

Sparking Innovation through Entrepreneurship:

From Macro to Micro

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Abstract

In this paper, I will discuss a range of issues, ranging from ‘macro’ to ‘micro’: * Is innovation, the traditional engine of growth, running out of steam, in the U.S. and abroad? If so, why? * Can effective innovation ecosystems be created? What is the key? Do incubators and accelerators really work? Is there an alternate approach to ‘incubation’? * is Venture Capital truly a crucial part of entrepreneurship? Can you launch a business ‘bootstrap’, without money? How? * Israel has been called the Startup Nation, with thousands of startups – but is there a dark side to this? * Can lab research be quickly and effectively brought to market, as value-creating technologies? How? Why is this so difficult? Can eggheads lay golden eggs? * Can you teach entrepreneurship? How? How will digital education alter the way students learn?

“Innovation is breaking the rules – intelligently.”

In this essay, I will attempt to summarize what I have learned in 48 years of teaching, researching and consulting with both MBA students and startups and global corporations, in Israel, Europe, Asia and the U.S. My theme: There is a very large gap between reality and perception, at all levels, a gap I discovered only after taking early retirement and doing extensive field work. The structure I will use in this paper, and in my talk, is “zoom out / zoom in”, from macro to micro. I am grateful to Prof. Varghese George and the College of Management, Univ. of Massachusetts (Boston) for this opportunity.

We begin with the ‘macroeconomic’ picture, and the future of innovation in the U.S. economy.

1. Innovation may be the problem, as well as the solution.

In his widely-discussed 2012 paper, and forthcoming book, economist Robert J. Gordon argues alarmingly that “future growth in consumption per capita” [for 99 per cent of the US population] could fall below 0.5 per cent a year for an extended period of decades” (p. 1).¹ He cites six headwinds that afflict the U.S. (and, by extension, many other Western economies):

- * demography (aging populations),**
- * education (declines in the quality and quantity of human capital),**
- * inequality in the distribution of wealth and income,**
- * globalization,**
- * energy/ environment and**
- * the overhang of consumer and government debt.”**

These ‘headwinds’ are in fact global in nature, as shown by the annual World Economic Forum Global Risk Report.

Gordon claims that “...the rapid [economic] progress made over the past 250 years could well turn out to be a unique episode in human history. ...Growth in the frontier [the technology-leading country – UK until 1906, US afterward] accelerated after 1750,

¹ * Robert J. Gordon “Is US Economic Growth Over? Faltering Innovation Confronts the Six Headwinds”, NBER, working paper 18315, August 2012, www.nber.org/papers/w18315. See also: R.J. Gordon, The Rise and Fall of American Growth: Princeton University Press Publication Date: January 26, 2016

reached a peak in the middle of the 20th century and has been slowing down since.” Gordon explains that the Third Industrial Revolution, 1960 to now, featuring computers, the web, mobile phones, created only a “short lived growth revival between 1996 and 2004”, and was weak compared with the First (steam, railroads) and Second (electricity, internal combustion engines, communications, chemicals) Industrial Revolutions. Underlying this bleak picture is the secular decline of innovation – new products and services that change and enrich our lives.

Gordon’s arguments are supported by the findings of Prof. Tyler Cowen, who argues that the global financial crisis has created a deeper and more disturbing “Great Stagnation” ; as The Economist summarizes, “for all its flat-screen dazzle and high-bandwidth pizzazz, it seemed that the world had run out of ideas”.²

The co-founder of PayPal, Peter Thiel, sums it up best: “... instead of having flying cars, we have 140 characters (Twitter). “

I would like to ask the audience to guess how many people are employed at Facebook, a seminal innovation of the past few years. The answer: As of June 30, 2015, only 10,955 employees. Much innovation is digital, and the nature of digital innovation is that very few jobs are needed. Coursera is perhaps the world’s leading purveyor of online education, with some 13 million enrolled students and some 2,000 courses. Yet Coursera employs only 180 persons.

Has innovation run out of steam in the U.S. and elsewhere? Has innovation changed its spots, toward new industries that create high-paying jobs for the lucky few, with little spillover impact to other sectors? Does digital business destroy jobs, by replacing labor-intensive industries, like advertising, with labor-saving digital technology?

All large organizations pay fervid lip service to innovation. Why is it, then, that many of them acquire their innovation, paying exorbitant prices for startups that have little more than an idea, rather than grow innovation at home? In a recent article, I outlined six ‘maladies’ big companies suffer from: short tenures of CEO’s, causing myopia; TopDownItis, ignoring bottom-up idea creation; riding success for far too long, until it is too late; molasses-slow innovation processes; loss of contact with customers by top management, barricaded in their posh corner offices; and Disciplinitis, focus on operational excellence whose rigidity drives away creative people.³ Nearly all big companies suffer from one or more of these maladies. Often they seek remedies in acquiring startups. This can prove disappointing.

² Tyler Cowen. Average is Over: Powering America Beyond the Age of the Great Stagnation. Dutton Adult. 2013.

³ See S. Maital, “Why can’t large ‘innovative’ organizations innovate? Six maladies in search of remedies.” Forthcoming, 2015.

All over the world, nations (rich and emerging alike) are seeking to drive growth through innovation. They are realizing that to do so, it is important to create 'clusters', geographical centers where entrepreneurship and creativity thrive, in well-contrived well-designed ecosystems. This is our next topic.

2. Innovation Ecosystems

Worldwide, nations, states, regions, and cities seek to spur innovation, as an engine of growth and prosperity. It has been known for years that innovation flourishes only when a thriving creative ecosystem is built, in which all the pieces of the innovation puzzle fit together in harmony -- education, finance, universities, research, vibrant urban environments, etc.⁴ Frenkel and Maital offer a methodology that visualizes such ecosystems for countries and cities, and they note how different each such ecosystem is. Some countries aspire to become, and emulate, Silicon Valley, but the Valley ecosystem in California is unique and probably not susceptible to replication elsewhere, as is.

