the Law for Encouragement of Industrial Research and Development (1984). The OCS has two primary missions: local innovation and foreign co-operation. The OCS offers a stunning array of programs to support innovation, collaboration within industry, collaboration between academia and industry, collaboration with foreign industrial partners, technology transfer, and participation in international programs. A chart showing the OCS programs is shown in Figure C.8.

96. OCS programs are divided into two areas: international and local. Local programs are further subdivided into *competitive R&D* and *generic R&D*. Competitive R&D comprises innovation programs targeting a visible business opportunity. Generic R&D seeks to provide a competitive position for Israel's industry with regard to state-of-the-art technologies of global interest. International programs are administered by MATIMOP–Israeli Industry Center for R&D and include an array of bi- and multi-national funds and co-operation agreements including full participation in the European Union's Framework Program for R&D; and other international activities.

Best practice...

- The Office of the Chief Scientist (OCS) of the Ministry of Industry, Trade, and Labor offers a stunning array of programs to support and encourage innovation, commercialization, technology transfer, and international partnership.
- Most programs offer soft loans based on collaborative innovation.
- In 2006, the OCS's *R&D Fund* derived $132 million from project royalties and reinvested it in the fund.

Local OCS programs—competitive

97. The *R&D Fund* is the main support channel of the OCS, in terms of budget, and it is open to all Israeli registered firms wishing to engage in

technology research and development. Proposals are evaluated by experts and approved finally by the Research Committee chaired by the Chief Scientist. The annual budget of $250 million is spent on about 800 projects undertaken by 500 companies. Grants are provided as a percentage (up to 50%) of the total approved R&D expenditures. The grants are structured as a conditional loan: in case of commercial success, it is subject to royalty payments of 3% - 5% of sales; in case of non-commercialization no repayment is required. Royalties received are returned to the R&D Fund. In 2006, the OCS derived $132 million from project royalties.

98. The *Technology Incubator* program was introduced in the beginning of the 1990's, in response to a wave of immigration from the former Soviet Union. Its mission is to support the earliest stages of technological entrepreneurship and to prevent the waste of commercially viable ideas due to lack of resources. The incubators, with an annual budget of $30 million, are supportive frameworks that enable novice entrepreneurs to establish their own company and translate their innovative concepts into commercial products. Currently, there are 24 Technological Incubators in Israel, 15 of them located in peripheral areas, with approximately 200 R&D projects being carried out at any given moment. In 2002, the program initiated a privatization process and since then, many investment groups and venture capital firms (foreign and local) have invested in, and taken ownership over, the incubators. The R&D grant provides 85% of the approved R&D expenditures (budget of $350,000 - $600,000 for two years), with the remainder to be invested by the incubator itself. The grants are, in effect, soft loans to be repaid by the incubators in case of commercial success only. As of July 2007, the total cumulative private investment in incubator companies surpassed $1.8 billion. Moreover, in recent years, incubator projects have raised privately more than twice the initial investment made by the government within two years of their admission into the program.

99. The *Tnufa* program supports technological innovation by assisting individual entrepreneurs and start-up companies during the pre-seed stage. Support includes assistance in evaluating the technological and economic potential, patent disclosure preparation, prototype construction, business plan preparation, establishing contact with the appropriate industry representative, and attracting investors.

Local OCS programs—generic

100. The *MAGNET* program is intended to provide a competitive position for Israel's industry with regard to state-of-the-art technologies of global interest. The new technologies are developed in a cooperative venture between industry and academic scientific research institutions and provide the basis for new high-tech products and processes. Funded programs must be

part of a broad spectrum of common technologies, components, materials, design, and manufacturing methods and processes, standards and protocols which have wide ranging applications in numerous industries. The MAGNET program initiates about 12 consortia annually, each active for 5 years. A consortium includes several industrial companies and academic institutes. Grants of up to 66% of the approved budget are available with no royalty payments due. MAGNET's annual budget is about $50 million.

101. The *MAGNETON* program promotes technology transfer from academia to industry via the mutual cooperation of individual companies and specific academic research groups. A project period is up to 24 months and budget is up to $800,000. Grants of up to 66% of the approved budget are available with no royalty repayments.

102. The *NOFAR* program aims to bridge the gap between the basic research and the applied research—a problem that characterizes biotechnology and nanotechnology. NOFAR funds basic research but sets a 12-15 month deadline to meet an industry-driven milestone. 90% of project costs are carried by NOFAR and 10% by the industrial partner. The maximum grant is approximately $100,000 per project and no royalties or repayments are required.

103. The OCS supports research institutes with clear links to industry. Support is used to strengthen their technology infrastructure and develop technologies and products for commercialization. A research institute eligible support must be an independent legal entity, employ a team of experienced researchers, have equipment for conducting and testing R&D in industry, and earn 30% of its revenue from industry. The program covers up to 90% of approved budget for up to two years. At least 10% of the budget must be provided by industry.

International OCS programs

104. International programs are administered by MATIMOP–Israeli Industry Center for R&D.

105. MATIMOP manages a number of bilateral innovation programs of which the oldest is the Binational Israel Research and Development program—*BIRD*. BIRD supports new product development by Israeli companies in partnership with American companies. The foundation pays up to 50% of approved R&D costs and this investment is repaid conditionally upon commercial success. The BIRD investment model is shown in Figure C.9.

106. MATIMOP has bi-lateral funding agreements similar to BIRD in Europe (Denmark, Finland, France, Germany, Italy, Slovenia, Spain, Sweden, Czech Republic, Turkey, United Kingdom), North America (Canada,

State of Maryland, USA, Commonwealth of Virginia, USA), South America (Argentina), and Asia (China, India, Taiwan, State of Victoria, Australia, Singapore, South Korea).

107. The *Global Enterprise R&D Cooperation Framework* encourages cooperation in industrial R&D between Israel and multi-national companies. Joint R&D projects between multi-national companies and Israeli companies, authorized by the OCS, are entitled to financial assistance of up to 50% of the Israeli companys R&D approved costs. Direct investments in joint R&D project with Israeli companies will be credited with 150 percent of the value of such investment for "Buy-Back" liabilities.

108. The *US-Israel Science and Technology Commission* seeks to catalyze progress by identifying and removing impediments and building the bi-national infrastructure for mutually beneficial economic and technological cooperation.

109. Israel is the only non-european participant in the EU Framework Program for R&D. The Office of the Chief Scientist has established the Israel-Europe R&D Directorate (ISERD) to facilitate participation in the Framework Program by Israeli companies. Participation is facilitated and encouraged by the Israel-Europe R&D Directorate (ISERD), an interministerial directorate established by the Ministries of Industry, Trade and Labor, Science and Technology, Foreign Affairs and Finance, and the Planning and Budget Committee of the Council for Higher Education. More than 2000 Israeli entities participated in various R&D projects, in the 4th, 5th, and 6th Framework Programs.

110. Israel is a member of *EUREKA*, an initiative by nearly 40 European governments and the EU to create a pan-European network for market-oriented, industrial R&D. EUREKA is the largest European platform for industrial innovation projects that are funded through national and regional schemes in the participating countries. In Israel, the Office of the Chief Scientist supports Israeli companies participating in Eureka projects. Over 40% of Eureka project participants are SME's. Among Eureka's activities are the Eureka Clusters, industry-led thematic initiatives in a particular area of strategic interest for transnational, cooperative R&D. Cluster projects are initiated by major companies which first develop road-maps to lay out future directions for industrial R&D in selected areas. Most clusters are active in ICT fields and among their initiators are Philips, Siemens, Alcatel, Thomson, Ericsson, Nokia, France Telecom, Telefonica, Deutsche Telekom, and other market leaders. Israel is among the most active Eureka members and currently Israeli Companies participate in more than 10% of all Eureka projects and in more than 20% of all Eureka Cluster projects.

111. The Eurostars Programme is the first European funding and support program specifically dedicated to SME's and start-ups. Eurostars projects can

address any technological area, but must be market-driven, have a civilian purpose, and be aimed at the development of a new product, process, or service. A Eurostars project is collaborative, meaning it must involve participants from at least two different participating countries. The main participant must be a R&D-performing SME from one of these countries. Eurostars is jointly operated by the EUREKA network and the European Commission and projects are funded through dedicated national funding schemes, which are topped up by the EU.

112. Galileo and SESAR are niche programs directed at satellite and aerospace.

113. The Israeli *Innovation Relay Center* (IRC Israel) advises primarily small businesses on technology and innovation. Each Relay Center is an independent office backed by funding from the European Union's Innovation Program. Through each center, companies and institutions establish links to many other relay centers located across Europe. The primary goal of all Innovation Relay Centers is to create an ex-change of information between organizations across Europe. This gives the organization a direct link to partners and potential buyers of the technologies developed, or potential sellers of the technologies the company may need.

