Faculty Workload and Productivity in Israel: Lessons for Uncertain Times

By Henry Lee Allen

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> *The incredible rise in Israel's economic performance in the last two decades is primarily driven by research, and its future economic flourishing will depend on research, too.*
>
> Carlo Strenger[1]

The health of cities and nations, notes economist Edward Glaeser, depends on their human capital.[2] Nowhere is this more apparent than in Israel, where cultural capital, social networks, and institutional policies produced an innovative, productive academic system in less than a century.[3] The horrors of the Holocaust and perpetual warfare with national enemies make the country's academic accomplishments that much more remarkable.[4] Its system offers lessons for all academics, especially colleagues in smaller developing nations.[5] This article notes lessons that might improve the conditions of faculty work elsewhere during uncertain times.[6]

ISRAEL: SOCIAL STRUCTURE AND CULTURAL CAPITAL

Israel, a parliamentary democracy established in 1948 in fulfillment of a Zionist vision, has a ceremonial president and a prime minister who leads a parliamentary majority and governs with a cabinet of officials.[7] The Knesset (a 120-member parliament) conducts the nation's executive and legislative affairs. It began with visionary, tenacious leaders, including Chaim Weizmann, David Ben-Gurion, Golda Meir, Yitzak Rabin, and Moshe Dayan.[8]

Located in a precarious military location, Israel encountered hostility from neighboring nations and terrorist groups from the outset (Figure 1).[9] It became a world leader in innovation while surviving political, ethnic, and armed conflicts, economic turmoil, and intergenerational transitions.[10] The population grew eightfold from 717,000 to 5.8 million—an estimated 80 percent Jewish—between 1948 and 2000.[11] One analyst lists the changes associated with this growth:

> During this period, over 2.6 million immigrants had arrived in the country, nearly 900,000 from the Soviet Union, 200,000 from the Americas and 400,000 from Western Europe. Commensurately the country has become distinctly urban with 91 percent of the population living in urban areas...The GNP stood at $90 billion, exports at $32 billion and the national budget at $55 billion.[12]

Figure 1. Israel, the West Bank, and Gaza

Government subsidies, universal conscription, and socialized medicine nurtured intellectual endeavors as well as human capital.[13] Israel experienced a 12 percent industrial growth rate between 1952 and 1973, despite housing shortages, food rationing, inflation, political oscillations, and warfare. Exports rose from $28.5 million in 1949 to nearly $477 million in 1966. Much of Israel's 8,000 square miles was desert and hill country, but irrigation "made the desert bloom."[14] Like other western countries, Israel has evolved into a consumer society with substantial high-tech and tourist industries.[15]

Israel's academic system contributed to its infrastructure and international impact. It contains, scholars note, the world's most potent concentration of innovation and entrepreneurship, including the highest proportion of engineers.[16] So, too, research and development, with companies like InTel in the forefront. Cultural and venture capital nurtured Israel's creativity. "In 2008, per capita venture capital investments in Israel were 2.5 times greater than in the United States," notes a recent study, "more than 30 times greater than in Europe, 80 times greater than China, and 350 times greater than in India."[17] Only Israel, the study claims, has devised a system of electric vehicles to free itself from dependence on foreign oil. Some further observations:

- Israel, with just 7.1 million people, attracted close to $2 billion in venture capital—as much as flowed to the United Kingdom (61 million citizens) or Germany and France combined (145 million).[18]
- After the United States, Israel has more companies listed on the NASDAQ than any other country.[19]
- Israel leads the world in the percentage of the economy invested in research and development.[20]
- Israel experienced an unmatched fifty-fold economic growth since independence.[21]
- Adversity, security concerns, and environmental constraints unleashed inventiveness.[22]
- Israelis are willing to challenge authority and convention. They question and debate, pursue innovation, and view failure as a prelude to success.[23]
- Forty-five percent of Israelis are university-educated—among the highest percentages in the world.[24]

Israel's investments in human capital have paid economic, military, and technological dividends. These investments are centered in Israel's academic system, especially at core institutions such as Technion (Israel Institute of Technology) and the Hebrew University of Jerusalem. The 1950 Law of Return, which permits Jews to immigrate and become citizens, provided scientists, industrialists, and professionals from much of the world.

Key cultural values are even found in the Israeli Defense Forces (IDF), well known for its military exploits. Members of IDF's elite units (such as *Talpoit*) innovate via cross-disciplinary thinking and *chutzpah*.[25] To foreigners, Israelis appear to be bold, frank, persistent, and risk-taking improvisers.

A cooperative ethos—apparent even within competitive endeavors—contributes to Israel's success. "Superstrings" of cultural capital and reinforcing social networks characterize Israel's collective conscience.[26] A rigorous dynamism and a willingness to challenge specious thinking and vacuous authorities generate its cultural gestalt.[27] Ancient norms and modern forms unleash innovation. Its cultural and social dimensions range from the kibbutz to Technion, from great musicians and artists to the Weizmann Institute of Science, from biblical relics to skyscrapers and space exploration.