University of Massachusetts (Boston) has undertaken to create such an entrepreneurial ecosystem. Here then are some of the lessons I have learned, with regard to 'incubators' or 'accelerators', often the keystone of such systems. I propose an alternate model for the 'incubator' approach, based on proven micro ecosystems that exist in Israel. (See Fig. 1: RAD Ecosystem). A talented entrepreneur, one of Israel's first, named Yehuda Zisapel, designed a remarkable incubation system that generated a 'cloud' of companies, 15,000 jobs, huge exports, and a thriving micro-ecosystem in North Tel Aviv. I should note that Tel Aviv has been ranked in the world's top 5 such entrepreneurial ecosystems.

⁴ A. Frenkel, S. Maital. Mapping National Innovation Ecosystems: Foundations for Policy Consensus. 264 pages Edward Elgar: Cheltenham, UK, 2014.

RAD Ecosystem

Today a vast ecosystem of more than 100 firms exists, with strong informal contacts binding them, and diverse linkages among them.

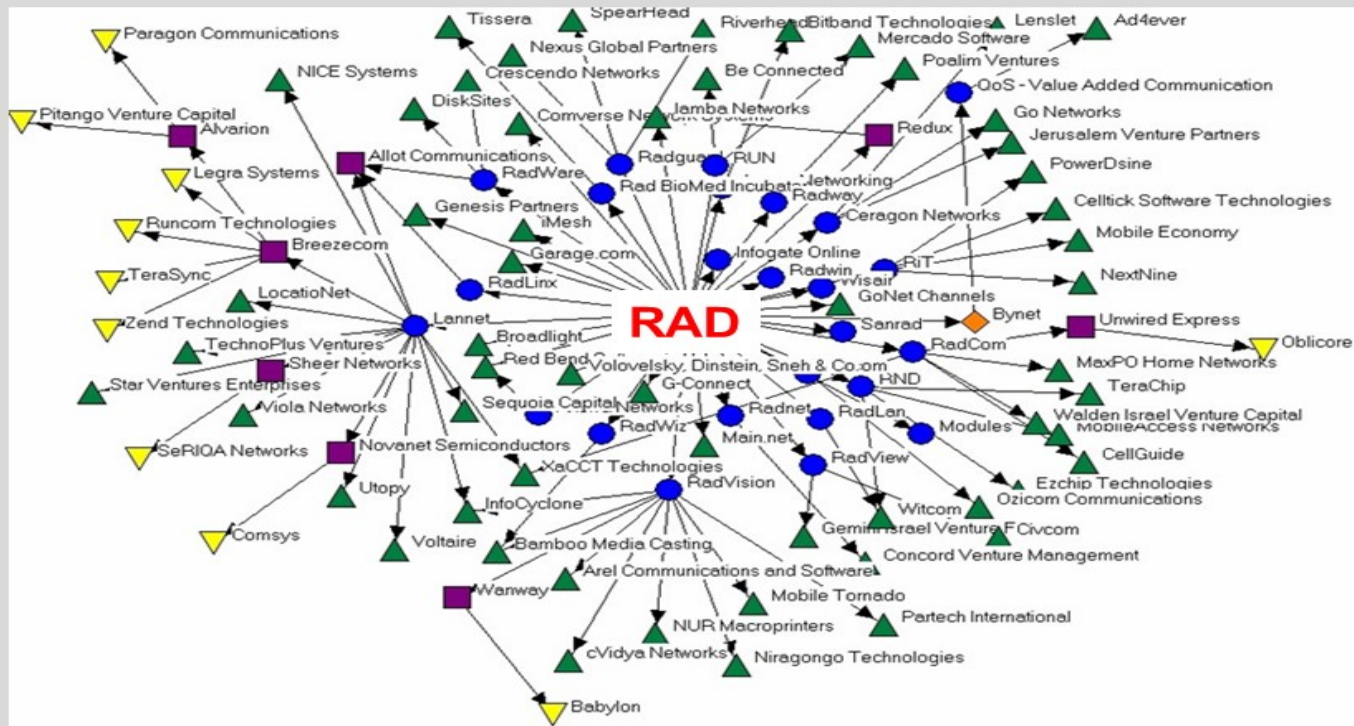


Figure 1. The RAD Data Communications Ecosystem in North Tel Aviv: 128 startup companies sprang from the 'mother ship', by intentional design of RAD's co-founder Yehuda Zisapel. Their success rate: 70 percent.

In my own experience, conventional incubators ‘incubate’ excessively, and accelerators ‘decelerate’. This, despite Israel’s pioneering efforts to create a national network of 30 such incubators, to absorb the sudden and blessed influx of high-level human capital from the former Soviet Union, during 1990-1999. Here is why.

When human babies are born prematurely, under weight, they are placed in incubators and kept warm and fed, until they grow strong. This is of course wise practice. But startups are not human ‘preemies’. This is simply a disastrously misleading metaphor. Startups are baby antelopes, born on the African plains. The lion lurks nearby, watching. The baby antelope must be born, have its afterbirth licked off by its mother, stand up on wobbly legs...and begin to run with minutes. If it cannot, the lion will get it. Startups must have a desperate sense of urgency, and must from Day One be ready to operate as a full-fledged company. This, despite the vital need for careful cautious and time-consuming hiring practices.

How in the world?

Here is Yehuda Zisapel, Chair of Rad Data Communications group, solved this dilemma.⁵

When you build a startup, you hire creative people. Naturally they come to you with ideas. At once, you have a dilemma. If you implement their ideas, your startup loses focus and spreads its meager resources far too thinly. But if you shut them up, you have very unhappy campers and their angst spreads to other creative people.