114. HEI-industry partnerships are handled naturally through the mechanism of directed research contracts. To the researcher, this arrangement provides welcome funding and a way to keep up with practical problems. To the industrial partner, the partnership may offer best-in-class expertise, relatively short lead times, relatively low costs, and/or simplification (no need to recruit talent, etc.) One potential barriers to HEI-industry partnership is appropriate handling of intellectual property rights (industry's concern) and publications (HEI's concern). A common solution is to delay publication until a patent disclosure has been submitted. An-other barrier to partnership is awareness: There is no practical clearing house where potential partners can meet.

115. HEI's facilitate knowledge exchange between researchers and industry through their technology transfer organizations. These have become increasingly active and visible in re-cent years. For example, TTO's now lease booths at industry trade shows. They also sponsor open houses and other outreach activities intended to promote connections with industry. However, HEI's and their TTO's do not facilitate connections between local companies and international partners as such is neither perceived to be their role nor incentivized at any level.

116. The State of Israel has chartered a number of technology incubators under a public-private partnership arrangement that works as follows. Like an ordinary venture (risk) in-vestment firm, the incubator raises private capital, solicits proposals for new business ventures, vets them, and makes

investment decisions. The twist is, the government provides matching investment capital to further the incubator investment. In exchange, the incubators must operate in areas intended for economic development.

3.1.7 Law for the Encouragement of Investment (1959)

117. An important tool for economic stimulus at the national level is the Law for the Encouragement of Investment (1959) (the "Law"). The Law establishes two means to encourage economic growth: matching funds for capital investment and tax incentives. Under the matching program, administered by the Ministry for Industry, Trade and Labor qualified capital spending by private companies can receive up to 50% matching funds at favorable terms. Under the tax incentive program, administered by the Israel Tax Authority, new businesses in qualified development zones pay no corporate tax for up to 10 years. The Northern District is a qualified development zone. Although popular with industry, the matching program is under funded by 95%. That is, each year qualified business plans are submitted in an amount equal to 20 times the program's budget. Also, a recent study by the Knesset Research and Information Center indicates that initiatives funded by subsidized capital are less likely to survive than those financed on market terms. The study concludes that investment in human capital may be more effective over the long term.

3.2 Responding to regional needs and demands

118. Research universities in the Project Region, as elsewhere in Israel, emphasize excellence and global impact over regional considerations. Incentives for advancement are based primarily on publications and participation in the international professional community. That said, many research projects explore regional issues as research topics. This is true both in the social sciences where the Galilee's diverse demographic landscape makes it a unique social laboratory and in urban planning, water management, transportation and other engineering disciplines. However, these activities are not so much the result of HEI policy as *ad-hoc* initiatives by individual researchers.

119. Migal–Galilee Research Center, a privately owned research and development center located in a modern building in an industrial park in Kiryat Shmoneh, is an important center of regional innovation. Migal has 130 affiliated scientists who work on issues of biotechnology, environmental sciences, and agriculture and offer support services relevant to the region's agricultural base. Because most of Migal's scientists also work or study at Tel Hai College, the Center is able to compete for academic grant and

project funding. Activities at Migal have led to the establishment of five start-up companies in Kiryat Shmoneh.

3.3 Technology transfer

120. Each university (and some colleges) has a technology transfer office. The largest such offices are aggregated under a single portal called the Israel Technology Transfer Organization with website at http://www.ittn.org.il/. However, this is no more than a collection of links to the university TTO's.

121. University TTO's have been very active and pro-active. At the Technion, the TTO employs a team of MBA-trained commercialization officers who comb research results and often attend research seminars in order to identify commercialization opportunities. Through their websites, TTO's invite industry to inquire about consulting.

122. Neither the universities nor their TTO's have a regional mission. If anything, there is an incentive to locate new companies in the center of the country due to the positive perception factor. Colleges usually see themselves as agents for regional change especially regard-ing social involvement. However, very little new company creation has resulted from the col-leges, even those with an engineering orientation.

123. An important channel of knowledge exchange is the internship system employed by some HEI's. For example, at ORT-Braude College, all third-year engineering students participate in some form of internship in industry. Many students continue working for the industry partner after the internship is completed so that internship becomes the entry point into the workforce. HEI faculty keep apprised of industry developments and requirements through direct contact or student feedback.

3.4 Conclusions

124. Strong and diverse framework conditions exist to commercialize innovation at the national level. However, few policies exist to channel knowledge creation into regionally relevant commercial activities. The two large research universities within the Project Region are focused on international excellence. However, the college system, especially in the interior of the region, could work to have greater regional impact. Although colleges perceive themselves to have a regional mission, regional impact is not factored in to the incentive system and there are *de facto* disincentives to regional activity. An interesting exception is the Migal research center. Through Migal's leadership, Tel Hai faculty work on biotech issues of relevance to the local agriculture economy.

125. There are hundreds of highly qualified academic researchers in the Region. Substantial infrastructure and familiarity with regional issues are further strengths. However, the lack of a recognized regional mission with clear goals and a significant role for academic researchers is a weakness in the present system. The lack of policies and incentives that could drive strong regional engagement by academic researchers is an additional dimension. The latent capabilities of the region's many college researchers create the greatest implicit opportunity.

Chapter 4

Contribution of Teaching/Learning to Labor Market and Skills

4.1 Localizing the learning process

126. Many of the colleges draw heavily on regional characteristics to aid or focus learning and teaching. This is done through two mechanisms: localized curriculum and internship. Several examples (of many):

Gordon College for Education grounds its studies in a basic understanding of the region through field work covering local ecology, water sources and management, and more. Gordon students deepen their regional understanding through a variety of courses on earth sciences, geography, geology, plant physiology, *etc.*, all of which are taught with a regional emphasis. Moreover, Gordon, with its diverse student population of Jewish, Arab, and Druze students, provides a practical introduction into the ethnic landscape of the region.

ORT-Braude College , with its engineering orientation, uses an internship program to localize the learning process. Beginning after the 6th semester of study, students work as interns in industry under the supervision of experienced engineers. The program enforces an on-going dialog between the College and industry through which the ORT-Braude gains an up-to-date picture of industry requirements and directions.

Emek Yezreel College uses in-community and regionally-driven learning heavily. Its Sociology Department offers a course on cross-cultural negotiation and conflict resolution that includes a practical workshop on Arab-Jewish issues.

Emek Yezreel College also makes a student-run radio station a platform for localized learning by offering academic credit for students who prepare and broadcast a weekly show on local social issues.

Emek Yezreel College 's Visual Arts Department regularly uses local events and issues as its learning platform. In one recent project, students designed posters and visuals to help mark the 30th anniversary of a local rape counseling center. In another project, students designed visuals for a national campaign on feral (street) cats.

[Emek Yezreel College]'s Management Department has created an innovative course in collaboration with a local technology incubator. Each year, students form consulting groups and work in year-long collaboration with companies from the incubator under the supervision of Emek Yezreel staff.

127. ORT-Braude in Carmiel, with its engineering orientation, uses an internship program to localize the learning process. Beginning after the 6th semester of study, students work as interns in industry under the supervision of experienced engineers. The program enforces an on-going dialog between ORT-Braude and industry through which the college gains an up-to-date picture of industry requirements and directions.

Best practice...

- Management students at Yezreel Valley College earn course credit by acting as consultants to companies from a local technology incubator.
- ORT-Braude College uses internship programs to help transition students to the workforce while keeping abreast of industry trends.
- Gordon College employs extensive fieldwork to ground future teachers strongly in the physical and human geography of the region.

4.2 Student recruitment and regional employment

128. HEI's operate independently on a competitive basis. The CHE allocates student seats at each HEI. HEI's are funded by the PBC according to the number of actual students enrolled up to the allocated limit. Aside from this central planning and budgeting, there are no policies to encourage regional recruitment nor arrangements among the HEI regarding quotas.

129. With the exception of the Technion and Tel Hai College, Project Region HEI's draw students heavily from the Galilee region. Technion recruits nationally due to its position as the premier technical university in Israel. Tel Hai, alone among the colleges, has reached a scale and level of prestige that permits it to recruit substantially from the center of the country. Its methods are sometimes unorthodox: It advertises, *inter alia*, in India where many Israelis travel after their army service and before college. Tel Hai also believes that its support center for students with learning disabilities is a unique offering that contributes to its ability to recruit nationally. ORT-Braude College sees recruitment from the center of the country as a core part of its mission to develop the Galilee region. However, in the last ten years, it has not been able to recruit meaningfully from the center where there are ample opportunities for engineering training close to key engineering employment centers.

Best practice...

- Tel Hai College advertises in India where many Israelis travel after their army service and before college.

130. Recognizing the need to increase access and enrollment, the Council worked over the last decade to increase the number of colleges throughout the region including those in which Arabic-language or bilingual teaching is carried out. It is currently believed that an adequate response has been made as far as geographical footprint is concerned.

4.3 Access

4.3.1 Pre-academic preparatory institutes

131. Pre-academic preparatory institutes are used throughout the higher education system to increase access. Commonly, each HEI will run one or much such institutes with the mission of closing the gap between student test scores and the HEI's admissions requirements.

Best practice...

- The Technion has opened a pre-academic program for the ultra-orthodox population.
- The 18-month program provides accelerated study of mathematics, physics, english, and scientific writing.
- In 2008, 11 participants were admitted for mainstream study at the Technion.

