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Anna (Fitzpatrick) Doherty is an experienced editor and writing instructor with a unique collaborative focus in her work. With the Kauffman Fellows Program, she launched the *Kauffman Fellows Report* in 2010 and the Kauffman Fellows Press in 2012. Recent edited books include Eric Ball and Joseph LiPuma's *Unlocking the Ivory Tower: How Management Research Can Transform Your Business* (Kauffman Fellows Press, 2012), Frank Slootman's *TAPE SUCKS: Inside Data Domain, A Silicon Valley Growth Story* (CreateSpace, 2011), and Yene Assegid's *Forget Not the Sparrows: Conversations with My Grandmother* (Shola Stories, 2011). Anna has 19 years of editing experience on three continents in a variety of business industries, and is the principal of Together Editing & Design, working with lead designer Leslie F. Peters. Anna graduated *summa cum laude* from Georgetown University. www.togetherediting.com

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The Startup Generation: Building the Next Generation Workforce from the Holy Land

Anna Brady-Estevez, Class 14
Hazel Stirgwolt

Recently we designed and delivered a technology presentation to members of "The Startup Generation," students in Israel aged 14-24. When we asked whether they were interested in starting their own companies in the future, we received blank and unbelieving stares. They replied indignantly, "What do you mean by 'in the future'? We have already started our own companies!" This is the type of one-second embarrassment that every innovator or venture capitalist prays for. The strength of this recruitment of youth into the innovation ecosystem was remarkable.

Indeed, why wouldn't a group of high schoolers already be well down the path of entrepreneurship? Granted, this was an unusual ecosystem: the Middle East Education through Technology (MEET) program[1] in Jerusalem is partially supported by MIT and a consortium of technology leaders across Israel, Palestine, Europe, and the United States, and brings together Israeli and Palestinian youth to learn about technology, build business plans, and launch businesses.

While only a few years old and still in advance of a major company "exit," the MEET program has already brought together more than one hundred top students who are pushing the envelope through their hunger for knowledge and building something to generate value and contribute to society. As they enter the workforce, these students will join good company: Israel boasts an exceptional technical workforce and the highest percentage of engineers globally (135 engineers per 10,000 people).[2] Furthermore, the country backs this workforce financially with the highest rate of research and development (R&D) investment globally: 4.7% of GDP.[3]

At a time when Israel is being highlighted for its ability to build out a high-tech workforce, we decided to investigate particular case studies and achievements more deeply. While in recent years *Start-Up Nation*[4] (an enjoyable read, if lengthier than this one) and other works have contributed diverse insights on the broader innovation ecosystem in Israel, in this article we focus on some of the factors that have enabled Israel to build out its high-tech workforce to levels of success most countries would find enviable. We begin by discussing the value of an advanced technology workforce, and then discuss possible channels for building such a workforce. The article closes with two case studies and a

[1] http://meet.mit.edu/.

[2] Richard Florida, Charlotta Mellander, and Kevin Stolarick, *Creativity and Prosperity: The Global Creativity Index* (Toronto: Martin Prosperity Institute, 2011), 6, http://martinprosperity.org/media/GCI%20Report%20Sep%202011.pdf.

[3] Ministry of Industry, Trade, and Labor, *Israel's Competitive Edge*, n.d., para. 1, http://www.moital.gov.il/NR/rdonlyres/EA03B0A9-FDE3-40A2-9039-647AC52C73E2/0/israel_competitive_edge.pdf; see also IMD, *IMD World Competitiveness Yearbook 2009*, available from http://www.imd.org/research/publications/wcy/index.cfm.

[4] Dan Senor and Saul Singer, *Start-up Nation: The Story of Israel's Economic Miracle* (New York: Twelve/Hachette Book Group, 2009).

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brief discussion of the future implications of these ideas.

Our deep interest in the building of the "Startup Generation" and Israeli innovation ecosystem comes from combining diverse perspectives. Anna's engagement with Israeli advanced research and technology goes back to 2004 during her doctoral research at Yale University with National Clark Award Winner Professor Menachem Elimelech, an Israeli-American leader in water treatment and related energy advances. Since then she has focused on building value across startups, venture capital, and corporate strategy, most recently deepening her interaction with the Israeli startup community upon her engagement as a U.S. venture partner for 4 innovation (4i). 4i works within the Open Innovation paradigm[5] to provide access to investments in disruptive technologies and build companies across leading venture ecosystems, including Israel (the home of the firm's founding office and the Tel Aviv local team).

As a 17-year-old budding inventor, Hazel represents the newest wave of the "Startup Generation." As president of her school's student government and National Honor Society, she has focused on increasing access and exposure to technical opportunities for youth in order to enhance the pipeline of her peers who will enter science and engineering programs in the next several years. Studying in Lynn, Massachusetts—a city rich in immigrant energy and diverse cultures (40% speak a language other than English at home) with household income levels at only two thirds of the state's median[6]—Hazel sees firsthand the potential for increasing innovative entrepreneurship on a local level.