What to do?

Yehuda Zisapel advises, ‘fire your most creative people’. This sounds absurd. But it works. Here is how. Tell the person who approaches you with an idea: “This is a great idea. It is far outside the range of products and services we can provide. But it could be the nucleus of a successful startup. I have an office next door. Why don’t you quit, and go start up a company based on your idea? If you do, we’ll help you. You can use our HR, finance, legal, IP, marketing and operations people to jumpstart your company. We might even invest a bit of money. And we’re here for you, right next door.”

The result of this process, which began in 1981, and has created 4-5 new companies almost every year since then -- 128 thriving companies in a cluster, half of them very close to the RAD mother ship, with 70 per cent success rate, nearly an order of magnitude higher than the average success rate of startup companies. The method is shown visually in Fig. 1. In place of a 2-3 year startup cycle, as

⁵ A Frenkel & S Maital, “The Evolution of Innovation Networks and Spin-off Entrepreneurship: The Case of RAD”. European Planning Studies, 2014

Startup Lifecycle

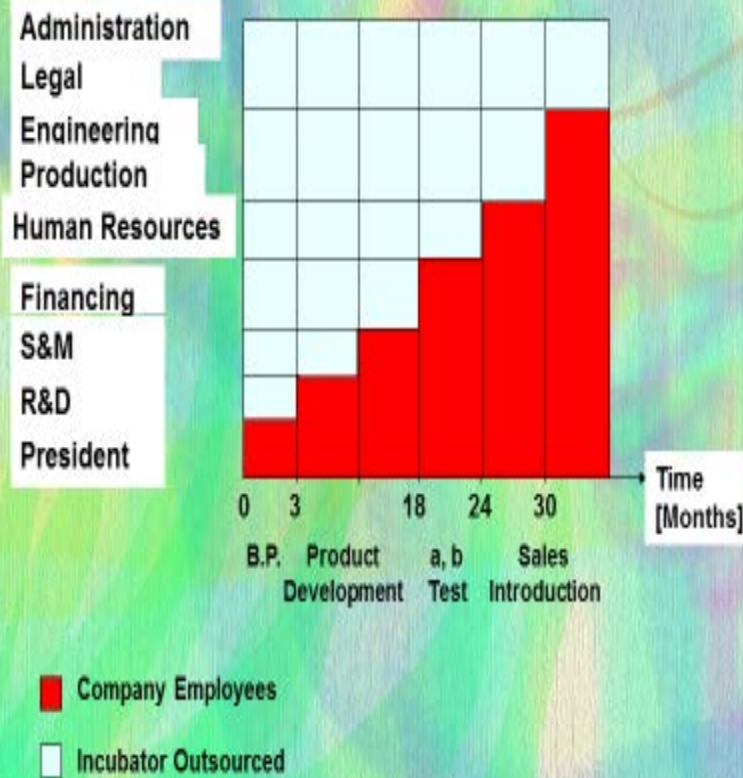


Fig. 2. Jumpstarting the Startup: Leveraging the Mother Ship (RAD)

Startups leverage the 'mother ship' RAD's resources, to become a fully-fledged operational unit from Day One, while they hire key personnel with care.

scarce talent is sought and hired, proven seasoned managers are called on to get the product or service to market quickly and effectively. Moreover, the powerful network of other startups in the area means that for any question that arises, someone in the area knows something, about everything. The informal transfer of knowledge within the cluster, or informal network, is massive, and almost invisible. But it works. And the RAD cluster is not the only one. Several others exist, well documented.

The lesson here for U. of Mass (Boston) College of Management: *Build your incubator around an anchor company, one whose senior managers are happy to devote some time to mentoring startups.* Pay attention to the physical location of startups, close by to the anchor firm. Arrange ways that entrepreneurs can meet informally with the anchor company's experts. And avoid the trap that incubators often entail: A comfortable warm roof over one's head, for a year or two, that dispels the vital sense of urgency so crucial for a startup's success.

3. The mythology of venture capital

In their HBR article, Ghalbouni and Rouzies provide evidence of the "VC myth", showing that Venture Capital firms on average earn relatively low returns, relative to the risk of their investments. In other words, VC's are not outstanding in their ability to pick winners. (See Fig. 3). After the 2008 global financial crisis, capital markets' enormous unsated hunger for risk turned into the opposite. As a result, it is more difficult today for startups to get VC funding, especially at the seed stage, when it is needed. VC funds are happy to invest in later-stage companies, when much of the risk and uncertainty has been dispelled.⁶

A great many entrepreneurs spend a year or more, in a frustrating and humiliating search for venture funding. They discover that opposite them are jaded investors who can write a much-needed check and hence act accordingly. They hear numerous pitches, often similar, and are often bored and inattentive. They read dozens or hundreds of business plans, stacked in piles, as they seek to maximize 'deal flow', looking for that one diamond in the rough. By the time entrepreneurs find a willing investor, valuable time has been lost.

Is there another way?

Backpack bootstrap startups offer an alternative. There is a large underground of entrepreneurs in Israel, not all of them young, who are self-financing. The term 'bootstrap' comes from a story about Baron Munchausen, who once found himself and his horse sinking in quicksand...and pulled himself out by his own hair. 'Bootstrap' once meant something physically impossible; today it has come to mean

⁶ Joseph Ghalbouni & Dominique Rouzies, The VC Shakeout. Harvard Business Review August 2010. "Venture capital hasn't worked for a decade..." "Investments in VC portfolio firms did not outperform investments in other NASDAQ stocks during the boom period of the 1990s'.