132. A highly innovative pre-academic program recently opened at the Technion targets the ultra-orthodox population. Ultra-orthodox Jews grow up in an educational system that emphasizes religious studies and includes almost no math, English, or science. The purpose of the Technion program is to prepare students from the ultra-orthodox Jewish sector of the population for study at the Technion and other HEI's in Israel. The program includes a 5 months pre-entry program and an additional 12 months as a preparatory program that teaches mathematics, physics, english and scientific writing. In 2007 and 2008 this program trained 60 students. In 2008, 11 program participants were admitted to various Technion departments.

133. A number of programs also address completion rates. Both Western Galilee and Tel Hai Colleges have programs to identify and support students with learning disabilities during their studies. Western Galilee further plans to open program for Arab students, 33% of their student body.

134. A number of stakeholders interviewed report the need for more preparatory institutes directed at the Arabic-speaking population. For many Arab and Druze students, higher education is the first experience in a fully Hebrew-speaking environment. Their ability to adapt is a key predictor for completion and success according to these stakeholders. Pre-academic preparatory training targeted at the needs of this demographic could form a helpful transition layer.

Best practice...

- Gordon College pioneered a culturally appropriate campus that enabled Druze women to attend.
- Oranim College runs a program to recruit and train Ethiopian immigrant students as teachers.
- Tel Hai and Western Galilee Colleges have centers for the support of students with learning disabilities.

4.4 The regional supply chain

4.4.1 Academic Training

135. Project HEI's recognize themselves as part of the regional education supply chain. This is perhaps most strongly felt at the academic teaching colleges (Oranim, Gordon, Arabic, WIZO, Sakhnin) where there are regionally oriented programs both for the intake of new students and the placement of graduates. Because graduates of these colleges go on to work within the region, and because of the cultural diversity of the region, these colleges recognize the importance of specialized, regionally-oriented training for their students. Oranim College, for example, ran a program to recruit and train Ethiopian students as teachers following a wave of immigration by that group in the 1990's. Gordon College similarly pioneered a culturally appropriate program to enable young Druze women to attend and receive teacher training.

136. The academic colleges similarly view themselves as key parts of the regional educational supply chain. ORT-Braude views the development of the Galilee as a key part of its mission. The translation of that mission into action lies in its position as a near-unique provider of engineers and technicians in the interior of the region. ORT's internship program is an effective tool in exposing students to local employers where many of them find their first jobs in their fields. Tel Hai is an important trainer of workers in the social sciences (as well as computer and natural sciences). Those students are similarly exposed to the workforce through internship programs and field work.

137. While the Universities do not have a regional mission *per se*, they nevertheless strongly participate in the regional education supply chain. Many corporate and political leaders are graduates of the University of Haifa or the Technion.

138. The primary pathway between HEI's and regional firms is the internship. For example, at ORT-Braude, students work as interns in industry under the supervision of experienced engineers beginning after the 6th semester of study. The program enforces an on-going dialog between ORT-Braude and industry through which the college gains an up-to-date picture of industry requirements and directions.

139. A secondary pathway between HEI's and regional firms is open houses, conferences, and seminars held from time to time on topics of professional interest. None of the HEI's have mechanisms in place to track career paths of graduates.

Did you know...

- Mr. Stef Wertheimer, industrialist, founder of Iscar, Ltd., former member of Knesset[a], and Israel Prize winner has funded a new vocational training center in the Galilee called *The Galilee Center for Industrial Training*.
- The Center will offer a one-year training program culminating in a certificate from the Landesakademie für Fortbildung und Personalentwicklung an Schulen of the state of Baden-Württemberg of the Federal Republic of Germany.
- The Center seeks to reverse a trend away from vocational training and support the manufacturing economy.

[a]Israel's Parliament

4.4.2 Vocational Training

Mr. Stef Wertheimer, industrialist, founder of Iscar, Ltd., former member of Knesset[1], and Israel Prize winner, has, for many years, advanced a critical view of the country's higher education system. According to this view, HEI's overemphasize the preparation of students to work in research and development while underemphasizing vocational training in support of a manufacturing economy. According to this view, the education system has abandoned vocational training as the country has shifted toward R&D and away from manufacturing.

[1]Israel's Parliament

In an effort to fill the gap, Mr. Wertheimer has funded a new vocational training center in the Galilee called *The Galilee Center for Industrial Training*. In cooperation with the state of Baden-Württemberg of the Federal Republic of Germany, the Center will offer a one-year training program culminating in a certificate from the Landesakademie für Fortbildung und Personalentwicklung an Schulen. The study program will include six months at the Galilee Center followed by six months at the Landesakademie. Initially, 20 students per year will participate in the program.

4.5 Lifelong Learning

140. Most regional HEI's offer programs in continuing professional development and training. The Technion program is naturally largest with 2,800 students enrolled at three centers around the country. (One may estimate 1,000 students in the Project Region.) Technion programs leading to academic degrees include:

- MBA with emphasis on high technology;
- M.E. in systems engineering, biomedical engineering, environmental engineering, civil engineering with emphasis on development and business management in construction, civil engineering with emphasis on managing construction projects, biotechnology and food engineering;
- M.Sc. in architecture with emphasis on conservation;
- M.E.E. in electrical engineering — program offered through Intel;
- M.R.E. - Masters of Real Estate;
- B.A. in Geo-information.

Certificate programs include:

- Management Studies in human resources, project management, quality assurance engineering, logistical systems management, and coaching;
- Real Estate Studies in land assessing and property management, planning and construction law, construction project management;
- Interior Design Studies in landscape design and curation of art exhibits;
- Computer Studies in software development, software testing, network administration and management, and data security;
- Continuing education in family medicine;
- Continuing education in dentistry.

The Technion has a history of working with regional partners to tailor programs to regional needs. Tailor made programs for various companies such as the Israel Electric Corporation, Intel, RAFAEL, Elbit, Cellcom, Bezeq, IDF, Iscar, Ministry of Defense, and more.

4.6 Changing forms of educational provision

141. The primary provider of online higher education in Israel is the Open University where entire degree programs can be taken through distance, online learning. In the 2006/7 academic year, 40,006 students were enrolled at the Open University. Of these, 7.9% (3,161 students) reside in the Northern District and another 9.8% (3,921) in the Haifa District. We may estimate 5,120 students from the Project Region representing 12.8% of the Open University enrollment.

    By comparison, the Project Region comprises approximately 24% of Israel's population. 60.4% of the Open University's student population reside in the Central Region (compare 40% of the general population). Thus, the Galilee residents are under-represented at the Open University. Moreover, data on enrollment by ethnic group shows that Arabs are especially heavily under-represented. 20% of the general population, Arab students comprised only 5.5% of the Open University's student body in 2006/7.

    In summary, 1 out of every 120 residents of the Central Region studies online at the Open University but only 1 out of every 340 students of the Project Region does so. (CHE-01)

Chapter 5

Contribution To Social, Cultural And Environmental Development

5.1 Social development

5.1.1 *Perach* mentorship program

142. The largest single program for social development is the *Perach* [1] program. *Perach* pairs needy children with university students who act as tutors, mentors and role models in a one-on-one relationship. Participating HEI students earn a credit toward tuition fees. The *Perach* project was established in 1974 by students from the Weizmann Institute of Science, who tutored children in need. Today, approximately 15% of students in Israel's HEI's participate in the project. A significant percentage of *Perach* mentors and mentees come from minority groups. Program goals are:

    - To enrich and improve the lives of children from underprivileged backgrounds from all sectors of society—Jewish, Arab and Druze—through a warm and caring relationship with a personal mentor.
    - To help university students meet the cost of higher education, by providing partial scholarships and/or academic credits in return for their work with needy children.

[1] Hebrew acronym for "Mentorship Program" and homonymous with the Hebrew word for flower.

- To create awareness and prepare HEI students for future leadership positions by exposing them to the country's most pressing social problems.
- To promote tolerance and understanding among different sectors of society through joint activities.

143. *Perach* targets children from disadvantaged socio-economic background, often suffering from educational, emotional and behavioral difficulties. Approximately 20% of *Perach* children are new immigrants. Another 20% come from the Arab sector. *Perach* also provides mentors to children with disabilities, children of parents in prison, disadvantaged high school students who need help to prepare for their matriculation exams, dyslexic or blind university students.

144. Mentors meet mentees twice per week for two hours each time. Encounters take place at the pupil's home, at the university campus, at playgrounds, libraries, museums or at *Perach* enrichment centers and typically focus on homework, computer games, sports, movies, hikes, *etc.* Approximately 75% of student-mentors meet their mentees on an one-on-one basis. The others serve as tutors in various programs throughout the country. The syllabuses of these programs are prepared by professionals who provide the tutors with written materials and guidance. These programs are offered in a variety of areas such as health and dental care, science education, nature and environment, law and order, music, *et alia*.

Best practice...

- 15% of HEI students nationwide participate in the *Perach* mentorship program.
- Students earn tuition credits by working in one-on-one relationships with disadvantaged children.
- *Perach* provides support and role modeling to needy children while fostering social awareness among HEI students.