From these very different vantage points, we recognize that the stakes are high in building the technology workforce to develop a competitive advantage that translates into real value creation. This article integrates experiences from our work in Israel; meetings with startups, venture capitalists (VCs), and university labs; and extensive research on the topic.

Building the Innovation Edge

Why does this success in building out a technology workforce in Israel matter, and how does this affect Kauffman Fellows and other innovators around the globe? First of all, we see aggressive, action-oriented build-outs on Israeli models (sometimes modified from U.S. models) taking place around the world.

As an example, Kauffman Fellows have watched (and many have helped build) the growth of the venture ecosystem in New York over the past several years. This burgeoning venture ecosystem is a main factor in the Kauffman Fellows Program (KFP) holding its 15th anniversary event and Fall modules this October in New York. In the past, New York venture was often critiqued for its lack of proximity to extensive top-tier engineering programs and technical workforce (in comparison with, e.g., Silicon Valley or Boston, with the exception of the 15th-ranked Columbia University[7]). In 2011, however, New York boldy committed to expand their high-tech workforce through heavily incentivizing a partnership for a new urban campus with the winning bidders of Cornell University and Technion University of Israel. The Cornell/Technion campus to be built on Roosevelt Island is expected to increase New York's number of full-time graduate engineering students with master's degrees and PhDs by 70 percent.[8]

To translate partial projections for value-creation from that graduate workforce, New York hopes to see 600 spin-off companies and $23 billion in added economic activity over the next

[5] Open Innovation is a method that identifies the technical and innovation needs of an entity and then utilizes both open source and targeted opportunities to meet and exceed those goals; see 4 innovation, "Open Innovation," n.d., para. 1-3, http://www.4-innovation.com/en/open-innovation.

[6] U.S. Census Bureau, "State and County Quick Facts: Lynn (city)," *Massachusetts*, 2012, http://quickfacts.census.gov/qfd/states/25/2537490.html.

[7] U.S. News and World Report, "Best Engineering Schools," 2012, http://grad-schools.usnews.rankingsandreviews.com/best-graduate-schools/top-engineering-schools/eng-rankings.

[8] The City of New York, "Mayor Bloomberg, Cornell President Skorton, and Technion President Lavie Announce Historic Partnership to Build a New Applied Sciences Campus on Roosevelt Island," *News from the Blue Room*, 19 December 2011, PR-444-11, para. 5, http://www.nyc.gov/portal/site/nycgov/menuitem.c0935b9a57bb4ef3daf2f1c701c789a0/index.jsp?pageID=mayor_press_release&catID=1194&doc_name=http%3A%2F%2Fwww.nyc.gov%2Fhtml%2Fom%2Fhtml%2F2011b%2Fpr444-11.html&cc=u.

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three decades.[9] Such goals may seem like "pie in the sky" without knowledge of the players' highly successful track records. Cornell is the highly ranked engineering powerhouse of upstate New York,[10] while Technion graduates head companies that employ 85 percent of Israel's technical workforce—quite an illustration of Pareto's Law[11] in a country that boasts the largest number of high-tech startups per capita and the second highest number of startups globally (following only the United States).[12]

What are the possible pipelines for building a skilled technical workforce, both in Israel and more broadly across the globe? We argue that there are several possible channels, including the following:

1. Attracting youth to technology and preparing them to enter the innovation and startup workforce;
2. Recruiting and retaining top talent among technically trained immigrants;
3. Repurposing the skill sets of adult workers to adjust to the demands of shifting, growing, and emerging technology workforces; and
4. Attracting technology talent from the security, defense, and other sectors—incorporating innovators and leaders with military backgrounds into the startup ecosystem.

While many of these elements feed into the technology workforce globally, Israel has demonstrated a high level of success in bringing workers through these specific channels.

This article opened with an example of a program interesting youth in technology and innovation. We now discuss the other three possible pipelines, using Israeli case examples.

Incubators, Cultural Assimilation, and "Immigreatness"

Immigrants have played a crucial role in Israel's technology build-out. The battle cry of many in the U.S. venture capital and entrepreneurial communities for increased H1-B visas (required for skilled foreigners to work in the United States) contrasts markedly with Israel's open-door policy of citizenship to all members of the Jewish faith worldwide. Many of these waves of immigrants have contributed significantly to technological advances in the country, including high numbers of immigrants from the former Soviet Union who had already earned degrees in math, science, engineering, medicine, and law in their home countries.