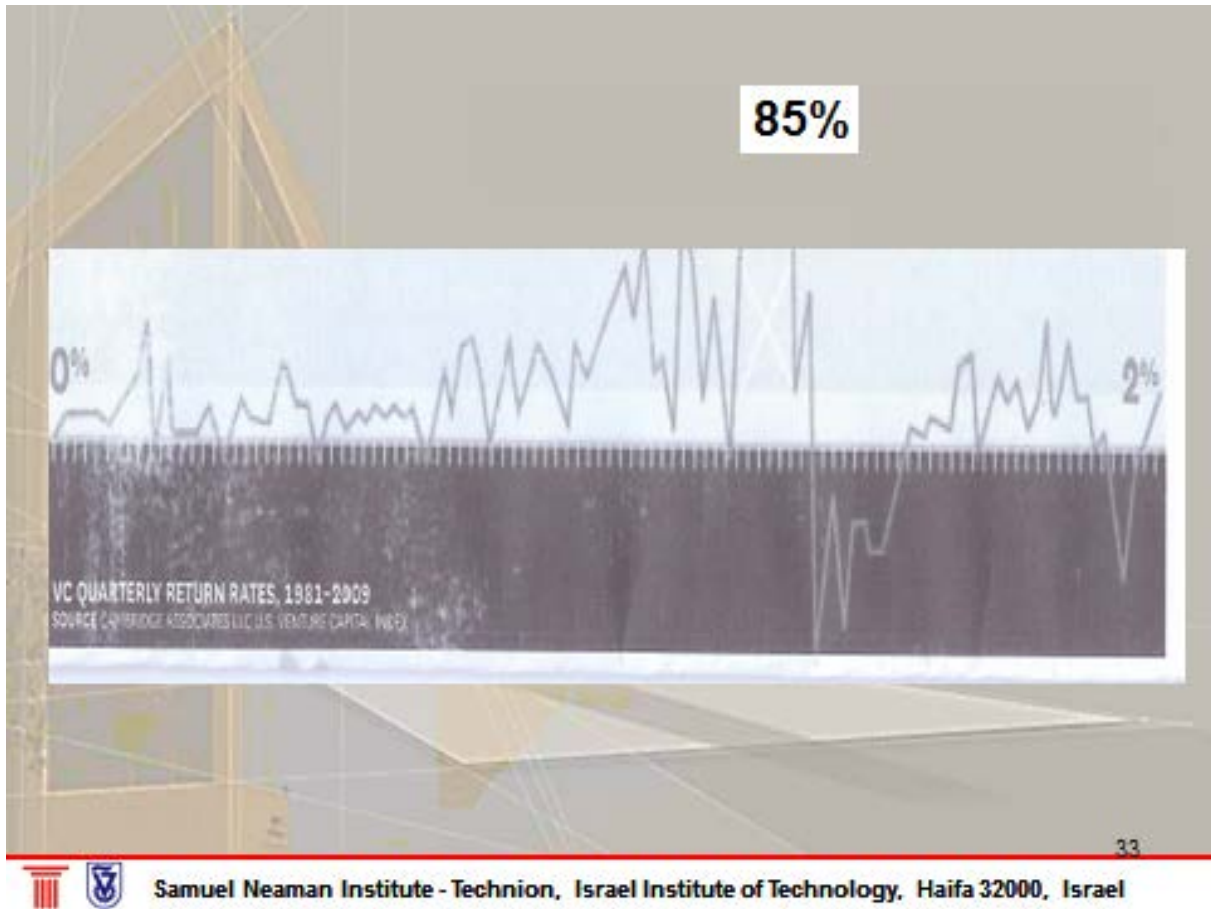


Fig. 3. Venture Capital Return Rates, 1981-2009 (U.S., quarterly)

the opposite – a way to launch a startup quickly, using minimal own funding. Fig. 4 shows a photograph of two such backpack startup entrepreneurs on a park bench in Tel Aviv’s Rothschild Blvd. Their idea? Knowledge management software known as Ripplify.

Backpack startups work with a great sense of urgency, as their dwindling funds signal impending doom unless something is brought to market and creates cash flow. Not all startups can be bootstrapped – some ideas do need funding. But many can. It is an option that all entrepreneurs should consider. And it is not mutually exclusive with VC funding. The farther along your startup idea, the more attractive it is to investors, as the degree of risk and uncertainty declines drastically. When seed money is extremely scarce, bootstrapping can save a valuable year wasted in seeking early-stage investors, and greatly improve the prospects of VC backing at a later stage, on terms that are more favorable (Zero-stage VC money often comes with draconic terms).