Yet, the society has its problems, and Israelis are often vehement critics, unwilling to sanitize affairs.[28] Israel shows substantial social inequalities:

> Israel is now rated second in the Western world, after the United States, in terms of social gaps in income, property, capital, education, and spending, as well as in the extent of poverty. While many countries have suffered from a widening of social gaps, caused by the influence of globalization and the technological revolution over the past twenty years, this trend is more pronounced in Israel than elsewhere…. Some 70 percent of private capital is in the hands of the upper 10 percent of the population.[29]

In 2011, Israel's Central Bureau for Statistics recorded the nation's population at 7.746 million, a two percent increase since 2010.[30] Its Jewish population was 5.8 million (75 percent), alongside an Arab population of nearly 1.6 million (21 percent). Ashdod, Haifa, Jerusalem, Petah Tikvah, Rishon Letzion, and Tel Aviv-Jaffa, have more than 200,000 residents; another eight cities exceed 100,000.[31]

Israel continues to face many challenging circumstances.[32] It has the highest fertility rate of all countries in the Organisation of Economic Co-operation and Development (OECD).[33] Having "the second-highest income poverty rate in the OECD," behind Mexico, has produced an erratic pattern of development.[34] Surveyed Israelis reported more "negative experiences (pain, worry, sadness, stress and depression) than any other country in the OECD."[35] The status of women and gay citizens and academics is unresolved.[36]

Political succession often responds to ethnic fragmentation, religious diversification, secularization, and the Arab-Israeli conflict.[37] The factors leading to a productive, enduring peace for Israel are elusive.[38] The Palestinian Authority, Hamas, Islamic Jihad, Hezbollah, the Intifada, suicide bombing, walled barriers, hostile nations, aggressive intrusions, lethal weapons, toxic flotillas, jingoistic settlers, and radical extremists require constant vigilance.[39] Terrorism stalks and stifles constructive negotiations.[40] But the Jewish Diaspora, friendly nations, and indigenous intellectual prowess help Israel persevere. These historical trends and factors directly affect Israel's academic system.

ISRAEL AND GLOBAL SCIENCE

The fate of societies in this global era, wrote Israeli sociologist Joseph Ben-David, is attached to the core scientific and technological innovations produced and disseminated through

academic systems.[41] A recent ranking places Israel eighth in the world, among 76 countries, in its scientific capacity.[42] Scholars attribute Israel's scientific prowess to the Jewish Diaspora, grit, tenacity (*davka*), investments, venture capital, entrepreneurism, the influx of expertise from immigration, initiative (*yozma*), a penchant for debriefing, social networking, and cultural and social capital.[43] "Brain circulation"—another contributing factor—occurs when talent leaves Israel, settles abroad or returns to the home country, and becomes an expatriate leadership.[44] These stimuli help to create a *rosh gadol*, a challenging, big-picture thinker who goes the extra mile to achieve.[45] The Jewish Diaspora provides substantial subsidies, though native and Diaspora interests are rarely identical.[46] Israel relies on China's Diaspora for 70 percent of its foreign direct investment; investments from India are growing substantially.[47]

Technion and the Hebrew University of Jerusalem are the hubs of social, cultural, and technical capital. Innovative faculty members possess knowledge (*yeda*), multitasking abilities, implementation skills (*yissum*), and a cultural norm of *mashup*, "when innovation is born from the combination of radically different technologies and disciplines."[48] The results: breakthroughs in medicine, computers, security, finances, engineering, science, and mathematics. Israel produces more scientific papers per capita than any other nation—109 per 10,000 people.[49] In 2004, Aaron Ciechanover and Avram Hershko of Technion earned Israel's first indigenous Nobel Prizes.

Observers often praise the Israeli academic system: "Today, Israel has eight universities and twenty-seven colleges," notes one study. "Four universities are in the top 150 worldwide universities and seven are in the top 150 Asia-Pacific universities. None are satellite campuses from abroad."[50] The study lists other key characteristics:

- Israel is a leader in the international academic community. A 2008 survey named the Weizmann Institute and the Hebrew University of Jerusalem as the top two "best places to work in academia" outside the United States.[51]
- Israel is first in publications in top economic journals, 1971–2000.[52]
- It possesses a formidable reputation in computer science.[53]
- About 3,000 tenured Israeli professors have relocated to universities abroad.[54] But a new generation of Israeli scholars may fill the gap caused by these departures. Also, Israel attracts world-class scholars by offering visiting academic appointments.
- Israel leads the world in the percentage of its GDP devoted to research and development.[55]
- Israel leads the world in engineers and scientists per capita.[56]

ISRAEL'S ACADEMIC SYSTEM: STRUCTURES, PROCESSES, OUTCOMES

Polemical discussions can obscure the strength of Israel's academic system, especially its state-funded core.[57] This system is nurtured by: (1) stable institutions and the rule of law, essential features of an advanced democracy, (2) a non-hierarchal culture, (3) overlapping networks, (4) the crucible of military service, (5) geographical proximity, and (6) informality.[58]

The system also includes academic, regional, and teacher-training colleges that feed the core institutions.[59] Yeshivas, or religious seminaries, also play a significant role in Israeli education.