5.1.2 Other community service programs

145. HEI's offer numerous programs for social involvement. Three examples (of many):

Oranim College offers a program called *Melach Haaretz*[2] in which students maintain a half-time job in community social/educational work

[2] Acronym for "Educator Leadership" and Hebrew for "salt of the earth".

while studying on campus only two days per week. The community work is supported by expert external lecturers and recognized for credit by the College.

Tel Hai College students created an innovative programed called *Ayalim*[3], based on students living directly within the most troubled neighborhoods.

Oranim College pairs students with high-risk children to develop work habits and skills as well as communications skills.

146. Sometimes HEI's support the community by making college programs available to the public. Western Galilee College created a program to identity and support students with learning disabilities and then made the diagnostic team available to local school to increase awareness in the community. Similarly, the Technion encourages science education among middle- and high-school students through its Harry and Lou Stern Youth Activities Unit. The purpose of this unit is to encourage the study of science and technology by children. Activities are held in the morning during science and technology days and in the afternoons as part of after-school programs. In the 2008/9 academic year, 9,300 children participated in 140 days of activities.

Best practice...

- Western Galilee College created a program to identity and support students with learning disabilities and then made the diagnostic team available to local schools to increase awareness in the community.

147. Other community programs are directed at encouraging academic excellence. The Technion's Archemedes Project lets exceptional regional students combine high school studies with academic studies at the Technion, especially in the field of chemistry. In the first year students attend three theoretical courses and one lab course in basic chemistry for a total of 12 academic credits. Students who finish the first year with an average above 80 receive a 100 on their high school matriculation exam in chemistry (5 units) per a policy set by the Ministry of Education. Following the first year, students may study for an additional two years. The curriculum includes math and computer science as well as chemistry. During these two years, participants accumulate 30–35 academic credits. Each year the project admits 70–75 students. The total number of participants at any given time is about 110. Lectures are usually held on Fridays.

[3]Hebrew for "Antelope"

The program is sponsored through the tuition paid by the students and through donations. It includes transportation from distant locations and need-based scholarships. A significant number of the program's graduates attend the Technion today.

148. In some cases, the community benefits from serving as HEI's living laboratory. The Technion's course "Planning with Community" paired Masters students in planning and advanced B. A. students in Architecture with community-based organizations in the Project Region to offer fresh visions for social change. In Haifa, one group of students found that a much-disliked new road cutting through a very poor neighborhood actually opened opportunities for new public spaces. As a result, the city is now developing plans in accordance with the students' ideas. A second group of students worked with a local feminist center to map spaces of physical safety and fear in the mixed Jewish and Arab Hadar area of Haifa. The work has spawned a new coalition to renew the Hadar area, and their first joint product was a bilingual (Hebrew and Arabic) position paper based on the students' work. A third group of students analyzed the ongoing World Heritage preservation in Old Acre from the residents' point of view. Subsequently, the Acre Development Corporation adopted several of the student recommendations including the need for policies to mitigate against gentrification and displacement of the very low-income Arab residents.

5.2 Medical Care

149. The main HEI contributor to medical care in the Galilee is the Technion Faculty of Medicine and the main mechanism for impacting regional health care is through the ap-pointments of leading hospital departments as teaching clinical departments in which the clinical studies of the M. D. program are conducted. 12 different hospitals participate in teaching medical students; 8 general hospitals: Hillel Yaffe Hospital in Hadera, Lady Davis (Carmel) Hospital, Bnai-Zion Medical Center and Rambam Medical Center in Haifa, Haemek Medical Center in Afulah, Poriya Hospital in Tiberias, Rivka Sief Hospital in Safed and Western Galilee Medical Center in Nahariya; 3 psychiatric hospitals: Mizra, Tirah and Shaar Menashe; and one geriatric hospital: Fleeman Hospital.

Studies of family medicine are carried out in clinics throughout the Galilee. The hospitals are non-academic bodies, but individual departments are accredited as academic teaching departments. Clinicians who work in these hospitals and have academic appointments at the Technion are an integral part of the Faculty of Medicine.

In January 2005, the Dean of Medicine decided to allocate an annual budget to upgrade teaching equipment in the teaching clinical departments

on a matching basis for the benefits of the medical students and of the daily activities of the clinical departments. Additionally, the faculty, through its research committee, provides several grants-in-aid to foster research cooperation between clinical and pre-clinical faculty members in order to advance clinical research in the hospitals with special emphasis on those more peripheral to Haifa. This is also done on a matching basis between the faculty and the hospitals.

The Technion has adopted a rule that clinical faculty cannot receive tenure at academic ranks lower that full professor. This rule ensures motivation by clinical faculty to continue in their clinical and basic research despite the heavy burden of clinical practice.

150. There has been a government decision to create a new, fifth medical school in Israel. It has further been decided that this school will be located in the Galilee. The goals of this new medical school are:

- Increase in supply of doctors to match population trends in Israel;
- Improvement of medical services in the Galilee;
- Overall development of the Galilee.

In July, 2009, the Israel National Institute for Health Policy and Health Service Research held a two-day workshop entitled, Medical Education in the 21st Century. The workshop included presentations by top health planners in the country as well as presentations by the President of the State of Israel, the Deputy Minister of Health, and the head of the opposition party. Among the important points made repeatedly at this workshop:

- The purpose of the new medical school is not only (or even primarily) to provide additional training capacity; this could be done within the existing 4 medical schools.
- A purpose of the new school is to change radically the way medical education occurs in Israel.
- A second purpose of the new school is to revolutionize health care in the Galilee. More specifically, planners intend that the new medical school will reflect a new, community-based approach to medicine and medical education. Medical students will spend far less time in hospitals and far more time in communities. Students will further learn from an early stage to work in multi-disciplinary teams alongside nurses, social workers, psychologists, and others. The medical school selection process will be changed to favor students who excel at teamwork and interpersonal communications.

Did you know...

- The government of Israel has decided to create a medical school in the Galilee.
- The medical school is intended to have broad-reaching impact on the Galilee.
- Leading healthcare planners intend to utilize the Galilee's unique geographic and demographic character to make the new school a pioneer in community-based medicine and medical education.

5.3 Conclusions

151. Regional HEI's are strongly involved in the social and cultural development of the region. Programs too many to list provide interfaces between students and local residents through which the social and cultural life of the community are enriched, the experience and commitment of the students are enhanced, and quality of life improved. HEI's act independently in this regard except that the largest community involvement program, *Perach*, is nationally organized and managed.

Chapter 6

Capacity Building For Regional Co-Operation

6.1 Mechanisms to promote regional engagement of HEIs

152. Despite a lack of formal mechanisms to promote regional engagement, two factors drive HEI's to be regionally engaged: (1) A sense of the strategic importance of Galilee development to the State of Israel; and (2) Relevance of regional activities to the learning process of their students. Thus, ORT-Braude College defines its mission (in part) as attracting educated young people from the center of the country to the Galilee (even as it reports failure in this endeavor over the last 10 years). Similarly, Tel Hai College feels it is in the vanguard of regional development because of its relative success in recruiting student from the country's center. Moreover, since most college students in the region train in the social sciences or for careers as teachers, a high degree of community involvement is natural. In that sense, the HEI's and the region's requirements are well aligned. Heavy community involvement by HEI students is a positive and ubiquitous element of the Galilee region.

153. The mechanisms through which HEI's identify regional needs are all informal. The primary channels of engagement-internships, community involvement programs, mentorship programs, sponsored research-are all driven by personal relationships between the par-ties. Thus, engineering faculty at ORT-Braude keep in contact with local industry in order to learn about evolving projects where students might find positions as interns; teaching faculty at Gordon are in touch with area principals to learn of trends and placement opportunities for their students; and community involvement programs are in touch with local government to identify nascent opportunities for social field work.

154. In regional engagement as in other areas of activities, HEI's compete for students and resources. The government neither organizes nor supports a pan-institutional approach to regional development. The CHE does monitor regional engagement of HEI's through annual self-evaluation reports however said engagement is not quantified or factored into an incentive system such as the funding system. In the spirit of this competitive approach, the CHE's main role is to oversee and rationalize the opening of new degree programs to as to align educational capacity and supply with demand. Demand is mainly gauged by student trends and the assumption is that students are responsive to trends in the labor marketplace.

155. The most strategic plan currently in place for the Galilee revolves around the proposed 5th medical school. Modeled on the perceived success of Ben Gurion University of the Negev in the southern city of Be'er Sheva, the new medical school would be a major employer in the region and would revolutionize health care in the region. Moreover, the medical school would create demand for trained workers in a series of paramedical fields. The training of this workforce creates opportunities for area colleges. Finally, the medical school is seen as a first step toward a large, research university in the interior of the Galilee.