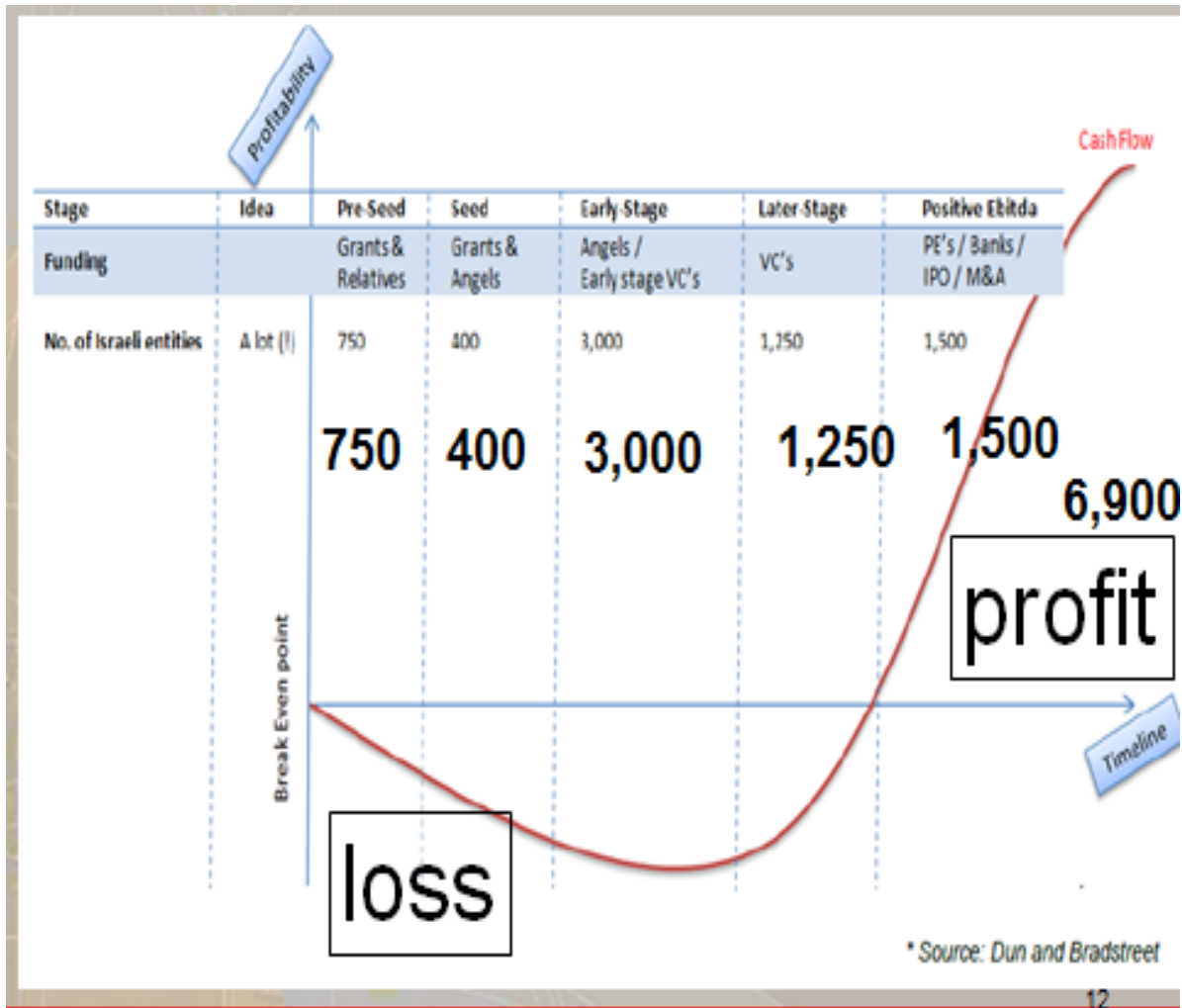
Figure 4. Backpack startup: Rothschild Blvd., Tel Aviv: Meidad & Oz, Ripplify

4. Israel as Startup Nation: The Dark Side of the Moon

The book by Senor and Singer, *Startup Nation*, has sold millions of copies and has been translated into many languages⁷. It recounts how Israel has achieved relative prosperity (about \$32,000 GDP per capita, at last count) through the creative innovation of its entrepreneurs and high tech industry.

But there is a dark side to this startup 'moon'. Fig. 5 provides data from a study by Dun & Bradstreet. Most of the 6,900 high-tech firms in Israel are very small, employing 50 people or fewer. Some 5,400 of them are still cash-flow negative. Over half are early stage. And most important – very very few grow to global scale. The last startup to reach true global scale, Check Point, was founded in 1993. Most startups fail, those that succeed choose 'exits' (acquisition) rather than grow independently. Often, the intellectual property created by exiting startups leaves the country, failing to generate jobs, exports, income and wealth. Only 8 per cent of Israel's work force works in high tech, and that figure has been unchanged for years. Moreover, the management expertise accumulated in high-tech has not spread widely to the traditional industry sector. In a sense, there are two Israeli economies, with a significant gap between them.

⁷ Dan Senor and Saul Singer. *Start-up Nation: The Story of Israel's Economic Miracle*. Twelve: 2011.



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Figure 5. 6,900 Israeli high tech firms: Statistical Profile. Small, negative cash flow and likely to 'exit'.

Figure 6 shows graphically how Israel's innovativeness has not been sufficiently leveraged to generate economic gains for the populace.⁸ Using data from the IMD World Competitiveness Yearbook, and showing five dimensions of wellbeing (including Economy) in cobweb diagrams, one can see that Israel ranks very high in innovation, but far less high in the other dimensions, especially Economy. This is a chronic problem that public policy has failed to address. (The closer the data point to the circumference, the higher the ranking, out of 60 globally competitive nations).

⁸ See S. Maital, "Startup Nation's Dark Side", Jerusalem Report, Marketplace: Sept. 22, 2014.