Israel's academic system evolved around a core set of institutions: Bar-Ilan University, Beersheba University, Haifa University, the Hebrew University of Jerusalem, Technion, Tel-Aviv University, and the Weizmann Institute of Science (Table 1).[60] Engineering and technical institutions, colleges dedicated to the arts and music, and schools of education surround this core (Table 2).[61]

Hebrew language and culture, along with foreign or immigrant faculty, influenced the evolution of academic work. The impact of the United States and Western Europe is a recurring

Table 1. Israel's Academic Core

Institution/University	Location
Bar-Ilan University	Ramat-Gan
Ben Gurion University	Beer Sheva
Hebrew University	Jerusalem
Open University	Tel Aviv
Technion (Israel Institute of Technology)	Haifa
Tel Aviv University	Tel Aviv
University of Haifa	Haifa
Weizmann Institute of Science	Rehovot

Source: Israel Science and Technology website: http://www.science.co.il/Univ.asp.

theme in the development of Israel's academic system, albeit adapted to societal influences. For example, compulsory military service brought an unduplicated seriousness to Israeli postsecondary education.[62] Government funding varies according to institutional impact, prestige, and politics.

Scholars identified a serious, unceasing crisis in academic labor markets over four decades ago, though some parameters have changed.[63] From the start, Israel's professors struggled to pursue teaching, research, and service under difficult financial conditions that resulted in an international brain drain. Deep challenges regarding absorbing a diverse faculty, immigrant students, contingent funding, and other institutional or professional adjustments—plus considerable flux—surrounded professors for decades. But Israel overcame most of these challenges.

ACADEMIC WORK IN ISRAELI UNIVERSITIES

Israel's postsecondary education system has an impressive record of accomplishments. But complicated "hydra-like" problems persist—including concerns about governance, salaries, contingent faculty, and academic capitalism.[64] In 2010, Education International (EI) and the Canadian Association of University Teachers (CAUT) reported on the system's dynamics.[65] The study—based on interviews with professors, students, union officials, academic staff, administrators, and representatives from Israeli and the West Bank human rights organizations, shows the strategic role of faculty unions in combating threats to academic freedom and the encroachment of academic capitalism by business interests.[66]

The 1997 UNESCO recommendation on the status of higher education teaching personnel—the basis for the EI-CAUT study—specifies principles of academic freedom, individual civil rights, collegial governance, employment conditions, remuneration, security, workload, collective bargaining rights, appraisal (evaluation), and nondiscrimination. Its recommendations provide the basis for a universal mode of scrutiny of national academic systems, though it fails to specify how academic systems should integrate these principles, or how violations should be sanctioned.

Academics teach about the best and worst aspects of civilizations, their humanistic ideals and their scientific pursuits.[67] No small order in Israel, which has confronted ideological intransigence, educational stratification, segregation, violence, jingoistic leaders and political gamesmanship, radical groups and

Table 2. Israel's Academic, Regional, and Teacher-Training Colleges

Academic and Regional Colleges	Teacher-Training Colleges
Academic Center of Law and Business	Achva College of Education
Academic College of Tel Aviv-Jaffa	Arab College for Education
Afeka-Tel Aviv Academic College of Engineering	Beit Berl College
Ariel University Center	Bloomfield Academy of Design and Education
Ashkelon Academic College	David Yellin College of Education
Bezalel Academy of Arts and Design	Efrata College of Education
Center for Academic Studies	Emuna College of Education
College of Management	Givat Washington College of Education
Hadassah College	Gordon College of Education
Holon Institute of Technology	Hemdat College of Education
Interdisciplinary Center	Herzog Teacher's College at Yeshivat Har Etzion
Jerusalem Academy of Music and Dance	Jerusalem College Michala
Jerusalem College of Engineering	Kaye College of Education
Jerusalem College of Technology (Machon Lev)	Kibbutzim College of Education
Kinneret Academic College	Levinsky College of Education
Lander Institute	Lifsihz Religious College of Education
Neri Bloomfield Academy of Design and Education	Mofet-Consortium of Colleges of Education
Netanya Academic College	Moreshet Yaakov Religious College of Education
Ono Academic College	Ohalo College of Education
Ort Braude College	Oranim Academic College of Education
Peres Academic Center	Orot College for Women
Ruppin College	Ort College for Teachers of Technology (Singalovsky)
Sapir Academic College	Shaanan Religious College of Education
Shaarev Mishpat College of Law	Talpoit College of Education
Shamoon College of Engineering	
Shenka College of Engineering and Design	
Technological Center of Beer Sheva	
Tel-Hai College	
Western Galilee College	
Yehuda Regional College	
Yizrael Valley College	
Zefat College	
Zinman College of Physical Education and Sports (Wingate Institute)	