Still, even a highly educated workforce cannot assimilate overnight—Israel invested in immigrants by offering "Ulpan" language-immersion programs. These programs allowed immigrants a subsistence stipend while they attended six months to a year of courses to learn Hebrew. More than just language courses, however, the classes were tailored to the professional focus of the immigrant (e.g., a doctor receives training on medical vocabulary).[13]

Israeli Incubators

While the Ulpan program promoted assimilation into Israeli culture, the technology incubators throughout Israel have been one of the most relevant initiatives to harness the entrepreneurial activity of immigrants, particularly following massive immigration from the former Soviet Union. These centers also pushed the innovative workforce to develop the country's peripheral regions, with 13 of the 26 initial incubators in the Galilee and Negev regions. Meetings with labs and

[9] Oliver Staley and Henry Goldman, "Cornell, Technion Are Chosen by New York City to Create Engineering Campus," *Bloomberg*, 19 December 2011, para. 7, http://www.bloomberg.com/news/2011-12-19/cornell-university-said-to-be-chosen-by-new-york-for-engineering-campus.html.

[10] For a concise breakdown of *U.S. News* rankings of Cornell engineering disciplines, see Susan Kelley, "U.S. News Ranks Seven Cornell Engineering Grad Specialties in Top 10," 15 March 2012, http://www.gradschool.cornell.edu/news/us-news-ranks-seven-cornell-engineering-grad-specialties-top-10.

[11] Pareto's Law is also known as the Pareto Principle, the 80-20 Rule, the Law of the Vital Few, and the Principle of Factor Sparsity. The law is often cited when the vast majority of effects come from a far smaller number of causes. The original observation came when Pareto noticed that 80% of Italy's land was owned by 20% of the population.

[12] This statistic is well-known and often-cited, as in the Wharton School of the University of Pennsylvania, "Israel and the Innovative Impulse," *Knowledge@Wharton*, n.d., para. 2, http://knowledge.wharton.upenn.edu/special_section.cfm?specialID=105.

[13] Shmuel (Steve) Adler, *Training and Retraining Programs in Israel*, 3-4, presentation at the International Council on Social Welfare (ICSW) Conference-Jerusalem, 2 May 2007, http://www.euro.centre.org/Jerusalem/files/Adler_Presentation.pdf.

entrepreneurs throughout Israel repeatedly demonstrated to us that leading work is not bound to any one geographic cluster or insititution. Within incubators, new immigrants were responsible for half of the innovation workforce in the early years of these programs following the breakup of the Soviet Union.[14]

The accelerator model had early success, with 50 percent of Israeli-incubator ventures successfully attracting outside funding.[15] This was an impressive start, especially considering typical funding rates in other countries where it is common for a few select incubators to generate the majority of successful startups, while many other incubators boast no financing events.[16]

Israeli incubators also seem to be following the broader venture capital trend toward specialization in developed ecosystems. Examples cut across the spectrum: Misgav Venture Accelerator[17] in medical devices, Kinrot Incubator[18] in water technologies, JVP Media Studio[19] in software and media, and Mofet B'Yehuda Incubator[20] in cleantech and the environment. While the many stories of Israeli incubator companies are worth a longer treatment, for the purposes of this article we provide brief sketches to support the broader discussion of the Startup Generation.

One incubator to be established in 2012, the Center for Educational Technology (CET), seeks to back transformative technology in education. CET plans to accelerate technologies to meet real needs in education through a model relying on three interlinked divisions: "the garage," where entrepreneurs work on solutions and products; "the lab," which links to selected schools to identify the educational system's technology needs; and "the aquarium," a first-of-its-kind research and data center for education and technology.[21] Success from such educational initiatives will further support the preparation of a top-caliber hightech workforce.

Keeping size of funding in mind, while in some cases Israeli funding rounds are lower-dollar rounds, capital efficiency is definitely king. Speaking with skilled investors and entrepreneurs, we heard frequent stories of investment below $3 million (at times only $500,000!)[22] and yet the firms were able to quickly achieve working-prototype medical devices. In Israel, there is an affinity for starting at a low burn, moving quickly to test and prototype, "failing fast," and evolving from what is learned. As we saw in one incubator, there is no reluctance to back a one-person team throughout the earliest stage of a venture, and significant progress can be expected even from small teams.

Corporate Incubator Programs

Even large corporations appear to be buying into the incubator model while putting their money where their mouth is: launching their own accelerators in Israel to benefit from the technologies emerging from the ecosystem and their potential value creation. Telefonica announced in March 2012 that they will build an incubator in-country, to expand upon their Israeli investments (e.g., Amobee, which sold for over $300 million in 2012).[23] Microsoft launched a startup accelerator—the first in the company's history—in Herzliya Pituah in 2012 to focus on fostering young Israeli companies in cloud computing, internet, and mobile.[24] Google is planning an incubator for open-code startups at their new Tel Aviv offices, citing their interest in building stronger ties to the local developer community, which they

[14] Israel Ministry of Foreign Affairs, "Technological Incubators," *Spotlight on Isreal*, 20 October 2002, para. 1 and 3, http://www.mfa.gov.il/MFA/Facts%20About%20Israel/Science%20-%20Technology/Technological%20Incubators.

[15] Ibid., para. 2.