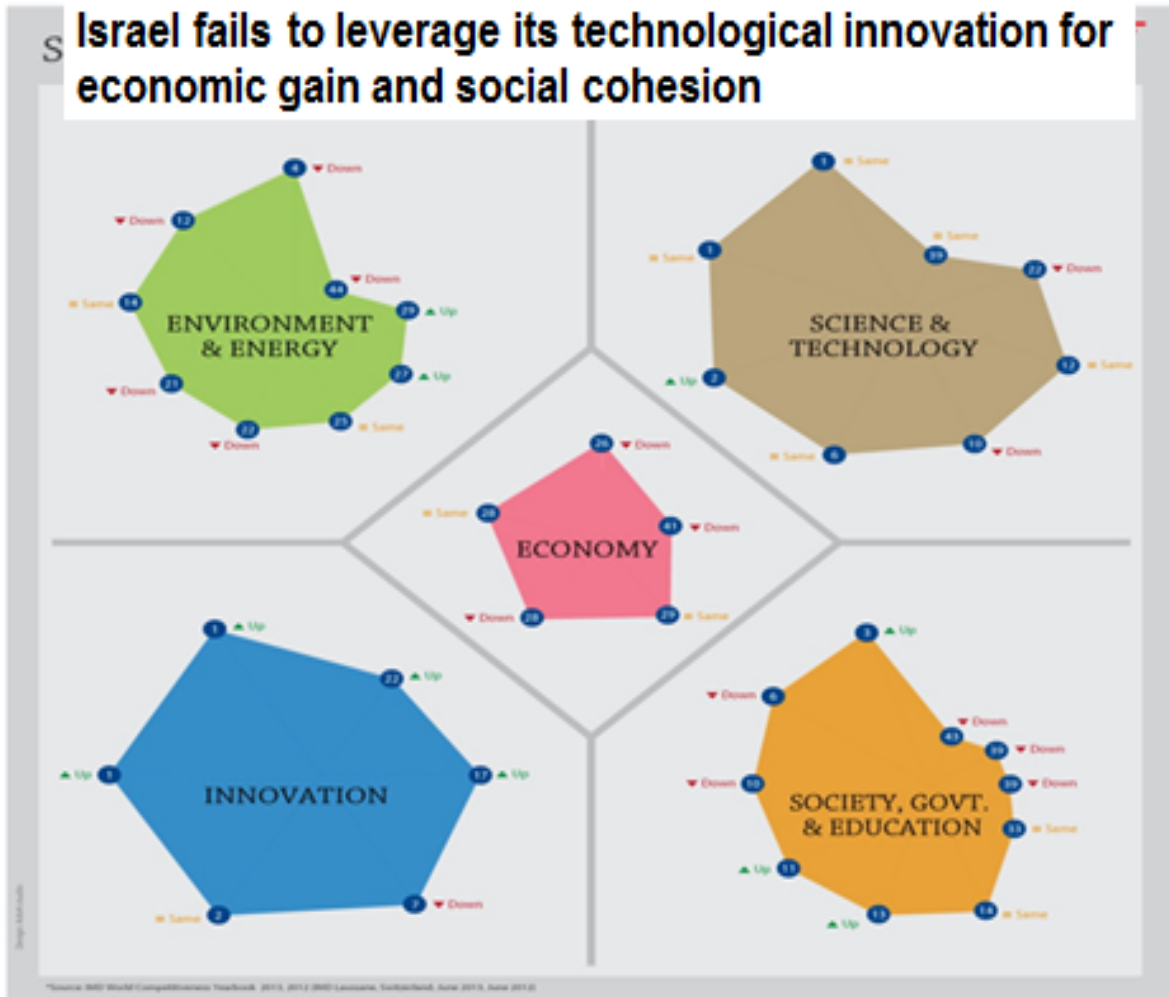


Figure 6. Israel fails to leverage its innovation leadership, in other key social dimensions

There is a lesson here for small countries. Large countries like the U.S. can benefit from an ‘exit’ model, in which big ‘whales’ swallow small minnows, because for the most part the benefits stay at home, in the local market. But for small countries, an ‘exit’ often means literally, an exit of talented people, ideas, technology, products and creativity. Ways must be found to grow startups to global scale, independently, and to cross the “Valley of Death” (see Fig. 7) between the zero-stage startup and a viable global firm.

5. From Eggheads to Golden Eggs: Moving Research into the Marketplace

Basic scientific advances emerge largely from university research labs. The mindset optimal for such breakthroughs is utterly different from that needed to bring the technology to commercial success. This has been called the “Valley of Death” – the gap between science and commerce. (See Fig. 7).

We have learned three key facts at Technion-Israel Institute of Technology.

- **First** – far more innovation is generated by graduates and alumni/ae who start businesses, than by faculty members who take leave or try to dance at both academic and entrepreneurship weddings.
- **Second**, while all technological universities have Technology Transfer units, the most effective technology transfer is done by teaching students state-of-the-art science and technology, spurring their creativity and then turning them loose to change the world. In general, we have found that venture investors find the academic environment rather slow-moving and cumbersome for true business initiatives. At the same time, corporations are finding their way into university labs, realizing that the time cycle between scientific breakthrough and commercial success has become very short, and that a university presence can be helpful to gain a short edge in development time.
- **Third**, every startup needs a strategic partner. Some major Technion successes have occurred, when a startup spun off from a Technion lab (e.g. the lab of optics professor Steve Lipson, Proteomics) has joined with a global firm with the ability to market, guide and scale up its innovations (the U.S. firm, BioRad). BioRad invested early in Proteomics to develop an instrument able to identify 36 different protein molecules on a biochip, and ultimately acquired the startup, while creating an instrument that fit perfectly into its portfolio.⁹ The basic lab technology was “surface plasmon resonance”, a way of identifying molecules by beaming light on them and examining absorption and reflection properties. Moving that technology from the lab to a successful \$250,000 lab instrument was indeed a journey across a fierce ‘valley of death’, possible only through the wisdom of BioRad, which proved as, or more, important as its continued financial investments.

I urge U. of Massachusetts College of Management to do best-practice benchmarking of the leading 10 universities, whose undergrad programs lead in creating venture-backed startups. (See Fig. 8). Each of these universities has succeeded in creating a micro- ecosystem that succeeds in keeping at least some of their graduates in the area, to launch new businesses, and each has succeeded in

⁹ S. Maital, “From Eggheads: Golden Eggs”, Jerusalem Report, Marketplace, July 30, 2012

creating value for alumni/ae by developing powerful networks. The study by Pitchbook for 2015/16 shows that the top 10 undergrad programs “alone have created over 3,000 companies and raked in \$33.5 billion in VC [funding]”. My own university Technion ranks 20th, well behind our colleagues, and competitors, at Tel Aviv U., who rank 9th globally. I should note, however, that Israel’s high-tech industry and startup sector was born at Technion. And our study of Technion alumni/ae show that one in every four has started a company, and one women graduate in every seven.¹⁰

