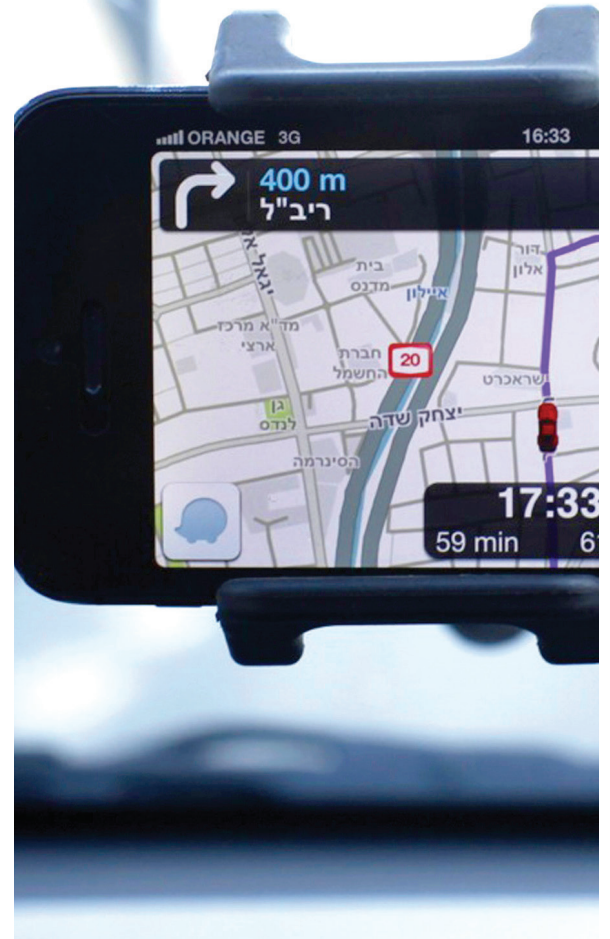




YOSSIZELGER / FLASH 90



Start-up Nation's dark side



NIR ELIAS / REUTERS



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Israel may top the tables in innovation, but the benefits need to be more widely diffused

The existence of two Israels – one advanced, the other traditional – is not stable; mirrors used by start-up NewCO2fuels reflect sunlight to make a fuel gas mixture; (left) the Brill shoe factory in Rishon Lezion; (center) Waze, bought by Google for close to \$1 billion

São Paulo, Brazil – My wife and I are visiting this sprawling city of 11 million as part of a round-the-world trip that includes lecturing, research and some touring. I spoke here to several groups of entrepreneurs and academics about Israeli innovation and start-ups.

While I expected to encounter some political protests – Brazil withdrew its ambassador to Israel in the wake of Operation Protective Edge – I found, instead, enormous curiosity about what Brazil can learn from Israel to catalyze its own high-tech start-ups. Prior to my talks, Technion Nobel Laureate Dan Shechtman and Saul Singer, co-author of the best seller “Start-up Nation,” also spoke here on the same topic.

As always, I told a lot of stories about how Israeli entrepreneurs love to tackle near-impossible challenges, bounce back despite many failures and stubbornly break the rules in order to change the world. But I also made sure to warn my new Brazilian friends about the downside of Israel’s high-tech start-ups. Start-up Nation, I warned, is like the moon in that both tend to show only their bright sides.

But, like the moon, Israeli start-ups do have a dark side, often ignored, that must be recognized, analyzed and dealt with.

My discipline, economics, likes to squeeze everything through the eye of a needle. The economist’s measure of well-being focuses single-mindedly on per capita gross domestic product (GDP) and how fast it grows. By that measure, Israel is a moderate success. Its GDP per capita is \$35,000, 27th in the world, a little higher than Italy (though substantially lower than the US, at \$53,000). However, Israel’s economic growth slowed to an annualized 1.7 percent in the second quarter of 2014, even before hostilities with Gaza broke out. That figure is on par with population growth, meaning that on a per capita basis, the economy has frozen.

But we do not live by bread alone. The quality of our lives depends on far more than GDP. It rests on our schools, environment, society, political system, infrastructure, and the disparity between rich and poor. Bhutan, a tiny Buddhist nation in the Himalayas, is one of the world’s poorest countries with a per capita GDP less than a tenth that of Israel. Yet, its prime minister rightly claims that Bhutan’s “Gross National Happiness” is extremely high.