6.2 Evaluating and mapping the impact of the regional HE system

156. HEI's submit annual self-evaluation reports to the CHE. Consequently, they keep careful track of community involvement programs and coursework. However, there is less data available to quantify the direct and indirect economic impact of HEI's on the region. Nevertheless, HEI's are believed by all to have important direct and indirect economic impact. For example, Tel Hai College is now the largest employer in the Galilee panhandle. ORT-Braude, Emek Yezreel College, Sakhnin College, as well as the two universities, are similarly important employers in their communities. Although there is no data on student employment and internal migration following graduation, it is believed that most graduates of regional HEI's continue to live and work in the area. Therefore, the indirect economic impact of these institutions is also great.

Did you know...

- Tel Hai College is the largest employer in the Galilee panhandle.

6.3 Institutional capacity building for regional involvement

157. Some HEI's have administrative offices that facilitate community involvement. Such is the case, for example, at Emek Yezreel College where the Unit for Social Involvement is organized as a department of the Dean's office. Through the Unit, 140 students found opportunities for volunteer work in 21 community programs and institutions throughout the Galilee in 2008. Participants receive a scholarship credit toward their tuition expenses.

158. HEI's make substantial use of adjunct appointments. In some cases, these appointments add expertise and important relationships to the capacity mix. Increasingly, adjuncts are also used as a low-cost solution to teaching core courses. As budgets are cut and tenure stream appointments become tight, adjunct staff have become an increasingly common solution for the teaching of core courses. Recognizing this trend, the CHE intends to modify the HEI funding formula to reduce somewhat the incentive for using adjunct teaching staff.

6.4 Creating a new organization culture

159. All HEI's in the Project Region view regional development as an essential part of their mission. However, HEI's fall into two groups regarding the culture of regional engagement:

    - To the academic and teaching colleges engaged primarily in the social sciences and teacher training, regional engagement is a natural and organic part of the life of the institution. These HEI's have no cultural conflict between their educational and regional missions. They impact the region directly through a web of engagement whose strands include community-based activities both inside and outside the classroom.
    - Institutions whose mission is global excellence also participate in the life of their communities. However, since their main mission is academic excellence, the primary mode of engagement may be indirect, *i.e.*, through the drip-down effect that comes from creating a supply of highly trained academics for the region. For these institutions, academic excellence is regional development.

160. There is a trend among the region's colleges to strive for world-class research excellence. World-class research is a part of the faculty incentive process, *i.e.*, it is a critical element for advancement in academic rank and tenure. By way of illustration, ORT-Braude College recently held "The Fifth ORT-Braude College Interdisciplinary Research Conference"

featuring speakers from around the country and papers on such topics as "Derivation of the Langevin Function from the Principle of Detailed Balance" and "Double Well Bose-Hubbard Model: A Playground for Quantum Control." By contrast, Tel Hai College will sponsor in November a conference on regional entrepreneurship as part of their participation in Global Entrepreneurship Week.

161. Despite the above, the primary system of incentive for HEI staff is promotion in academic rank and tenure. For promotion to professor at all HEI's, a standard review is carried out at the national level by the CHE and is based on traditional performance metrics: quantity and quality of publications, participation in international conferences, teaching ranking. Thus, a staff member who wishes to work on regional issues should combine his work with traditional publications.

Chapter 7

Conclusions: Moving Beyond The Self-Evaluation

7.1 SWOT Analysis

7.1.1 Strengths

162. The region has a great many strengths. First and foremost is a consensus among stakeholders that Galilee development is a national priority.

The region further enjoys a robust higher education system with a broad geographical footprint and dedicated and caring staff members. Faculty and students alike have a culture of social action and community involvement.

The region is located near key markets, potential markets and business centers including Tel Aviv, Europe, the Middle East, and Africa. There are successful industries in the area and experienced business-people who could serve as mentors or advisors in new ventures. Framework conditions are strong and include subsidized capital, tax incentives, partnership programs, and an entrepreneurial culture.

7.1.2 Weaknesses

163. One important way in which HEI's can drive regional development is by stimulating new business creation. Despite the strengths described above, there is generally a low level of new business creation from Galilee HEI's. None of the academic colleges seem to embrace this metric as part of their mission in more than a theoretical way.

Projects, policies, and systematic changes that could enhance regional engagement must come from above. Because of the multi-focal nature of

decision making, such changes may require collaboration across organizational lines at the national level.

As far as HEI staff are concerned, the present system of incentives (advancement, tenure) emphasize traditional academic publications. In most cases, these publications must come at the expense of regional engagement. There is no umbrella policy in place that encourages HEI staff to be locally engaged and impactful.

7.1.3 Opportunities

164. The rich cultural diversity of the area combined with the educational infrastructure create opportunities.

The region already has successful businesses in manufacturing, biotech, and clean-tech. A focus on new business creation in these areas could stimulate further growth and drive a transition from public services to knowledge-based manufactures.

Moreover, according to Dr. Raed Muallem, Vice President of Mar Elias College, the Galilee, with its population of native Arabic speakers, could become a leader in higher education in the Middle East and North Africa upon resolution of the Arab–Israeli conflict. It could similarly become a leader in international trade in the region.

The 5th medical school project, if realized, could provide game-changing health care.

Already a tourist destination, the Galilee could develop into cultural tourism and eco-tourism.

Finally, the region can be a laboratory and a showcase for Jewish-Arab coexistence.

7.1.4 Threats

165. The first threat to any development plan is the macroeconomic background which, as of this writing, is still characterized by poor credit, conservative markets, and high unemployment.

Another threat to the region's development, as to any region that engages in manufacturing, is off-shoring to low-cost emerging economies such as China.

Another threat is the business impact of the real/perceived degree of geopolitical stability. Instability impacts tourism by staunching the flow of tourists to the Region; manufacturing by creating concern among foreign customers for security of supply.

Another threat is the danger of focusing exclusively on tactical issues due to the multi-focal nature of government. For example, a focus on

infrastructures to the exclusion of human capital may yield disappointing returns.

7.2 Conclusions

166. The reader of Section 7.1 is struck by the many strengths and opportunities. A region of physical beauty and cultural diversity, the Galilee possesses substantial tertiary educational capacity including world-class research universities, academic colleges, and academic teacher-training colleges; manufacturing infrastructure and expertise; and supportive national framework conditions. It is therefore surprising that there is relatively little new enterprise creation associated with HEI's.

    Among the most important resources are the hundreds of academic staff at the 8 academic colleges in the region. Not funded to perform research, they are nevertheless evaluated based in large part on their research records during regular reviews for academic advancement or tenure. Thus, the colleges pursue a *de facto* policy of world-class excellence.

    The primary tool that the CHE and PBC use in this respect is budgetary: By not funding research infrastructure at the academic colleges, and by requiring staff at the colleges to carry a greater teaching load than staff at the research universities, the CHE and PBC bias the college system away from research and, presumably, toward regional engagement. However, the CHE advancement and tenure system negate this effect and enforce a focus on academic publications. The effect drips down to the colleges so that in-house evaluation also relies heavily on academic publications.

    The situation is a result of two factors. On the one hand, the free-market planning policy pursued by the Council allows each college leave to chart its own course within certain parameters. On the other hand, the leadership of most colleges, as well as the promotion/tenure committee members at the national level, are products of the research university system. Their notion of excellence is *academic* excellence and global impact as measured by traditional metrics.

    Other elements of the research university are also replicated in the academic colleges. As in the university system, college teachers accrue sabbatical leave. In an effort to increase the exposure of Israeli staff to world-class research, national policy holds that sabbatical must be taken abroad. This policy is easily understood in the context of a global excellence strategy. By contrast, in Spain, researchers can use their sabbatical leave to work on local start-up companies and new ventures.

    The question arises, Does the *de facto* policy of world-class excellence pursued by the academic colleges best serve the region?

167. Another important reality in the Galilee is the lack of a regional government and the multi-focal nature of centers of decision-making. Aside

from the CHE and PBC, the most important player is the Galilee Development Authority. Of the various stakeholders, the Authority is the only one whose stated mission is regional in nature. Moreover, the Authority operates a forum of local governments which provides the only practical means of interfacing with the multiplicity of local leaders.

168. In light of the above, it seems desirable that the Council for Higher Education and the Galilee Development Authority create a forum for exploring means and policies through which the academic colleges could increase their regional engagement. Other important participants are the Ministry for Minority Affairs and the Arab Affairs Desk within the Prime Minister's office. While it is the Council's sole responsibility to set policy for the HEI's, such a forum might offer a venue for exploring ways to increase regional engagement and, ultimately, economic impact.