Why Creativity is So Hard

There is a “Valley of Death” Between an Idea and Market Success

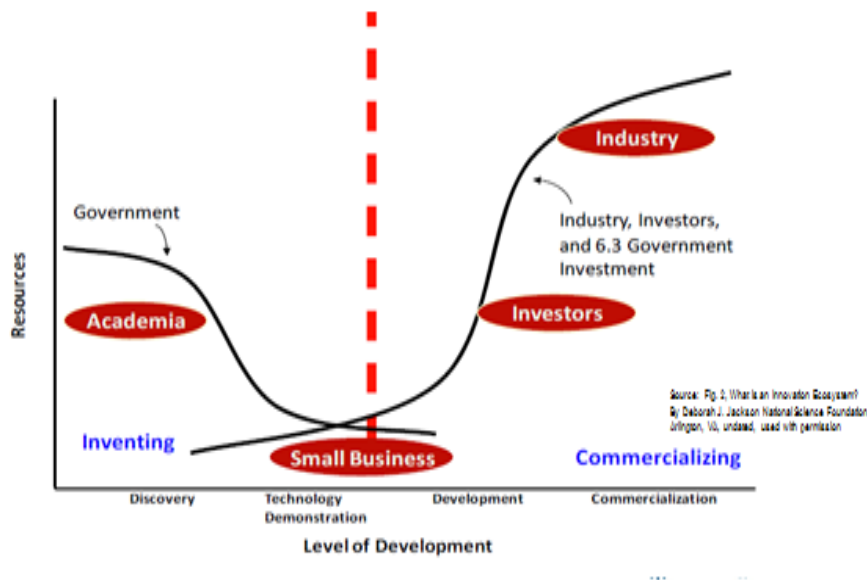




Figure 7. The Valley of Death Between “Academia” and Industry: How to Cross It?

¹⁰ A. Frenkel and S. Maital. Technion Nation: Technion, 2nd edition, 2015.

TOP 50 UNDERGRADUATE

| | | | entrepreneur count | company count | capital raised (\$M) |
|----|-------------------------------------------------------------------------------------|----------------------------|--------------------|---------------|----------------------|
| 1 |  | Stanford | 561 | 472 | \$5,896 |
| 2 |  | UC Berkeley | 536 | 468 | \$4,107 |
| 3 |  | MIT | 435 | 369 | \$4,555 |
| 4 |  | Harvard | 404 | 359 | \$4,955 |
| 5 |  | University of Pennsylvania | 393 | 351 | \$3,047 |
| 6 |  | Cornell | 323 | 291 | \$3,220 |
| 7 |  | University of Michigan | 312 | 272 | \$1,948 |
| 8 |  | University of Texas | 293 | 266 | \$2,005 |
| 9 |  | Tel Aviv University | 250 | 204 | \$1,754 |
| 10 |  | University of Illinois | 239 | 217 | \$2,061 |

DATA: PITCHBOOK

Fig. 8. Top universities in creating funded startups: Source – Universities Report: Pitchbook 2015-16 edition, p. 4

6. Can you Teach Entrepreneurship?

Entrepreneurship is by definition an act of creation that entails ‘intelligently breaking the rules’. How, then, can one define a set of rules for breaking rules? How can we teach the rules for breaking the rules?

Here is a feeble attempt to answer this paradoxical question, based on several experiments with which I have been involved. The core of the difficulty is this: Entrepreneurs need mastery – they need expertise, deep expertise, in some discipline or skill. At the same time, they need the innate ability to challenge anything and everything-- rebellion. *How can we teach the importance of mastery (learning old things) and rebellion (inventing new ones), while overcoming the difficulty of getting the lamb of discipline to co-exist comfortably with the wolf of creativity?*

- **Experiential Action Learning:** I doubt you can teach someone to *become* an entrepreneur. You can only provide them with proven tools that will help them improve the odds of success, once they have chosen the difficult and challenging path of the startup. Imparting those tools is best done in an experiential, action-learning framework. For years, I have taught an innovation course that is concentrated into three, four or five days, including 38-hour for-credit MBA courses, in which teams of students practice ideation and then transform their idea into viable businesses, and present the package to a panel of critics.

I most recently ran this course at York University’s Lassonde School of Engineering, together with my friend and colleague Prof. Andrew Maxwell. The pattern is always the same. Initially, the classroom has less than a milli-joule of energy, as students wait passively to hear lectures and scribble notes. This always saddens me, as it indicates that our higher-education pedagogy is still largely based on passive listening, on ‘teaching’. At some point, often it takes some time, a light bulb goes on. The students understand that the course is about their *learning*, not about a professor *teaching*. The energy rises, the room fills with noise – and in the grand finale, there is laughter, applause and excitement, as students engage and take action. The focus of these experiential courses varies. But always, the goal is learning-by-doing.

- **Temple University (Andrew Maxwell):** “innovation creativity” course for all. Prof. Maxwell has pioneered a university-wide course at Temple University, titled “Innovation Creativity”, with some 1,500 students enrolled. This course is based on the principle that creativity pervades all human activity, not just entrepreneurship, and hence every student should take a course designed to enhance his or her creativity. Prof. Maxwell and I are working on a plan to bring a similar university-wide course to Shantou University, in Shantou, Guangdong China, where my university Technion is helping to found a new science and technology university. It is

worth considering to launch a similar course at University of Massachusetts, driven by the College of Management, and suitable for all disciplines and faculties.