[16] Aziz Gilani and Gianlucca Dettori, *Incubators in U.S. and Europe: Speed and Scale in Capital Formation*, presentation at the Kauffman Fellows Program Affinity Conference, July 2011, Palo Alto, CA, slides 10 and 21, http://www.slideshare.net/dgiluz/accellerators-in-us-and-europe.

[17] http://www.misgav-venture.com/.

[18] http://www.kinrot.com/.

[19] http://www.jvpvc.com/jvp-media-labs.

[20] http://www.mofet.org.il/.

[21] Roy Goldenberg, "CET Setting Up Yeruham Educational Technology Incubator," *Globes*, 21 May 2012, para. 3, http://www.globes.co.il/serveen/globes/docview.asp?did=1000750625&fid=1725.

[22] Discussions at 4 innovation meetings in Israel, Summer 2012.

[23] Shmulik Shelach, "Telefonica to Set Up Startup Incubator in Israel," *Globes*, 27 March 2012, para. 1, http://www.globes.co.il/serveen/globes/docview.asp?did=1000736816&fid=1725.

[24] Shmulik Shelach, "Microsoft Israel Launching Start Up Incubator," *Globes*, 14 March 2012, para. 2 and 4, http://www.globes.co.il/serveen/globes/docview.asp?did=1000733223&fid=1725.

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judge as "sizzling," "innovative," and "with great potential."[25] Merck Serano is starting the first biotech incubator in-country without government support, although the initial commitments for what they will invest over the next several years are modest, at only €10 million.[26]

These corporate incubator efforts will effectively gain access to some of the most talented members of the Startup Generation. As many of the incubators in Israel have been government and investor partnerships in the past, it will be fascinating to see if these corporate incubator models meet the success metrics and evolving priorities of leading multinational corporations invested in Israel.

Creative Destruction and the Need for Workforce Repurposing and Retraining

Numerous thought-leaders and investors have recognized the increasingly fast pace of change in both technology industries and the broader workforce. Schumpeter's assertion that "creative destruction" was the essential fact of capitalism has been supported by market reality and by later works such as Foster and Kaplan's book.[27] Their work illustrates the decreased tenures of leading corporations at the top, the accelerating change of technologies, and the need to adjust effectively to disruptive innovation.

The demands of this faster-paced innovation economy generate a strong message for success and survival: "Improve, Evolve, Disrupt, or Move Over." The technical workforce needs to embrace this challenge by developing workers' ability to switch into jobs with different skills than those for which they were originally trained, and occasionally into different industries entirely.

While most people have some awareness of the shift to shorter tenure in individual jobs, the actual numbers are staggering in comparison with the career-long tenures employers offered post-WWII. Examining recent decades of U.S. employment, Baby Boomers (born between 1947 and 1954) held an average of 11.3 jobs from age 18 to age 46.[28] While half of these job changes occurred before the age of 25, even for workers aged 40-46 who were starting new jobs, a third of their jobs lasted less than one year, while an overwhelming majority of 68 percent lasted less than five years.[29] And this is the generation that often considers their younger colleagues to be the fast paced job-switchers!

In such volatile innovation and employment environments, critical skills must be continuously renewed and acquired. The previously mentioned immigrant-assimilation initiatives in Israel reflect this dynamic, as further programs extended beyond the Ulpanim language study to additional job search training, retraining, and vocational training courses. The impact of this model on immigrant engineers was measured by a study in 1995 showing that immigrants with such (re)training had a much higher ability to stay in related technical fields: 40%, versus only 15% for those who did not participate in these programs.[30]

While retraining for new industries and technologies is essential in any innovation workforce, Israel's workforce may have a slight maturity edge in meeting market needs, at least in the first round of career placement. Due to the years that Israeli youth spend in the military (frequently followed by significant time traveling), the common age for entering university is the same (or older) than that of graduating students from many other countries. Entering university in their early- or even mid-

[25] Ray Goldenberg, "Google to Set Up Israeli Incubator in 2012," *Globes*, 13 November 2011, para. 1-7, http://www.globes.co.il/serveen/globes/docview.asp?did=1000697285&fid=1725.

[26] Steven Scheer and Jane Baird, "Merck Serono sets up biotech incubator in Israel," *Yahoo! News Maktoob*, 15 April 2012, para. 1-2, http://en-maktoob.news.yahoo.com/merck-serono-sets-biotech-incubator-israel-160846486.html.

[27] Richard Foster and Sarah Kaplan, *Creative Destruction: Why Companies That Are Built to Last Underperform the Market--And How to Successfully Transform Them* (New York: Broadway Business, 2001), http://www.amazon.com/Creative-Destruction-Underperform-Market-And-Successfully/dp/0385501331.

[28] Bureau of Labor Statistics, "Number of Jobs Held, Labor Market Activity, and Earnings Growth Among the Youngest Baby Boomers: Results from a Longitudinal Survey Summary," *Economic News Release*, 25 July 2012, para. 1, http://www.bls.gov/news.release/nlsoy.nr0.htm/.