For this reason, I and my colleagues at the Samuel Neaman Institute at the Technion in Haifa have developed a broad-based index we call “Wheels of Life in Israel,” showing Israel’s performance in five dimensions relative to other nations. They are: Innovation; environment and energy; economy; society, government and education, and science and technology. Our visual map of these dimensions reveals that while Israel’s dynamic start-up energy leads the world in innovation, the country fails to capture the benefits of innovation in other aspects of everyday life.

IF ISRAEL'S LOW-TECH BUSINESSES ARE NOT TRANSFORMED, THE HIGH-TECH SECTOR ITSELF WILL DEGRADE OVER TIME

Method: I asked each of our five main Neaman Institute research groups to choose five to 10 measures that reflect Israel’s performance in their specialty dimension. For consistency, all the data were drawn from a single source, the IMD (Lausanne) World Competitiveness Yearbook, 2014 (IMD is a leading Swiss business school). Israel’s ranking in comparison to 59 globally competitive nations was recorded for each measure or variable.

For each of the five dimensions, we arranged the results on a “wheel” [see graphic: Israel’s Wheels of Life 2014]. On each wheel, a high rank of No. 1 places Israel’s measure at the outer perimeter of the wheel; a low rank of No. 60 places Israel at the center. When you join the data points, a circle, or wheel, results. The shaded area inside the wheel shows overall how well Israel performs in each dimension – the larger the area, the better the performance compared with other countries. In addition, the arrow next to each variable shows whether Israel has improved or declined during the current year, 2014.

Some of the variables are objective in nature, e.g. GDP per capita. Others are subjective, reflecting the opinion of a panel of experts, e.g. “science in schools is sufficiently emphasized” on a scale of one to five, with five indicating “strongly agree.” I

myself respond to the IMD’s detailed questionnaire for Israel each year, along with other experts.

Results: Israel is at or near the top in most measures of “Innovation” (the blue wheel) and, with some exceptions, in “Science & Technology” (the brown wheel). But in “Economy” (the pink wheel), which includes the economic benefits flowing from innovation, science and technology, Israel is only mediocre. This indicates that Israel, the Start-up Nation, is not sufficiently capturing the benefits of its entrepreneurial energy. In “Environment & Energy” (the green wheel), Israel’s performance is highly variable; it is among the world leaders in some areas, such as waste water treatment, but trails in others, such as renewable energy. In “Society, Government & Education” (the orange area), as well, Israel lags due to inequality in income distribution, low social cohesion and bureaucracy.

For the innovation dimension, Israel ranks first, second or third among 60 top nations in four key measures: Managerial entrepreneurship; innovative capacity; venture capital; and qualified engineers. Innovative capacity, for instance, measures the “ability of firms to generate new products processes and services.” Here, Israel ranks first.

For science & technology, the dimension that underlies and drives innovation, there are three worrisome gaps. Israel’s performance is mediocre or worse in the international tests of science, reading and math among 15-year-old students; in the perceived (lack of) emphasis of science in schools; and in the proportion of undergraduate college degrees comprising science and technology. A burgeoning shortage of engineers is developing as the wave of Russian engineers who immigrated to Israel in the 1990 ages and begins to retire and high-tech firms struggle to find replacements.

For the economy dimension, a major area of weakness is productivity – one of the key measures of the wheel. Labor productivity (output per worker) is abysmally low in Israel and it is high productivity that makes factories competitive, which in turn creates well-paying jobs. Among the 34 developed nations comprising the OECD, Israel’s industrial productivity is 23 percent below the OECD average; services productivity is 37 percent lower; and construction productivity is 38 percent lower. Low productivity translates directly into

the high cost of housing and other goods, in turn a source of distress for families struggling to make ends meet.

For the society, government & education dimension, major gaps exist in four key measures: The low proportion of the population in the labor force (partly reflecting low Haredi participation); bureaucracy, which strangles business initiative; equality of income distribution (Israel ranks 39th out of 60 nations, owing to the very large rich-poor gap); and lack of progress in social cohesion, in turn a reflection of the disparity between haves and have nots.