Source: Israel Science and Technology website: http://www.science.co.il/Univ.asp.

terrorism, diplomatic disputes over territories, and warfare. Israeli faculty, the EI-CAUT study concludes, weathered these storms despite episodic discrimination and possible corruption. The study elaborates on faculty workload and productivity:

- Israeli professors have two unions: the Senior Faculty Union for tenured and tenure-track faculty, and the Junior Faculty Union for teaching assistants, instructors, fixed-term staff, and other non-tenured staff.[68]
- Teaching loads average six to eight classroom hours per week across seven months. Core faculty ranks are eligible for fully paid research sabbaticals after each seven years of employment.
- Academic appointments in Israel resemble North American and Western European patterns: assistants, instructors, lecturers, and associate and full professors.
- Appointments, tenure, and promotions depend upon research productivity as assessed by academic peers and external reviewers.
- Faculty salaries have lagged below the inflation rate. Inflation increased by 31 percent between 1997 and 2007, but salaries rose by only 22 percent.
- Academic freedom controversies are often rooted in political or ideological ramifications of the Israeli-Palestinian conflict.
- Proposed changes in governance threaten to subordinate faculty autonomy and collegiality to the interests of business and government.
- "Working conditions for Israeli faculty have deteriorated" as the proportion of contingent faculty appointments has increased.[69]
- Student-faculty ratios have increased to 1 to 25.[70]
- "Salary erosion" produced a brain drain of professors to North America and Western Europe. "The number of Israeli scholars now based in the United States alone represents one-quarter of total senior faculty in Israeli institutions."[71] Consequently, Israel risks a faculty shortage.
- Senior faculty ranks declined as student enrollments increased. Their numbers declined from a peak of 5,178 in 2000 to 4,500 in 2010.[72]
- Half of Israel's 11,000 junior faculty members have contingent or part-time appointments. The nation needs to hire about 600 faculty members per year to recoup the losses due to retirements and resignations.[73]
- Contingent staff members have no job security and receive poor remuneration.[74]
- Women receive 59 percent of degrees awarded, but women faculty members are disproportionately relegated to lower academic ranks: 43 percent of lecturers, 35 percent of senior lectures, 22 percent of associate professors, and 12 percent of full professors in 2004–05.[75] Gender differences remain salient.[76]
- A considerable achievement gap exists between Jewish and Arab students. Inequities exist in primary schooling for interpersonal, cultural, financial, and structural reasons. Arab-Israelis constitute 20 percent of the nation, but only two percent of academic staff.[77]
- Quality assurance and assessment have become major imperatives.
- University senates have stifled the most jingoistic reforms advocated by critics. Unions have occasionally utilized the right to strike—most recently in 2008 and 2010—with collective bargaining upheld by the courts.[78]
- Political opinions differentiate Israeli faculty members as they battle incursions by outside interests.

Israeli academics confront the same forces of academic capitalism, commercialized governance, contingent employment, marginal or declining salaries, market disincentives, organizational turmoil, diversity, discrimination, and threats to academic freedom as other professors in postindustrial societies.[79] These confrontations make the many accomplishments of Israeli faculty even more notable.[80]

IMPLICATIONS

The recently promulgated *Israel 2028* plan builds on the nation's achievements, while addressing its problems.[81] The plan—conceptualized by the United States-Israel Science and Technology Commission and Foundation (USISTC) and by key Israeli leaders—aims to expand higher education and improve Israel's school system, while calling for policy changes.[82] The plan shows how theory and practice can connect to formulate effective solutions to complex academic challenges.[83] "We believe that Israel cannot afford to have mediocre levels of economy, science and technology, government and security," states the plan:

> It cannot allow large social gaps or the strengthening of the forces that crumble it from within. The great challenges that Israel faces at home and abroad require the building of a quality education system, world-class science and technology infrastructure, an outstanding economy, and a society based on justice, tolerance, conciliation, and social solidarity.[84]

The USISTC report confronts problems related to a dual-economy, substantial income gaps and polarization, global competition, labor force participation, deteriorating public infrastructure and services, and the effects of the brain drain. "The approach [of the report] aims for a free, balanced, fair and compassionate economy, which relies upon Israel's cultural wealth and scientific/technological ability. At its core lie Israel's high-quality human capital and its nurturance."[85]