[29] Ibid., para. 5.

[30] Adler, *Training and Retraining Programs in Israel*, 6.

20s (rather than as a 17- or 18-year-old), young Israelis have already had several more years of exposure to work and technology, and typically have built out professional networks and experience through the military (and possibly industry). This ability to choose an undergraduate major later in life, after having already seen technology deployed, may be contributing to Israel's high percentage of technical workforce.

While initiatives in formal adult education and retraining are gaining traction in many regions globally, it can also be highly efficient for workers to have the opportunity to continue to grow and meet new challenges on the job. Cultures that reward risk-taking, support workers expanding their skills, and allow people to take on new responsibilities may best facilitate more rapid evolution of the technical workforce. These values were emphasized several times during our meetings with leaders in Israeli labs and startups, alongside frequent stories of the ease of technical talent in switching jobs between companies and industry sectors. As the pace of innovation continues to quicken, more agile economies that are able to maintain and repurpose their human talent to new opportunities will build and extend their competitive advantage.

Understanding the "Military Startup Complex"

The Israeli military has been so key to innovation and startups in country that practically everyone we met with (including entrepreneurs, venture capitalists, professors, researchers, and students) was able to speak directly to its role and emphasize its importance. There are also several articles and books that have touched upon this subject.[31]

Unit 8200 of the Signals Intelligence branch of the Israeli military is a prime example of how targeted, high-performing, interdisciplinary units have later had significant impact on Israel's startup community. A recent article in the *Financial Times* describes 8200's entrepreneurial bent and provides a quote from former Commander Yair Cohen that sums up the impact:

> It is almost impossible to find a technology company in Israel without people from 8200, and in many cases the entrepreneur, the manager or the person who had the idea for the project will be someone from 8200.[32]

Successful and well-known companies in the IT/telecom and security space founded by 8200 alumni[33] include Checkpoint (NASDAQ:CHKP), NICE (NASDAQ:NICE), EZ Chip (NASDAQ:EZCH), Gilat (NASDAQ:GILT), ICQ (sold for $187.5 million), Audio Codes (NASDAQ:AUDC), and FST21. As Yossi Vardi, founder of Israel's first software company in 1969, pointed out to the Financial Times: "More high-tech billionaires were created from 8200 than from any business school in the country."[34]

Before getting too committed to the success formula of any military or intelligence units, however, it is important to recognize that the Israeli Defense Forces are different from most. Israel's military is a melting pot where virtually every Israeli[35] is required to serve (3 years for men and 2 years for women). It is also marked by a decentralized approach that expects responsibility and encourages creative approaches to problem-solving from a very early tenure and age. Experience within the military forms tight networks within units that span across society and are later often leveraged professionally. The fact that military service extends across society

[31] See Senor and Singer's *Start-up Nation*; Tobias Buck, "Israel's Army of Tech Start-ups," *Financial Times*, 30 November 2011, http://www.ft.com/cms/s/0/d45b0c5c-1a83-11e1-ae4e-00144feabdc0.html#axzz240ar0tF1.

[32] Buck, "Israel's Army," para. 12.

[33] For more on IDF 8200 and its impact on startups, see Gil Kerbs, "The Unit," *Forbes.com*, 2 August 2007, http://www.forbes.com/2007/02/07/israel-military-unit-ventures-biz-cx_gk_0208israel.html; Atara Arbesfeld, "Forbes Israel: The Millionaire IDF Units," *The Algemeiner*, 9 August 2012, www.algemeiner.com/2012/08/09/forbes-israel-the-millionaire-idf-units-2/.

[34] Buck, "Israel's Army," para. 20.

[35] In 2007, 35% of eligible Israeli women received an exemption on religious grounds, 11% of men as Yeshiva students, and 7% of men for medical deferments (Mijal Grinberg, "IDF: Nearly 28% of Israeli Males Avoided Conscription in 2007," *Haaretz*, 6 November 2007, http://www.haaretz.com/news/idf-nearly-28-of-israeli-males-avoided-conscription-in-2007-1.232645). However, some exemptions have since expired: While for 63 years ultra-orthodox Jewish males have received a military exemption, this exemption expired in 2012 and the Supreme Court ruled against extending it (Douglas Stanglin, "Israel Drops Military Exemption for Ultra-Orthodox Jews," *USA Today OnDeadline*, 1 August 2012, http://content.usatoday.com/communities/ondeadline/post/2012/08/israel-to-drop-military-exemption-for-ultra-orthodox-jews/1#.UEZmzFSfvFl;).

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further contributes to the existing, significant buy-in regarding the value from this experience and its development of skills relevant to building businesses.

On the most basic level, universities and companies have a constant stream of talent coming from the military after the mandatory period of service, which mitigates the "reintegration" issues faced by military in some countries upon returning to the workforce. Those in military service also commonly gain an understanding of technology used in the field (before they select their later university studies), which also aids their productive assimilation into the technology-training programs and workforce.