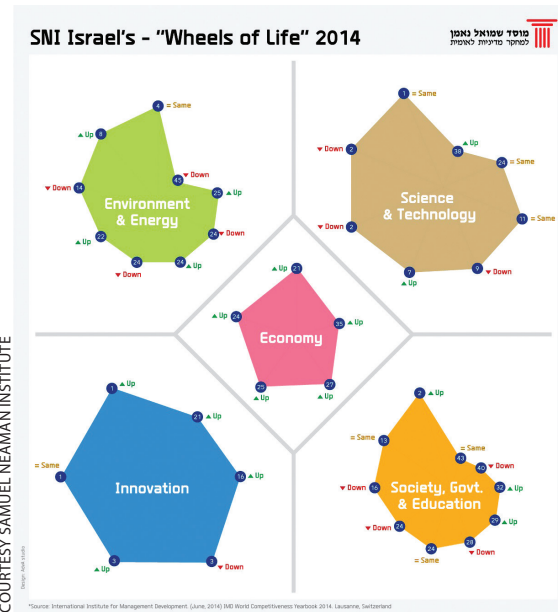
For environment & energy, the cup is both full and empty. Israel is a world leader in waste-water treatment (ranks 4th) and in conserving water (8th), but lags in renewable energies (45th) (despite the wide use of solar water heaters), and in carbon emissions (24th).

Overall, Israel's "Wheels of Life" show the need to address pressing challenges in economic and social policy, as well as in education, in order to sustain the country's excellence in innovation, science and technology, and to fully capture the benefits such excellence confers.

None of this is new. Other studies have reached similar conclusions. For instance, the Global Cleantech Innovation Index for 2014 shows that out of 40 countries, "Israel topped the 2014 index, with its relative outperformance on the measure of start-up companies per capita being a key reason that it did so. The country generates the *culture, education* and *chutzpa* necessary to breed innovation, plus it has the survival instinct to manage a resource-constrained geography."

At the same time, notes the study, "though Israel topped the overall index, the country generates *very low clean-tech* revenues. Israel, as well as Finland and Sweden, have demonstrated the largest gaps between 'evidence of emerging clean-tech innovation' and 'evidence of commercialized clean-tech innovation,' perhaps because companies in these geographies have not yet reached full maturity or are having trouble scaling up efficiently. The gap between venture capital and private equity or acquisition for these geographies may remain a concern in future years," the index asserted.

The same story is repeated in biotechnology. Though biotech is one of the world's most important, fast-growing technologies, and even though Israel has



The Wheels of Life index showing Israel's performance in five dimensions relative to other nations

world-class basic biotech research with three Nobel Prize winners in chemistry and biology, Israeli biotech generates very little in the way of jobs, exports and income.

One of the darkest aspects of Start-up Nation is that, according to my Neaman Institute colleague Giora Shalgi, former CEO of Rafael (now Advanced Defense Systems), Israel is, in fact, "Exit Nation." Start-up companies are acquired by foreign multinationals well before they can grow to global scale and much of the creativity and innovation is shipped abroad before they can benefit the broad mass of Israelis. Far more attention must be given to finding ways to help start-ups expand to global scale before selling out to multinationals.

Former Teva CEO Israel Makov once defined innovation in just nine words: First to imagine, first to move, first to scale. Israel, Start-up Nation, excels in six of the nine words: First to imagine (loads of creativity) and first to move (loads of start-ups), but stumbles at first to scale – and it is in global scale that the true benefits of innovation are captured in jobs, income and exports.

Our "Wheels of Life" project has initiated some spirited debate in Israel's business press. Inbal Orpaz, a journalist who interviewed me about "Wheels" for TheMarker, pressed me for solutions to the dark-side issues. I tried hard to evade the question by claiming that we need to do far more to

understand the fundamental problem – to understand *why* Start-up Nation benefits are not more widely diffused – before we jump to conclusions.

But there is one action item about which I feel strongly. I believe Israel's high-tech community should do far more to impart its management skills, wisdom, experience, competitive juices, and tools to the large chunk of the economy that is low-tech. Many high-tech managers disagree. They tell me that it is all they can do to grow their businesses, stay competitive and constantly generate new and innovative products and services, and it is not their role to mentor other businesses.

But I disagree. If you do not transform Israel's low-tech businesses, I plead, the high-tech sector itself will degrade over time. The existence of two Israels – one advanced, the other traditional – is not stable. Over time, one will consume the other, just as the lean cows devoured the fat ones in Joseph's dream.

High tech should evangelize low-tech for the long-term benefit and survival of each. And the same creative spirit that drives legions of start-ups should permeate every aspect of Israeli society, including its local and national government, schools, universities, shops and small businesses. To paraphrase Herzl, if we will it, then it is no dream. ■

The writer is Senior Research Fellow at the Samuel Neaman Institute, Technion