The report calls for positioning Israel among the world's top ten or 15 nations economically while reducing social gaps. It makes the state responsible for stimulating 50 percent growth in Gross Domestic Product (GDP) by using innovative governance methods and by unleashing citizen creativity. Higher education, USISTC believes, is key to fulfilling its recommendations: "Unless post-secondary education is broadly applied within the labor force, innovation will not be dispersed within traditional sectors, nor will Israel be able to compete internationally in a broad and effective manner; subsequently, it will be impossible to produce rapid growth and a significant, sustainable increase in incomes of society's lower-earning segments."[86] Israel, the report recommends, must boost its postsecondary enrollments from an estimated 250,000 to 610,000 students between 2008 and 2028.[87] Faculty ranks must increase commensurately, even if technology is the preferred means of implementation. USISTC also recognizes the need to increase funding for basic university research.[88]

No other nation—including the United States—has addressed its social problems with the tenacity and boldness expressed in *Israel 2028*.[89] Israel's faculty unions can play a critical role in attaining the envisioned societal outcomes. Strategic planning for the welfare of all segments of society, *Israel 2028* demonstrates, is not lethal to market economies. American leaders should include faculty members if they decide to promulgate a similar report.

The fate of professors is inextricably linked to their societies; studies of academic systems should probe comparatively.[90] *NEA Almanac* and *Thought & Action* articles have explored the academic systems of Israel, Canada, the United Kingdom, and the United States, and the experiences of faculty members within them—their structures, dynamics, and outcomes.[91] Core environmental and social factors are always salient, but a society's collective vision, resource allocations or priorities, and policies inexorably affect its system of higher education and vice versa. Deterministic thinking cannot explain the behaviors of individual professors or academic disciplines, but recurrent patterns of behaviors in social networks can.[92] Scholarship on complex systems suggests that social moods might trigger the growth or decline of social systems and their subsets, including academic systems.[93]

What lessons can we learn from Israel's academic system?

- Innovations (humanistic, artistic, scientific, technological, cultural, and social) require nurturing environments and investments.
- Society should tackle difficult problems instead of ignoring or abandoning them. Israel turns pernicious problems into new discoveries and innovations.
- A multidisciplinary vision (*Israel 2028*) and experience (IDF) can nourish a social solidarity that goes beyond financial inducements. Israel, before its days of prosperity, was built from vision and collaboration. Its international stature among global academic systems reflects the sacrifices of prior generations.
- Israel's success results from nurturing social networks (including those in the Jewish Diaspora) and institutional programs in the public and private sectors.[94]
- Societal investments in human capital have unpredictable payoffs that econometric models cannot fully capture. External forces, developmental trajectories, and maturation effects may delay payoffs across generations. But these delays do not justify avoiding the investments.[95]
- Israel's core, peripheral, and semi-peripheral academic institutions must be coordinated. But coordination must occur with inclusive interactions, minimal external intervention, constructive feedback, and academic freedom. Israel's faculty unions can counteract misguided intrusions.
- Proactive planning and action steps galvanize Israeli society, even when specific steps fail. At their best, Israelis tenaciously persist.
- The life of the mind, embodied in the faculty who generate and nurture its contours, will determine the fate of Israel—despite its unresolved social problems and political dilemmas. A scholarly exodus will not annihilate Israel. New minds will take their place, given a compelling vision.
- Research is the key to national health; markets are merely exchange mechanisms. Great research, Einstein taught us, requires vision, creativity, imagination, courage, tenacity, and time. Popular, political, or capitalistic pretensions do not determine these intangible qualities. Perusing *Israel 2028* may help others see what the right academic leadership can produce.[96]

What lessons may we derive from other academic systems in uncertain times? Table 3 compares four academic systems according to often-neglected criteria in quantitative research. The items in the far left column illustrate the reciprocal relationships between academic systems and their host societies, but note the difficulties in quantifying indivisible or intangible social goods that matter. Vision directs leadership. Under the right conditions, coherence and solidarity—instrumental factors for innovation—foster collaboration. We may distinguish Israel, Canada, the United Kingdom, and the United States by the presence or absence of a clear vision that includes its academic system.

Israel, we've noted, relies heavily on its academic system for technological and scientific innovations. Canadian policies favor universities as key actors in research and development. The Royal Society recently urged the United Kingdom to increase its investments in academic institutions that advance global science.[97] The National Academy of Sciences reminds the United States of the global impact of its higher education system. But shortsighted or expedient political policies have shifted investments toward a disjointed, private goods mantra, instead of a focus on human capital.[98] Human capital requires public investment, as even private sector firms receive social benefits from a civilized social order.[99] The United States has nothing like *Israel 2028*.[100]

To sum up:

- Israel and Canada, though smaller societies, improved their global status by formulating a coherent vision and galvanizing proactive, inclusive leadership. Britain is moving in that direction. The U.S. is impaled by political stagnation plus confusion about the worth of its postsecondary education system.