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Appendix B

Tables

City	Pop. (1,000's)
Haifa	264.9
Nazareth	65.5
Nahariya	51.0
Acre	46.0
Upper Nazareth	43.1
Tiberias	39.7
Safed	28.5
Sakhnin	25.1
Carmel	24.9
Kiryat Shmona	22.1

Table B.1: Populations of cities and towns in the Project Region. *Source: Central Bureau of Statistics*

City	Tel Aviv	Jerusalem
Haifa	95	157
Nazareth	107	147
Tiberias	137	176
Safed	166	205
Kiryat Shmone	187	226

Table B.2: Driving distances from the Project Region to the Central Region. *Source: Google Maps*

City	Tel Aviv	Jerusalem
Haifa	1:32	2:38
Nazareth	3:23	2:15
Tiberias	3:12	2:50
Safed	3:23	3:28
Kiryat Shmone	3:55	3:55

Table B.3: Bus travel times (hour:min) from cities in the Project Region to main cities in the center. *Source: Egged Bus Cooperative*

	Central Region		Haifa Subdistrict		Northern District		Project Region	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%
Jews	2,660.0	90.3%	431.5	81.7%	532.1	43.6%	963.6	55.1%
Moslems	150.8	5.1%	17.5	3.3%	464.1	38.1%	481.6	27.6%
Christians	17.3	0.6%	22.1	4.2%	89.9	7.4%	112.0	6.4%
Druze	0.0	0.0%	22.3	4.2%	96.6	7.9%	118.9	6.8%
Unclassified	118.4	4.0%	35.0	6.6%	36.9	3.0%	71.9	4.1%
TOTAL	2,946.5	100.0%	528.4	100.0%	1,219.6	100.0%	1,748.0	100.0%

Table B.4: Population by religion in Tel Aviv and Central Districts, Haifa Subdistrict, Northern District, and Project Region. *Source: Central Bureau of Statistics*

	1995	2007	% Change
Israel	5,612.3	7,243.6	29.1%
Northern District	946.9	1,221.9	29.0%
Haifa Sub-district	495.0	527.5	6.6%
Total Project Region	1,441.9	1,749.4	21.3%

Table B.5: Population growth in Israel and the Project Region between 1995 and 2007. *Source: CBS-06*

	Jerusalem	Tel Aviv	Haifa	Northern District
Beds per 1,000 population	2.50	2.66	2.70	1.58

Table B.6: Hospital beds per thousand population by location. *Source: Dr. Bishara Bisharat*

Universities (8)	
Bachelors	76,155
Masters	33,817
Doctorate	9,972
Academic Colleges (27)	
Bachelors	65,926
Masters	4,120
Doctorate	
Academic Teachers Colleges (27)	
Bachelors	26,883
Masters	994
Doctorate	
Total (62)	
Bachelors	168,964
Masters	38,931
Doctorate	9,972

Table B.7: Students in the higher education system, by HEI type and degree. *Source: Central Bureau of Statistics*

Universities (2)
Technion–Israel Institute of Technology
University of Haifa
Academic Colleges (8)
Emek Yezreel
Kinneret
Mar Elias
ORT-Braude
Safed
Tel Hai
Western Galilee
WIZO Academy Haifa
Academic Teachers Colleges (5)
Arab College of Haifa
Gordon College
Ohalo College
Oranim College
Sakhnin College
Research Center (1)
Migal–Galilee Technology Center

Table B.8: HEI's in the Galilee by type. *Source: Central Bureau of Statistics*

HEI	Founded	Independent	1st	2nd	3rd	Total
Universities (2)						
Technion	1925		8,693	2,812	925	12,430
University of Haifa	1963		10,658	4,964	898	16,520
Academic Colleges (8)						
Emek Yezreel	1965	1994	3,420			3,420
Kinneret			169			169
Mar Elias						
ORT-Braude			2,118			2,118
Safed			1,900			1,900
Tel Hai			2,297			2,297
Western Galilee			1,100			1,100
Academic Teachers Colleges (5)						
Arab College of Haifa						
Gordon College						
Ohalo College						
Oranim College						
Sakhnin College						
WIZO Academy Haifa	1971					

Table B.9: . *Source: Council for Higher Education*

	Private Non-profit	Higher Education	Government	Business	Total
Total (Million NIS)	1,003	3,792	1,460	20,384	26,639
	3.8	14.2	5.5	76.5	100.0
Financing Sector					
Business	14.7	7.6	15.7	95.4	75.5
Government	51.4	57.0	76.0	4.6	17.7
Higher education	1.0	14.7	0.2	–	2.1
Private non-profit	7.8	6.5	2.7	–	1.4
Rest-of-world	25.1	14.2	5.4	–	3.3

Table B.10: National expenditure on civilian research and development by operating sector and financing sector (2005). Percentages except first line is millions of NIS. *Source: Central Bureau of Statistics*

Appendix C

Figures

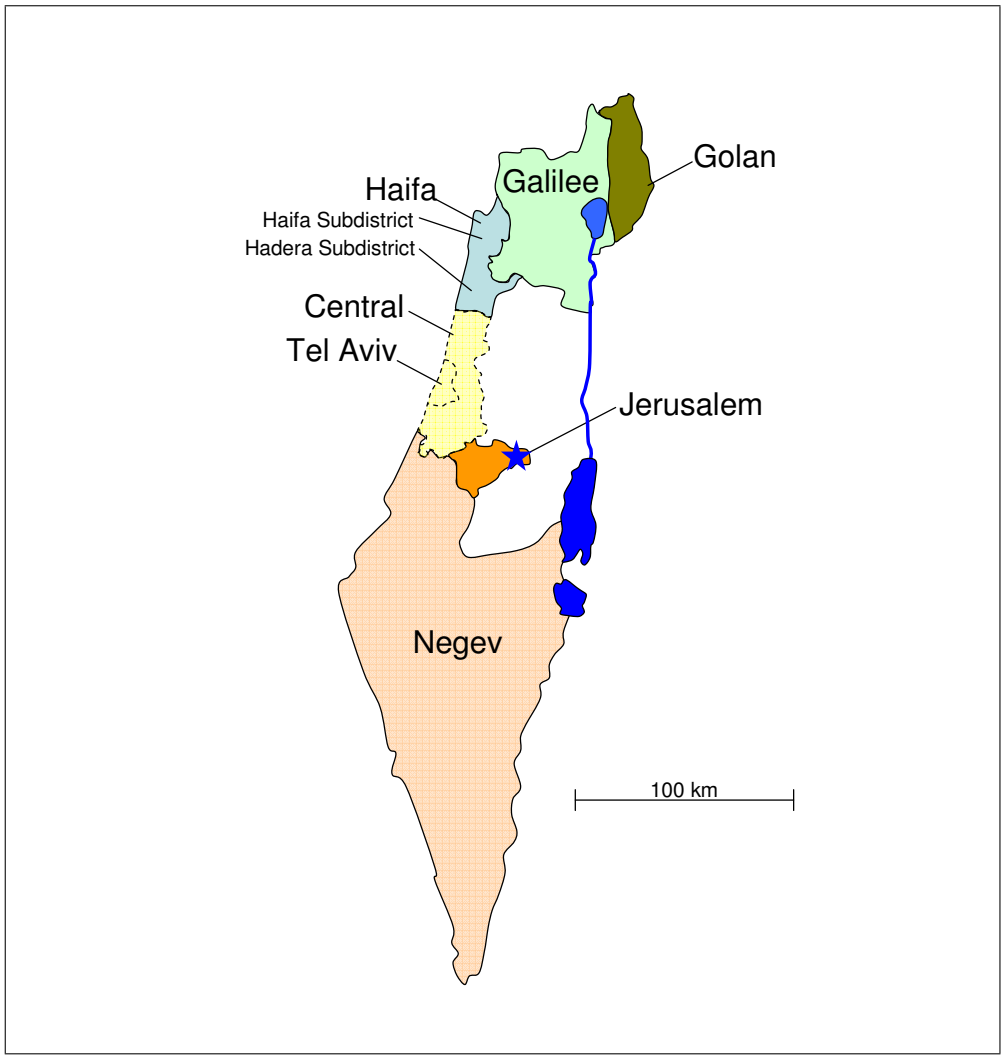

Figure C.1: State of Israel: division into districts. *Source: Central Bureau of Statistics*

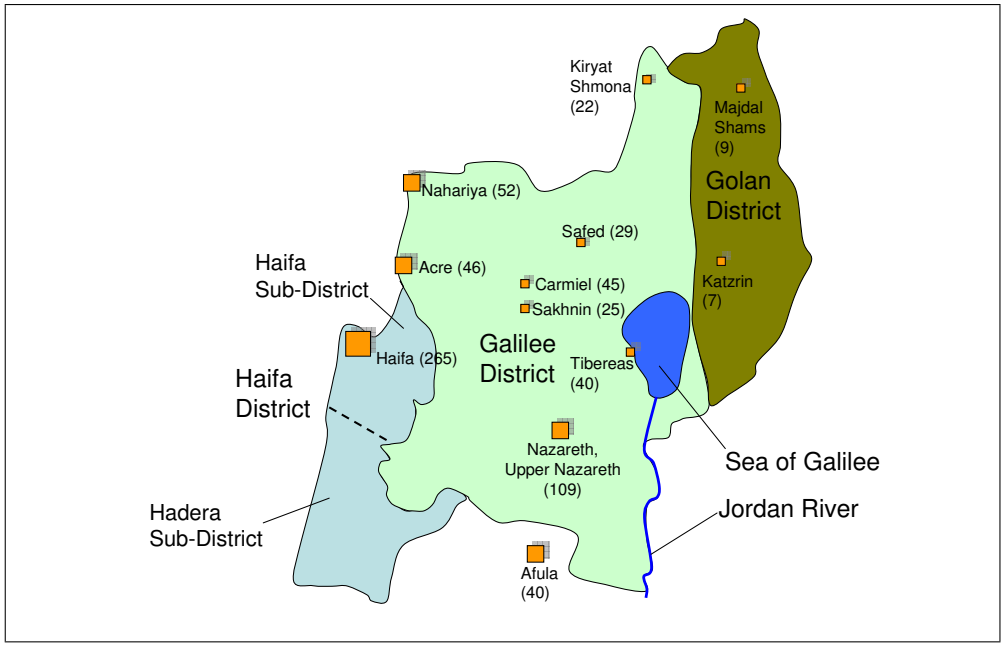

Figure C.2: The Project Region, its districts and main cities and towns. *Source: Central Bureau of Statistics*