Considering the relative uniqueness of Israel's military, it may be most productive for other nations to target the commercial development of leading edge technology from specific branches of their own militaries. Potential targets might include elite corps, military labs (non-classified technology), and units that have in-depth networks within a specific field of expertise.

Seeing the success Israel has had in startups led by military talent, the question arises—particularly for countries with extensive military spending (like the United States)—how can military advances and know-how be better transferred to civilian use and used to grow startups, jobs, and GDP? Decades ago, Eisenhower noted the monumental U.S. spending on defense in his farewell speech: "We annually spend on military security more than the net income of all United States corporations."[36] While significant civilian and commercial value has stemmed from building upon military research and advances over the years (from microwaves to the internet), military excellence represents an extraordinary opportunity to expand upon the innovation economy. This value seems especially pertinent in light of the United States spending over 4% of its GDP on defense (in 2010, this amount was more than the next 17 countries combined[37]). Several other countries may also benefit from leveraging more of their military talent and R&D for their high-tech and startup economies. Many nations spend over 2% of their GDP on military, including China, Britain, France, Russia, Saudi Arabia, India, South Korea, Australia, and Turkey.[38]

Recently, more leaders are seeking to harness innovation talent by attempting to bridge the military workforce–startup gap in the United States. In early August 2012, Google and families from Syracuse University held the first Startup Weekend: Veterans and Military Families, in partnership with The Kauffman Foundation.[39] There have also been recent legislative pushes such as the Veterans Entrepreneurial Transition Act to enable U.S. veterans to receive their GI bill benefits (~$69,000) to start a business in lieu of educational benefits.[40]

Developing creative solutions to increase startup formation that leverages military talent could unlock tremendous value in terms of hitting major customer pain points (i.e., needs), expanding revenues, growing GDP, and creating jobs. Across the United States there are increasing efforts to build on these strengths. Steve Blank (Silicon Valley successful serial entrepreneur and Vietnam Veteran) recently explained the military advantage:

> If you've been in combat, you know how to make difficult decisions in times of chaos, which is a big part of being an entrepreneur….You also learn about risk management. I remember starting out in business, my roommates would ask me how I was comfortable taking so many risks. I wish I'd been

[36] Eisenhower's farewell address can be found in many locations, including Paul Halsall, "Modern History Sourcebook: President Dwight Eisenhower; Farewell to the Nation, January 17, 1961," Fordham University website, http://mcadams.posc.mu.edu/ike.htm, para. 1.

[37] *The Economist Online*, "Military Spending: Defense Costs; The Biggest Military Spenders," 8 June 2011, para. 1, http://www.economist.com/blogs/dailychart/2011/06/military-spending

[38] Ibid.

[39] For the event page, see the Startup Weekend website, http://sandiego.startupweekend.org/; for background information, see Nicole Provansal and Barbara Pruitt, "Startup Weekend Launches Startup Foundation Initiative in Partnership with Kauffman Foundation," 27 September 2011, Ewing Marion Kauffman Foundation website, http://www.kauffman.org/newsroom/startup-weekend-launches-startup-foundation-initiative-in-partnership-with-kauffman-foundation.aspx.

[40] PatriotEnterpriseProject.org, "What Benefits Would I Receive under the VET Act GI Bill?," question 4, http://www.vetactof2011.org/GIBILLfacts.php#1.

more articulate back then so I could have told them that risk is relative.[41]

Technology as a Vector for Greater Inclusion, Tolerance, and Peace

In a country where the military is such a driver for creativity, technology advances, and startups, it was equally fascinating to see the extent that building the high tech community as increasingly inclusive is also being envisioned and pursued as a vector for peace. These are core values for the next generation of Middle East Education Through Technology (MEET) students.

As volunteers linked to the innovation community, we had the pleasure of setting up the first lab visits for MEET's Israeli and Palestinian youth who are considered top-notch in math and science. Researchers and universities across Israel were eager to open their doors to welcome these young people, who then lit up at advances in areas such as novel drug delivery and nanoelectronics. While the focus was on the startups and technology, we also witnessed the relationship-building occurring among the students. Several students explained the transition from seeing "the other side" in terms of the conflict on the news to seeing each other as teammates and teenagers interested in the same things: "the same music, the same dancing, real interest in technology and startups."[42]

The MEET program is young, so the economic, social, and political impact (on the Middle East and beyond) of these individuals with their evolving networks cannot be known at this time. Still, an alumni student summed up the MEET technology and start-up experience: "We believe we can do anything now."[43] From a global perspective, when considering the stabilizing impact of strengthening economies in contrast with the destabilizing factors of high unemployment, a focus on enhancing innovation and the technology workforce seems right on point.