Table 3. The Academic Systems of Israel, Canada, the United Kingdom, and the United States: A Comparison.

Select items	Israel	Canada	United Kingdom	United States
Vision	Dominant in research, science, technology and start-ups	Universities have centrality in government policy and R&D clusters[1]	Innovation and renewal in science and education (Royal Society)[2]	Shift from human capital to a private goods model[3]
Leadership	From IDF and government to create infrastructure and accentuate research	Federal investments and incentives, provincial autonomy, and national clusters[4]	Accentuate scientific networks; investment in science via STEM	Lacks a core vision; multi-sector crises; private -public bifurcation[5]
Coherence	A culture accentuating innovation and start-ups [Technion]	Inertia toward future innovations within a stable economy[6]	Political fluctuations and economic crises retard progress.	Political infighting and eroding bipartisanship (a rudderless ship)
Solidarity	Enshrined in culture (chutzpah); heightened by external threats and terrorism	Relatively stable society with an educated populace	Inconsistency	Inconsistency[7]
Innovation	Expected; risk-taking is normative	Implementing assessments to streamline future innovations[8]	Revitalizing education and government policy	Current trends will yield decline in era of global science[9]
Human Capital	Accentuated	Accentuated	Prioritized	Commercial imperatives[10]
Public Investment	Initiated academic system; deregulated atmosphere for start-ups	Significant investments in public university research	Ambivalent tension between public and private sectors	On the precipice of bankruptcy; deficits; private sector may cause devaluation of public sector
Academic Labor Markets	Nurtured, but problematic[11] [brain drain plus brain gain][12]	Nurtured	Ambiguous; global science; international pressures[13]	Ambiguous; ambivalent academic labor markets[14]
Assigned Grade	B+	A-	B	B-

Sources:

[1] Allen, 2011.

[2] Royal Society, 2011a, 2011b, 2011c, 2010.

[3] Altbach, Gumport, and Berdahl, 2011.

[4] Council of Canadian Academies, 2011b.

[5] Reese, 2011.

[6] Council of Canadian Academies, 2011a.

[7] Best, 2011.

[8] Council of Canadian Academies, 2011c.

[9] Arum and Roska, 2011.

[10] Clawson and Page, 2011.

[11] Interpretations of an Israeli "brain drain" must be cautious. Yinon Cohen (2011) found that most Israeli emigration occurred in the 1990s, and most emigrants were foreign-born Israelis. This study added, "The share of Israeli-born residing outside Israel is not high," relative to other nations.

[12] Israeli Council for Higher Education, 2008.

[13] Tight, 2009.

[14] Nocella, Best, and McLaren, 2010.

- Israeli and Canadian leaders have produced documents that invite academic coherence and encourage solidarity among citizens. Britain's Royal Society leads the charge of the United Kingdom in this direction, but the United States lacks substantial cultural momentum.
- Every society acknowledges the salience of human capital, but Israel and Canada are implementing policies targeting the human capital of its citizens. The United Kingdom and the United States are ambivalent. The political and financial climate in the U.K. mitigates the policies championed by the Royal Society. For decades, the United States has not optimized its investments in the human capital of postsecondary faculty.

Trends in public investment, human capital, and academic labor markets, if unabated, portend greater innovations for Israel and Canada. The United Kingdom and the United States face a declining future unless they can produce a coherent vision, implemented by a fresh generation of thoughtful, proactive, and inclusive leaders. Faculty unions can hold themselves and institutional leaders truly accountable by helping to generate this vision.[101]

Serious problems, some intractable, exist in each society, but Canada and Israel seem the most determined to tackle their problems though academic research. The United Kingdom and the United States face perplexing political climates. One must guess about their oscillations in nurturing innovation within their academic systems. Public investments are stigmatized and stereotyped, while private mechanisms are hailed as panaceas. Assessments, not innovations or discoveries, are celebrated.

So let's assess by assigning an imaginary grade to each academic system and its society. Israel receives a B+ until it makes substantive progress in reducing social gaps. Canada earns an A- for its momentum toward innovation and global scientific prowess. The United Kingdom gets a B until it implements the Royal Society recommendations. The United States earns a B- for its underachievement and its downward slope in global scientific status. The future may be less kind to the United States than the past, especially if the society continues to undermine its professors.

CONCLUSION

No nation is infallible.[102] Brainpower and innovation promote Israel's survival.[103] In contrast, the floundering American academic system lacks astute leadership, a coherent national vision, financial fecundity, and collective tenacity.[104] Faculty assets attenuate; the nation wastes potential productivity and innovation.[105] Problems cannot be solved at the same level of consciousness that created them (an idea attributed to Albert Einstein), so academic publication does not necessarily imply scientific innovation. Genuine intellectual breakthroughs are exceedingly hard to predict and rare.