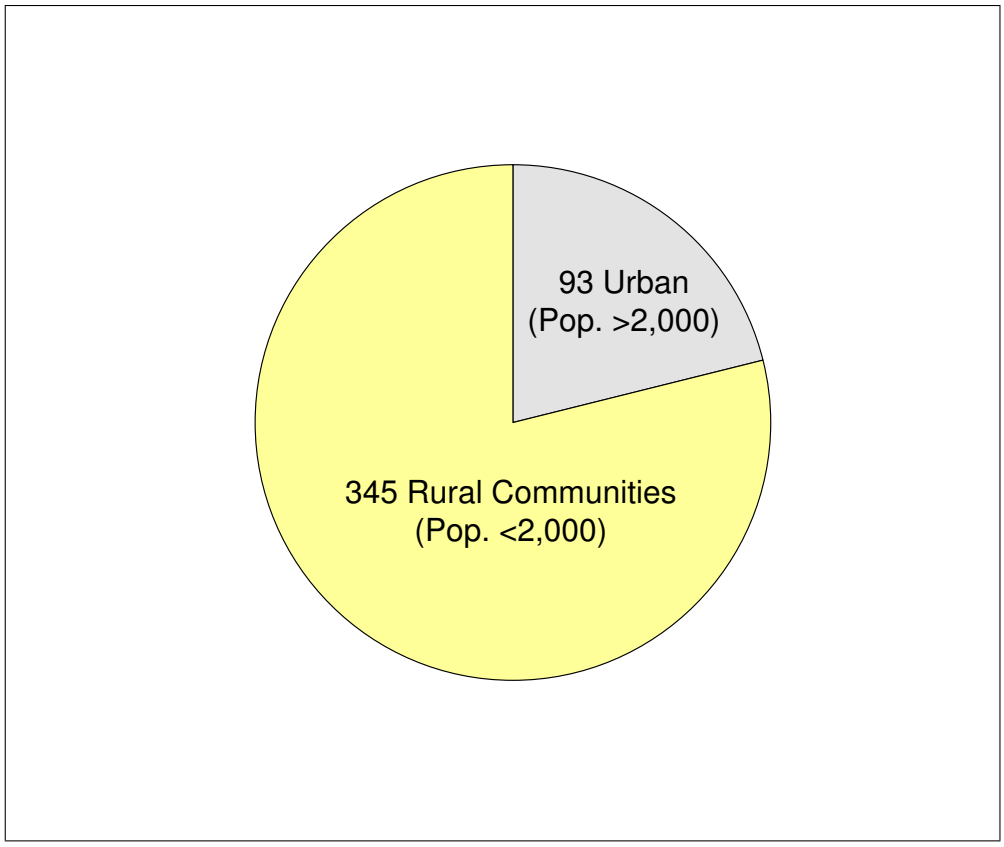

Figure C.3: Rural vs. urban settlements in the Project Region. *Source: Central Bureau of Statistics*

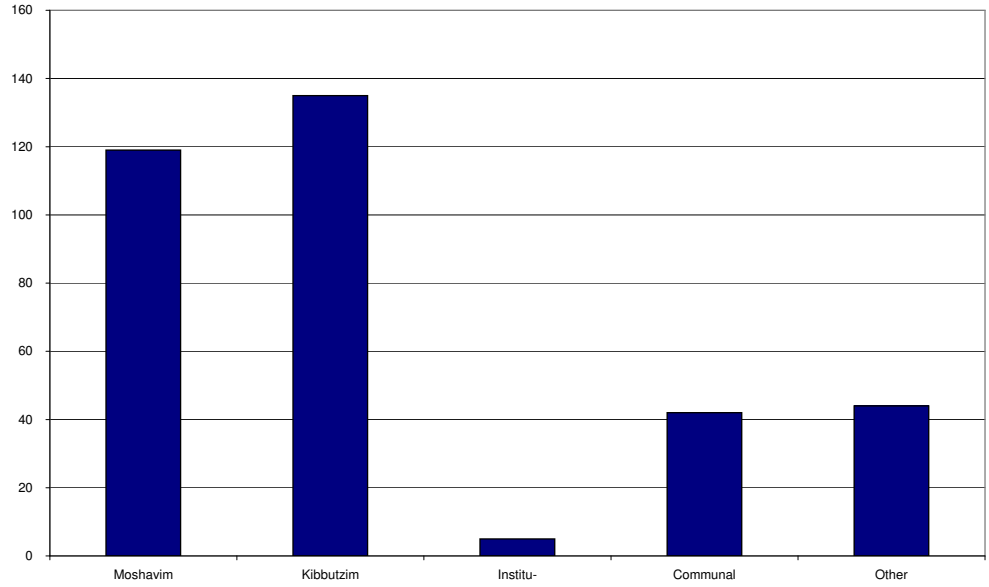

Figure C.4: Rural settlements in the Project Region by type. *Source: Central Bureau of Statistics*

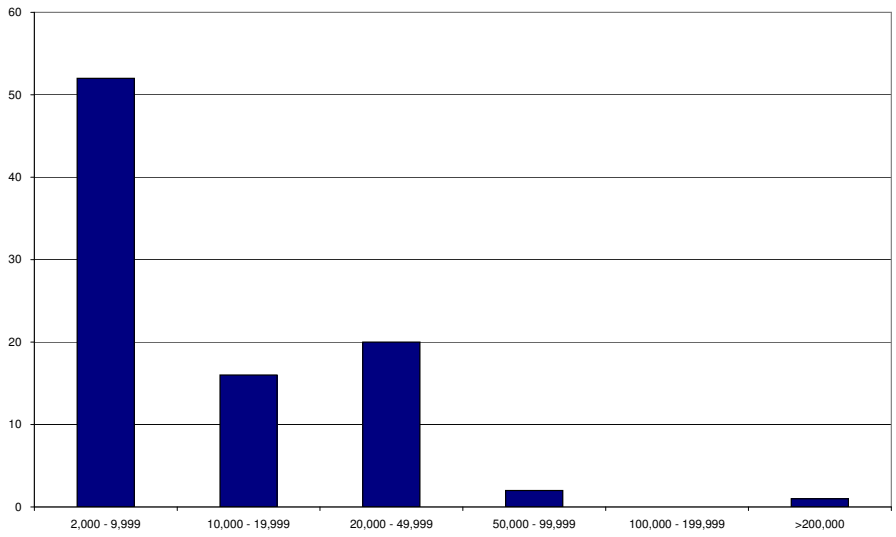

Figure C.5: Urban settlements in the Project Region by size. *Source: Central Bureau of Statistics*

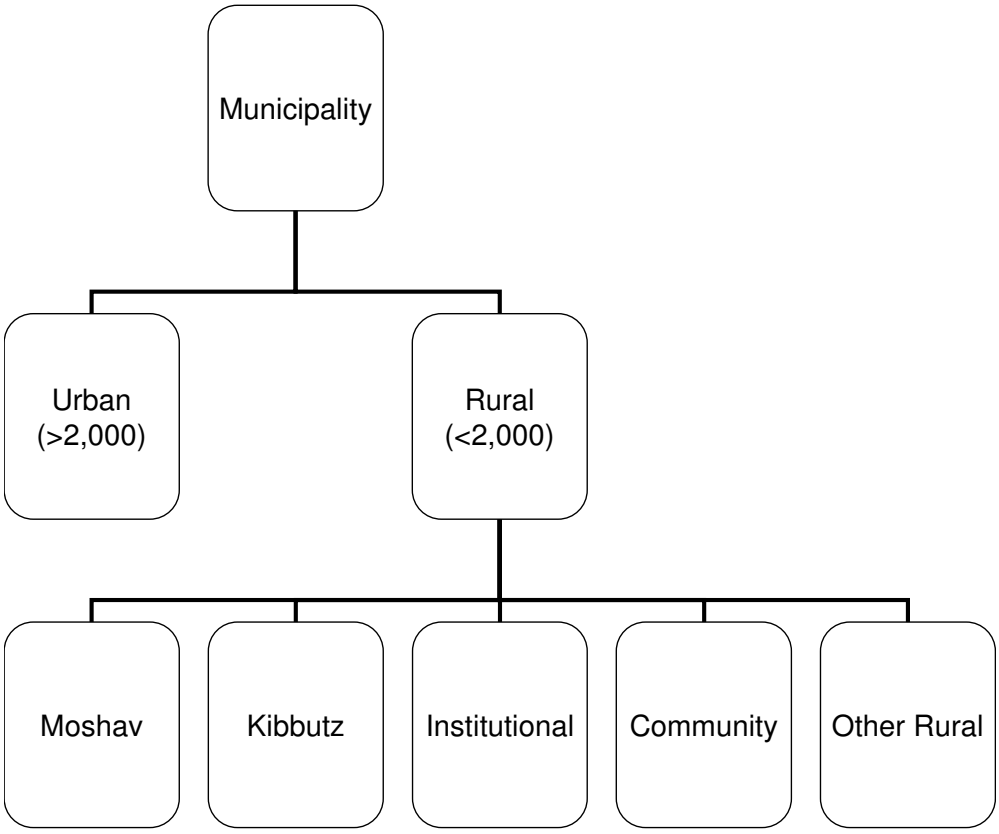

Figure C.6: Types of municipalities in the Project Region. *Source: Central Bureau of Statistics*