Value Creation using Hybrid Israeli-International Models: The Case of 4 innovation

It was the exceptional strength of Israel's innovators and technical workforce that initially led 4 innovation (4i) to expand the pipelines of Israeli startups and technology to other international startup and investment ecosystems throughout Europe, North America, and Latin America. 4i works to link "upstream" producer regions and countries rich in startups and technological advances with robust "downstream" markets that have a need for specific investment opportunities or technologies. This model represents an evolution of the open innovation, venture capital, and corporate venture models providing in-depth sourcing, investing, and partnering.

The firm has several ways of working with clients, including identifying and analyzing companies for investment, partnering, licensing, purchasing products, and pursuing company M&A. These linkages are driven primarily by timely market needs and critical pain points, to better facilitate value creation.

While companies from several sectors—especially information technology—have already chosen to be in Israel (e.g., Google, Intel, and Microsoft, among many others),[44] several other leading corporations in industries such as energy, cleantech, defense, and lifesciences, work with 4i to enhance their access to Israeli advances. The firm then tailors client services to an individual innovation and investment plan in Israel (or other regions of local team operations in North America, Europe, South America, and Asia).

[41] Robin Wilkey, "Veterans In Technology: Silicon Valley Taps the Military for the Next Wave of Startup Power," *Huff Post San Francisco*, 25 May 2012, para. 18, http://www.huffingtonpost.com/2012/05/28/veterans-in-technology_n_1544310.html.

[42] Zaid, interview, Middle East Education Through Technology in Jerusalem, 9 August 2012.

[43] Lubna, interview, Middle East Education Through Technology in Jerusalem, 9 August 2012.

[44] Rachel Roei, "Investment Climate in Israel: Our Competitive Advantage," *Tradeway* (December 2008): para. 1, http://www.investinisrael.gov.il/NR/rdonlyres/3A43C82E-D23A-49F9-B5F4-8DB8082525F6/0/Investment_Climate_in_Israel.pdf.

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Future Implications

Every community and country has the potential to enhance their technology workforce. Here, we distill five potential avenues, drawing on the example of Israel's success.

Changing Attitudes

Too many times, we have seen people express a sense of awe in response to someone stating their technical background. What we need instead is for the "rocket scientists" to explain that the work is highly attractive and encourage others, so that all who are interested are capable of joining the innovation workforce and contributing in these disciplines.

Starting Early

While it is important to mentor those already in their careers or studying at the university level, there is a need to fill the pipeline at a much younger age. High school and even middle school are where most students opt-in or opt-out of preparing for the innovation workforce. While some view mentoring high school students as too early to get engaged, we as venture capitalists can see that these young people will be in the workforce faster than many seed companies will reach the expansion stage. A wide variety of leaders are needed to engage with youth to illustrate the potential and excitement of technology beyond dry theory—it's as easy as speaking passionately at your local high school or inviting students to visit your workplace.

Drawing on "Immigreatness"

Israel's example demonstrates the opportunity to expand a region's technology workforce with extraordinary efficiency by offering enhanced pathways to residency and citizenship for top foreign talent which has already been nurtured. (At minimum, for example, the United States could increase the number of H1-B specialty temporary visas.) It seems especially critical that engineers and scientists who have benefitted from a host country's educational and research facilities (read: taxpayer dollars) should have the opportunity to work and contribute within that ecosystem. In addition to applying pressure to accept more skilled immigrants (and companies hiring them), mentoring foreign-born technical workers and entrepreneurs is another often-overlooked opportunity. These mentoring networks, when successful, often become entrepreneurial resources for life-long citizens and new immigrants alike.[45]

Preparing and Repurposing Agile Talent

Paths to maintaining an agile workforce include encouraging employees to work on interdisciplinary teams, take on responsibilities outside one's primary area of expertise, and continue adding and expanding skills. There is also significant value to bringing non-technically trained talent into the innovation workforce, and allowing them the flexibility to become embedded on the technical side or to contribute through their other, complementary skills. More than once, we have met leaders with a non-technical background who may know more about a specific area of disruptive technology than a colleague trained in engineering, math, or science. Rather than constraining people to limited areas of credibility based on past experience, it is best to encourage people to continue to develop their talents and contribute across expertise—to the full extent of their abilities and interest. Formal programs that offer professional retraining may also provide value in some instances.

Openness in Innovation, and Leveraging Strengths

Building a "Military Startup Complex" represents one exceptional opportunity to better leverage current investment and harness advances for company- and value-creation. Openness to hiring talent directly from the military without requiring prior industry experience, facilitating the utilization of veteran benefits to create businesses, and enhancing channels of commercialization from leading military R&D

[45] The Indus Entrepreneurs Network is a good example of this approach: https://www.tie.org/about-tie-global.

arms are possible ways to benefit from such innovation. The message can also be broadened beyond defense, as each ecosystem needs to look to the various players that can contribute: militaries, universities, research institutions, labs, incubators, and larger companies. It is important to determine how to best incorporate the talent from these channels and the innovations they develop for the advanced technology workforce.