We may even criticize research universities for rewarding piecemeal, disjointed publications instead of innovations that improve society or stimulate effective problem solving.[106] Though much smaller than the United States, Israel is an innovation hub, enhanced by constructive academic policies. If a regression toward the mean characterizes the United States, a power law accentuating innovations fuels Israel. The U.S. may be headed for trouble if the social forces currently affecting its academic system persist.[107]

How do academic labor markets interconnect academic systems?[108] How do their informal structures, processes, and outcomes affect visible dimensions such as prestige, citations, and funding opportunities? Why do or don't these structures and processes promote scientific innovations? Researchers must investigate the role of scientists in Israel, Canada, and innovative developing nations to understand the conditions facilitating genuine intellectual innovations, not routine scholarship or normal science.[109] Nations ignore these conditions at

their peril. Israel points the world in a promising direction:

> While we may be a small country in certain ways, we are a giant in science, research, and brainpower. Therefore, the intention is to concentrate here a focus of work and research, a significant financial focus and harness to it strong forces in research, science and technology, and link them with similar bodies from around the world, with Israel being the leading factor.[110]

NOTES

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[1] Haaretz.com, March 29, 2011.

[2] Glaeser, 2011.

[3] Israel's academic pursuits and scientific accomplishments should be scrutinized apart from the politics of territorial disputes. Its universities and colleges create the ideas that fuel core innovations affecting technology and industries, thereby creating opportunities to reduce poverty. See Senor and Singer, 2009, for examples.

[4] Philip Altbach cites the role and impact of the Jewish (academic) Diaspora in contributing to Israel's academic system.

[5] Like other developed societies, Israel has entrenched social inequalities and poverty (see below). It "has the second-highest income poverty rate in the OECD [Organisation of Economic Co-operation and Development], coming in only behind Mexico." Israel also has the highest fertility rate of all OECD countries. See *Israelity*, May 26, 2011.

[6] Israel has experienced many cycles of adversity and unexpected disruptions. Yet, it developed a premier academic system—measured by per capita output and allotted time—even as global competition escalated across older nations. Israel ranks eighth in scientific capacity among 76 countries, according to Wagner, 2008. The rankings are: (1) United States, (2) Canada, (3) Sweden, (4) Finland, (5) Switzerland, (6) Japan, (7) Germany, and (8) Israel. Israel is the youngest nation, having gained independence in 1948. All societies can learn from observing the conditions under which Israel has developed this system, the policies it adopted, the challenges it faced, and how it developed its resilience.

[7] Skolnick, 2001, offers a glimpse into Israel's history.

[8] This generalization is not meant to ignore their shortcomings and wrongdoings.

[9] Dershowitz, 2008.

[10] Ritterband, 1978.

[11] Skolnik, 2001, 356. Israel absorbed more than 22,000 Ethiopian Jews in recent decades, changing the ethnic mix and political landscape. Ibid., 352.

[12] Ibid., 358. Fifteen percent of Israel's population are Muslims; two percent are Christians.

[13] Senor and Singer, 2009, 103-134.

[14] Skolnick, 2001, 334.

[15] Ibid., 350.

[16] Dan Senor and Saul Singer, authors of *Start-Up Nation*, which depicts Israel's scientific and technological prowess, appear on YouTube in the video series about Technion, the Israel Institute of Technology (http://www.youtube.com/watch?v=3JN1xwlKmoQ).

[17] Senor and Singer, 2009, 11-12.

[18] Ibid.

[19] Ibid., 12-13.

[20] Ibid., 13.

[21] Ibid., 15-16.

[22] Ibid., 16-17.

[23] Ibid., 18-40.

[24] Ibid., 73. OECD reported this statistic.

[25] Ibid., 69, 70-71. Talpoit is the toughest, most intense IDF unit.

[26] Israeli sociologist Gad Yair (2008, 2009), of the Hebrew University of Jerusalem, examined the influence of deep cultural ideas and motifs on scholarly productivity in sociology. His research has implications for other fields of study. See Israel and Gasca, 2009 for an example pertaining to mathematics.

[27] Senor and Singer, 2009.

[28] Shindler, 2008, 1, Friedman, 1989.

[29] Ibid., 6. Shindler, 2008, notes that 1.65 million Israelis lived in poverty in 2006.

[30] "Israel at 63," retrieved May 12, 2011 from www.israel21c.org.

[31] Ibid.

[32] Shlaim, 2009.

[33] The fertility rate is 2.96 children per household (21c Israelity blog, May 26, 2011).

[34] Ibid.

[35] Ibid.

[36] Toren, 2000.

[37] Ben-Rafael, Gergely, and Gorny, 2006; Yiftachel, 2006.

[38] Carey and Shainin, 2002.

[39] Shindler 2008, 321-350.