- **Technion: General Studies: Technological Entrepreneurship.** My friend and colleague Prof. Dan Shechtman, 2011 Nobel Laureate in Chemistry, is almost as passionate about entrepreneurship as a way to change the world, as he is about his quasi-crystal research. In 1987/8, he founded a General Studies course on technological entrepreneurship at Technion, and I have the privilege of assisting him. In the past 28 years, thousands of undergraduate students from every faculty have taken this course. The structure is always the same. We invite leading entrepreneurs to come to Technion and tell their story honestly to the students. We ask them to talk about their mistakes and failures, as well as their successes. We respectfully ask that speakers eschew theory totally, and simply give us their narrative. In this way students are exposed to real entrepreneurs and see for themselves that even the most legendary and successful among them are ordinary people like themselves, not geniuses, not Einsteins, who with perseverance and strength of character tackled a hard problem, solved it and created value for thousands or even millions of people. We have had students take our course, graduate, found a company, do an 'exit' and return to tell the tale to a new generation of students. Again, I highly recommend such a General Studies course for UMass Boston. It exposes students to an option (starting their own business) that they may not otherwise have considered.

- **Coursera:** With the help of Technion's experts in science and technology education at the Center for Improvement of Teaching and Learning, I had the privilege of building an on-line course on creativity available at Coursera.com, *Cracking the Creativity Code: Part One – Discovering Ideas*. Some 13,000 students have enrolled so far, though not all have stayed for the full course. Two more courses are in preparation, and together the three courses will hopefully comprise a Coursera specialization in Startup Entrepreneurship.

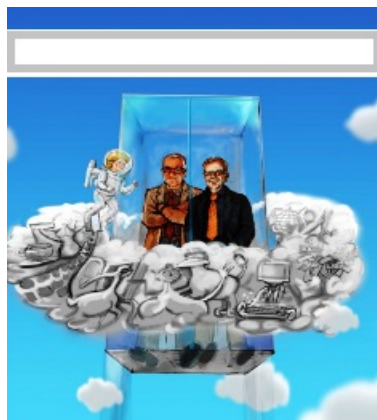


Fig 9. *Cracking the Creativity Code: Part One: Discovering Ideas* (Coursera.com)

Digital (on-line) education is transforming the way students learn, and hence, the way educators teach. I believe universities (including my own) have been rather slow to understand and embrace this technology. It will not replace universities or classrooms. But it will powerfully complement them. For me personally, as a veteran educator, it means ‘raising my game’, because now, my cozy monopoly position in teaching compulsory courses is suddenly democratized and opened, to competition from instructors from around the world, many of them vastly more erudite, talented and capable than I.

For the College of Management, Univ. of Massachusetts, I recommend investing adequate resources in a professional studio, led by an experienced producer with content-creation experience in television. In doing my first on-line course, I learned (painfully) that an effective on-line course is not a professor talking (with slides) to a camera. It is instead a carefully produced almost theatrical venture spiced with photographs, videos and other aides, set up in relatively short ‘bites’, adapted to the needs of learners who work full time and who slip in their learning into spare moments, with very specific needs and goals. I believe this investment will pay off in spades.

Self-Awareness: A vital aspect of entrepreneurship is self-awareness – having the individual entrepreneur be keenly aware of her or his key strengths, weaknesses, passions and goals in life. As someone once said, you can learn a lot about yourself by starting a business, but – the tuition will be very expensive. Ideally, the entrepreneurial journey should *begin* with a high level of self-knowledge, and self-awareness. This is rarely the case with undergraduates, who experience independence perhaps for the first time.

A major role that universities can play in teaching entrepreneurship, is to help students discover who they are – “become yourself”, as Nietzsche counselled. At York University, for instance, we used our three-day startup course to constantly debrief each process, each stage, and asked our participants to look deep into themselves and tell us what they have learned. We found that this debriefing was a valuable and valued part of the course. It may be true that the “unexamined life is not worth living”, but nonetheless, most of our lives go unexamined. In an experiential three-day startup simulation, for instance, students learn about their leadership skills, teamwork, creativity, and ego management (allowing someone else’s idea to be embraced and enlist to make it succeed). It is most effective if regular ‘debrief’ sessions (what I learned, what I learned about myself, what I learned about our team) are conducted.

7. Summary and Conclusion

My final observation is this. After several decades as an educator specializing in innovation and entrepreneurship, at a technological university that has spawned a great many entrepreneurs, I have come to believe that one cannot teach people to *become* entrepreneurs. For some, the risks, intense effort and enormous uncertainty entailed are just too daunting. But for others, who have ‘fire in their bellies’, educators can offer useful proven tools to improve their chances of success, and above all, offer them role models and narratives that show them the option of starting a business, rather than conventionally landing a job. There is enormous benefit in providing young people with a vision of startup entrepreneurship as an option, in addition to conventional options of working for large organizations.

Entrepreneurship entails fairly careful career planning, including an almost obligatory stint working for an organization and learning the ropes of good management, and learning about an industry, without buying into the conventional rules of the game.

Once this is understood, universities can play a key role in fostering startups. Even a very small university, such as MIT or Technion, can change the face of an entire nation. Prof. Ed Roberts and his student Charles Easley ¹¹ have shown how MIT alumni/ae have generated nearly 30,000 companies whose revenues, if regarded as GDP, would comprise the 11th largest national economy in the world. Frenkel and Maital ¹² found similar impact for Technion.

As University of Massachusetts (Boston campus) embarks on the challenging adventure of building its innovation and entrepreneurship programs, through the College of Management, I extend my congratulations, and best wishes for its success. Few challenges are as important or meaningful for the future of the United States, and indeed the world.

¹¹ Edward B. Roberts & Charles Easley. Entrepreneurial Impact: The Role of MIT. MIT Sloan School of Management, Feb. 2009.

¹² A. Frenkel & S. Maital. Technion’s Contribution to the Israel Economy Through Its Graduates. S. Neaman Institute, Jan. 2012. See also Frenkel & Maital, Technion Nation (2nd edition, forthcoming).

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