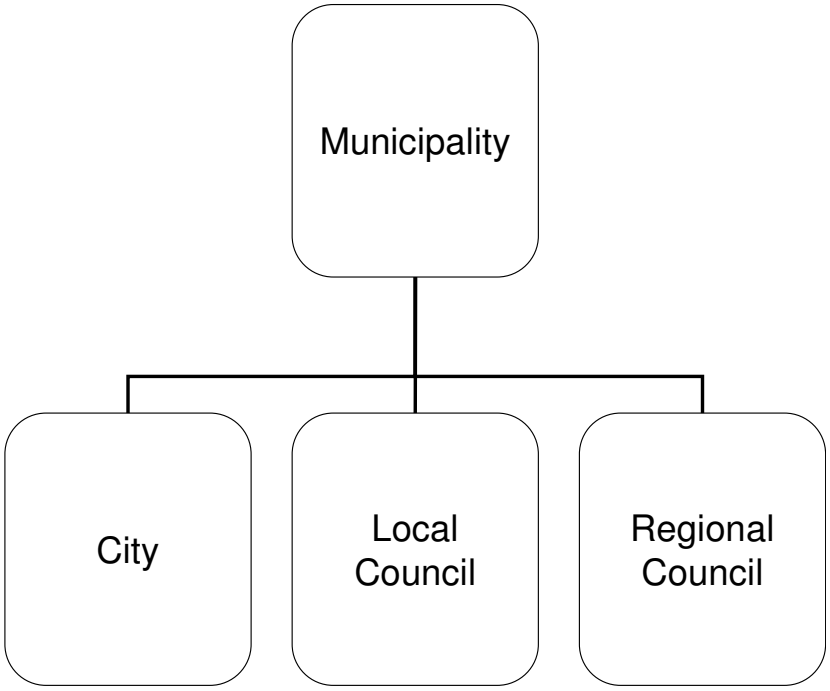

Figure C.7: Types of municipalities in the Project Region. *Source: Central Bureau of Statistics*

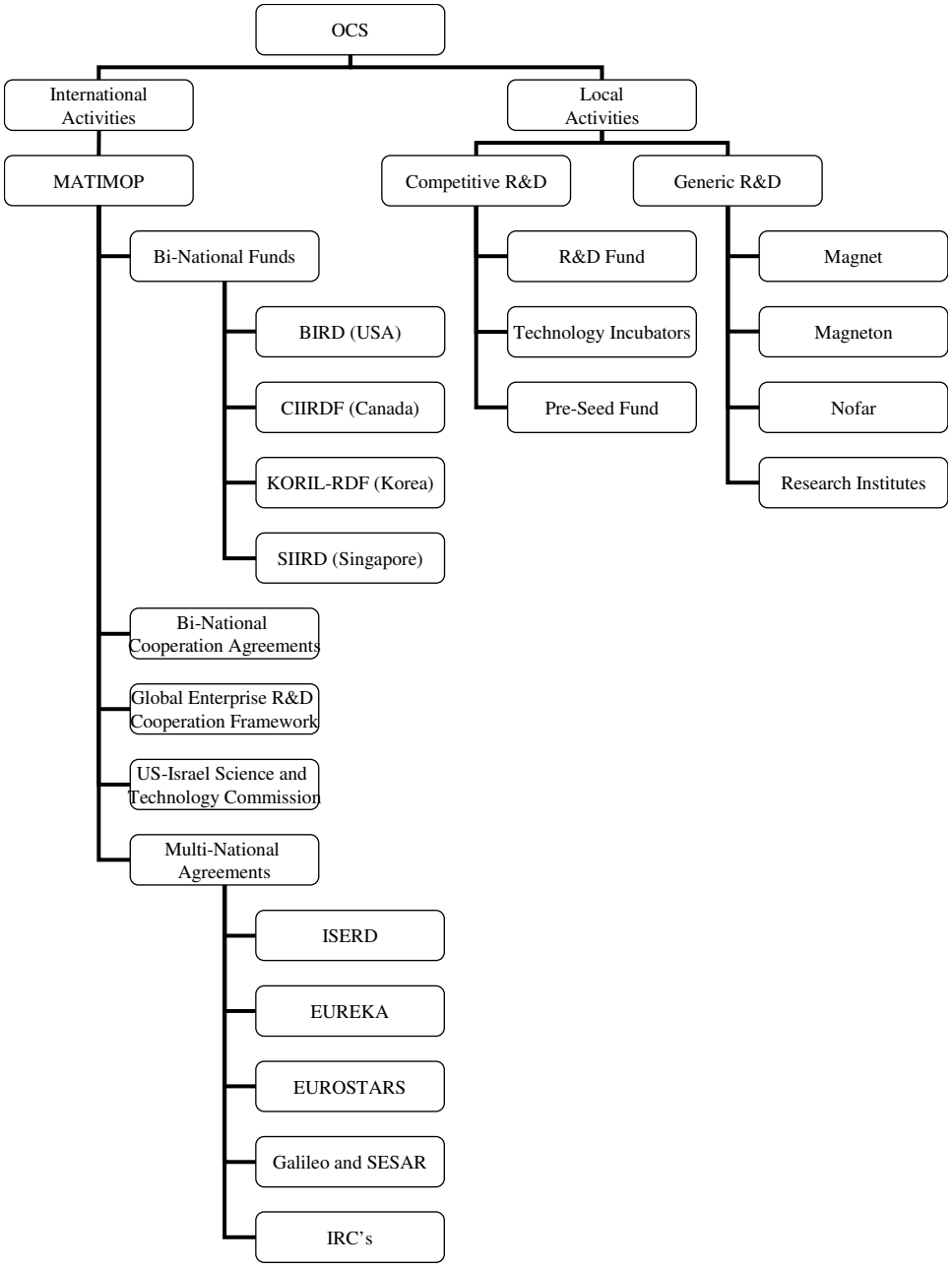

Figure C.8: Business innovation programs of the Office of the Chief Scientist, Ministry of Industry, Trade and Labor. *Source: Office of the Chief Scientist*

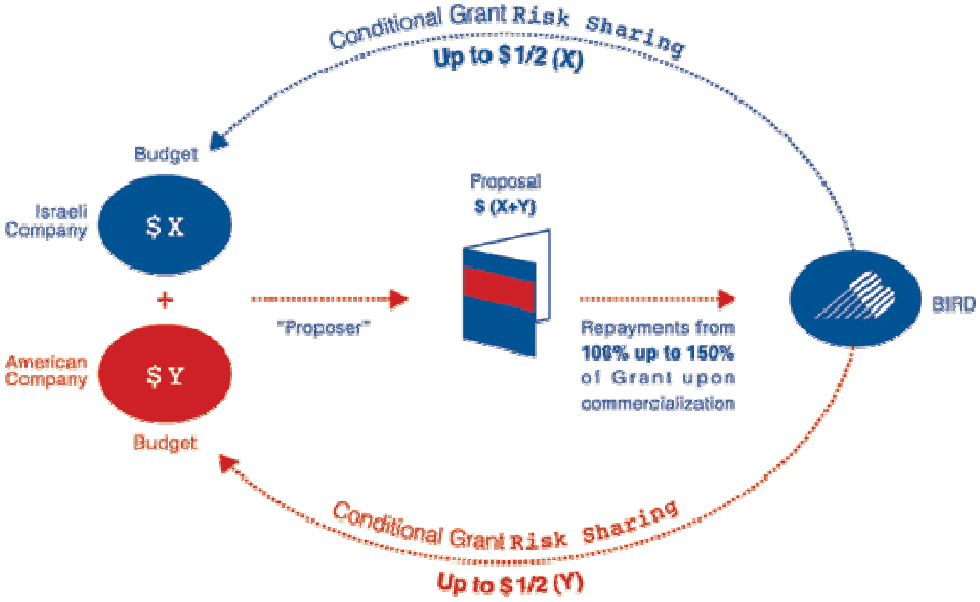

Figure C.9: Investment model of the BIRD Foundation. *Source: MATIMOP*