[40] Byman, 2011.

[41] Ben-David, 1984.

[42] Wagner, 2008, 88.

[43] Senor and Singer, 2009, 135-173. One can never discount the impact of social networks in any domain. See Hale, 2011, and Valente, 2010.

[44] Senor and Singer, 2009, 138.

[45] Ibid., 88.

[46] For an example in sociology, see Yair, 2009, 143-145.

[47] Senor and Singer, 2009, 139.

[48] Ibid., 188.

[49] Ibid., 212.

[50] Ibid., 211.

[51] Ibid, 219.

[52] Ibid.

[53] Ibid.

[54] Ibid., 220.

[55] Ibid., 227.

[56] Ibid., 212.

[57] According to the Israel Science and Technology Homepage and Rauch, 1971. Israel's Council for Higher Education is sponsoring a new funding program for research [I-CORE: Israeli Centers of Research Excellence] in the computer sciences, renewable sources of energy, cognitive sciences, and molecular medicine. http://www.che.org.il/.

[58] Senor and Singer, 2009, 100.

[59] Faculty workload and productivity is our immediate concern, so we will confine our analysis to the postsecondary level. For helpful compilations of the history of Israeli education, see Elazar, 1997; Elboim-Dror and Tlamim, 2001; Okun and Priedlander, 2005, and Sheffi, 2002.

[60] Rauch, 1971.

[61] Ibid. This study chronicles the history and organization of Israel's school system with special attention to intersections between the state, cultural imperatives, immigration, ethnic cleavages, religious groups, funding, educational policy, faculty ranks, and academic work. It also tabulates the number of faculty appointed to each core institution decades ago.

[62] Auerbach, 1975; Senor and Singer, 2009.

[63] Ibid.

[64] Stinnet, 2007.

[65] Robinson, 2010.

[66] The Maltz Commission on university governance was not enthusiastic about the habitual operations of university governance. It suggested that representatives from business and government increase their presence on governing boards and their control of university affairs.

[67] This generalization is not meant to minimize the sustained, constructive efforts of many citizens and coalitions who advocate peace and justice in Israel.

[68] Robinson, 2010, 18.

[69] Ibid., 3.

[70] Ibid., 17.

[71] Ibid., 16.

[72] Ibid., 17.

[73] Ibid.

[74] Ibid.

[75] Ibid., 23.

[76] Yair, 2009.

[77] Robinson, 2010. See also Ayalon and Shavit, 2004; Elazar, 1997; Elboim-Dror and Tlamin, 2001; Okun and Friedlander, 2005, and Sheffi, 2002.

[78] Robinson, 2010, 18-19.

[79] Ibid.

[80] Ibid.

[81] United States-Israel Science and Technology Commission and Foundation, 2008.

[82] Ibid., 5.

[83] USISTC met for nearly two years and based its recommendations on rigorous research. This essay offers only the highlights of *Israel 2028*.

[84] Ibid, 6.

[85] Ibid, 15.

[86] Ibid, 16.

[87] Ibid, 25.

[88] Ibid.

[89] Canada is a possible exception. See Allen, 2011.

[90] See Rauch, 1971, for the history of Israel's academic system.

[91] These explorations are a prelude to conceptualizing mathematical models and measuring relevant empirical indicators affecting academic work. See Higgins, 2007 and Northrup, 2011. Such systems, which include institutions of varying types and quality, are reflections of social networks that can be analyzed mathematically. See Newman, 2010, and Pattison, 1993.

[92] Higgins, 1998, 200-220.

[93] Prechter, 1999; Buchanan, 2001, and Casti, 2010.

[94] Goleman, 2006.

[95] Goldin and Katz, 2008.

[96] See also Senor and Singer, 2009, 20.

[97] Royal Society, 2010.

[98] Goldin and Katz, 2008.

[99] Ibid.

[100] The federal government and innovative states could modify or adopt relevant aspects of *Israel 2028* when developing their own strategic plans.

[101] Allen, 2010.

[102] Diamond, 2004.

[103] Prince-Gibson, 2008.

[104] Ehrenreich, 2009.

[105] Newfield, 2008.

[106] Lightman, 2005.

[107] In August 2011, Standard and Poor's downgraded the credit rating of the United States for the first time due to the financial mess and political ineptitude of government leaders. See Gross, 2011.

[108] Standard statistical surveys have not adequately grasped this issue—obscuring the impact of weak ties, friendship networks, kinship networks, and affiliation networks in the process. My studies of affirmative action, occupational or career mobility, and status attainment convinced me that social scientists ignore salient multidimensional complexities (power laws, hubs, bifurcations, and fractals), and that an anemic social science results. See Buchanan, 2001.

[109] Ibid.

[110] *MFA Newsletter*, September 19, 2010. These ideas refer to Israel's efforts to reduce its dependence on petroleum.

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