As the pace of disruptive invention seems sure to accelerate, regions and companies that have access to a well-prepared and agile technical workforce will magnify their edge in competitive advantage in creating advanced societies and value. While Israel provides a series of examples, we look forward to seeing several successful new models for amplifying technical workforces over the next ten years.

Anna Brady-Estevez
Anna currently serves as a venture partner with 4 innovation, a global corporate venture services firm. She also advises governments on innovation, infrastructure, and power. Previously, Anna served as Director of Strategy at The AES Corporation, a Fortune 150 global utility. Earlier, Anna worked in the startup ecosystem as both an inventor and principal at an early-stage venture firm. Anna holds a PhD, MS, and MPhil in chemical and environmental engineering from Yale University, where she was an NSF Fellow and helped teach Creativity and New Product Design, as well as a BS and BA from The Johns Hopkins University. Anna served on the board of the Association of Yale Alumni (AYA) and the *Yale Alumni Magazine* in her role as President of the student government.

Hazel Stirgwolt
Hazel is currently a high school senior at St. Mary's in Lynn, Massachusetts, and was elected president of both the student government and National Honor Society. Hazel has a strong interest in increasing student access and opportunity in science, technology, and entrepreneurship, both internationally and in local communities. She is a budding inventor and is always eager to learn about new advances and discoveries. In addition to her academic studies, Hazel has won numerous acting awards in state-level competition and is a member of the swim team.

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Designing Culture: A Kauffman Fellows Perspective

Phil Wickham • This article examines what is—and is not—being learned from Silicon Valley, and how structural changes are empowering new centers of innovation in major metropolitan areas. The author stresses the importance of story in successful entrepreneurship, describes how to build a strong company culture, and outlines key leadership skills.

The Rise of the Innovation Strategist

José Romano • Limited Partners (LPs) are critical to VC, but little has been said about the relationship between LPs and fund managers. The author explores this sensitive subject and argues that LPs need to become Innovation Strategists—more entrepreneurial, transparent, and leadership-focused—and that the Kauffman Fellows can help.

Venture Capital in Latin America: Connecting Opportunities

Gonzalo Miranda • Venture capital in Latin America is a new industry that has shown a remarkable evolution since the early 2000s, presenting both interesting opportunities and significant challenges. Based on his own experience and current data available, the author proposes a regional model to invest in Latin America.

Venture Debt: A Capital Idea for Startups

Patrick Gordan • Access to capital at an appropriate cost is the paramount concern of emerging growth companies, and venture debt has grown to address the need for alternatives to equity financing. The author traces the rise of venture debt, describes the current market, and provides a template for considering the use of venture debt.

What Acquirers Want: An Insider Perspective on Getting Acquisitions Right

Lak Ananth • Acquisitions are a vital, regenerative link in the cycle of capital formation and innovation—a young technology company today is seven times more likely to be acquired than go public. This article demystifies acquisitions for founders and management teams, and provides a framework to achieve better outcomes.

The Startup Generation: Building the Next Generation Workforce from the Holy Land

Anna Brady-Estevez and Hazel Stirgwolt • Israel brings multifaceted strengths to building its innovation workforce, which is poised to accelerate with the dynamic energy of the "Startup Generation." The authors focus on the next-generation workforce and illuminate specific drivers behind Israel's success that can be extended to other regions.

What Can Venture Capitalists Learn from Academics?

Eric Ball • Recent academic research can inform how VCs evaluate and invest in startups. The author summarizes three papers, finding that investors do better focusing on the business plan over the team, take more risk when capital is abundant, and react to stock market runups when timing exits. He provides shorter summaries of six other papers.

A Venture Entrepreneur in China: Building U.S.-China Venture Partnerships

Tharon Smith • Venture partnerships will change the way the United States and China invest together. This article describes one woman's journey to combine her passions for cross-cultural understanding, innovation, and entrepreneurship in China—building a foundation to bring together cultures, ideas, frameworks, and capital for venture investing.

Learning from Silicon Valley: Applying a Venture Capital Model to Philanthropy

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Creating a New WAVE: A Fundraising Journey

Praveen Sahay • The author shares his challenging experience of raising a new cleantech fund at a time when the sector has fallen from grace and the overall venture capital industry is consolidating. Those who have created a fund will see themselves in this story, while others may be inspired to find their own creative core.

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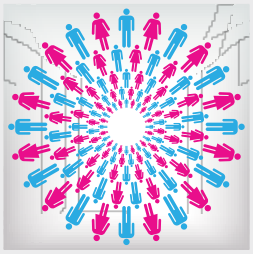
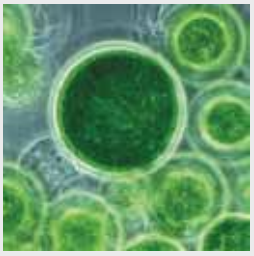

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