A Case Study
On
The Israeli Conceptual Abilities/Innovations

(An excerpt from my book "Lean, Innovation and the Spirit of Enterprise" published on March 5, 2016)

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Table of Contents

Israel – A Case Study

Israel is a leader in research and technological creativity. Its accomplishments in the field of innovation and technology are remarkable. As per the Bloomberg 2015 innovation index, Israel is the world's fifth-most innovative country and second in GDP expenditure on R&D. Since its establishment in 1948, Innovation is an important element of Israel's policy.

Let's take a look at some major factors that make Israel an example of entrepreneurial spirit:

Research and Development

Israel's technological research in significant fields like computer technology, alternative technology, water treatment, agriculture, and communication are world known. The percentage of Israelis engaged in scientific and technological inquiry, and the amount spent on research and development (R&D) in relation to gross domestic product (GDP), is the second highest in the world. Since 2000, Israel has been a member of EUREKA, the pan-European research and development funding and coordination organization.

Israel's Office of the Chief Scientist (OCS) that comes under the Ministry of Industry, Trade and Labor is responsible for executing the government policies that are related to industrial R&D support. The Government of Israel has signed agreements and created funds with other countries to support and promote industrial R&D cooperation [3]. (For more information visit: OCS Website - http://economy.gov.il/RnD/pages/default.aspx)

Key International Research Bodies are:

MATIMOP - Israeli Industry Center For R&D, Bi-National Funds- Bi-national fund model to support cooperative projects with other nations, BIRD (Bi-National Industrial R&D)- American Israeli Foundation, BRITECH - Britain-Israel Industrial R&D Foundation, CIIRDF - Canada-Israel Industrial R&D Foundation, KORIL-RDF - Korea-Israel Industrial R&D Foundation, SIIRD - Singapore-Israel

Industrial R&D Foundation, US-Israel Science & Technology Commission, IRC - Innovation Relay Centers.

Israel Governments Key initiatives to encourage technological and industrial research are:

Technological Incubators: The Technological Incubators program was introduced at the beginning of the 90s, since then the program has been open to all beginning Israeli entrepreneurs. The technological Incubator program provides entrepreneurs following benefits: R&D grant, R&D infrastructure, Business guidance and Administrative assistance.

Pre-seed Fund- the TNUFA Program- TNUFA assists individual entrepreneur and start-up companies during the pre-seed stage.

Seed Fund - the HEZNEK Program- This program mobilizes funds for the establishment of start-up companies.

The MAGNET Program- MAGNET program promotes new technologies via cooperative venture between the industry and leading academic scientific research institutions in the field. This program provides a grant of up to 66% of approved budget.

MINI-MAGNET (MAGNETON) Program - Within the MAGNET umbrella, Mini-Magnet promotes technology transfer from academia to industry.

NOFAR Program- NOFAR comes under MAGNET program supports biotechnology projects.

(Read in detail from http://www.moit.gov.il/NR/rdonlyres/CD3AF19B-2619-415B-B2F4-B747101C5202/0/TheIntellectualCapital3550.pdf)

Israel has seven research universities: Bar-Ilan University, Ben-Gurion University of the Negev, the University of Haifa, Hebrew University of Jerusalem, the Technion – Israel Institute of Technology, Tel Aviv University and the Weizmann Institute of Science, Rehovot.

Other scientific research institutions include the Volcani Institute of Agricultural Research in Beit Dagan, the Israel Institute for Biological Research and the Soreq Nuclear Research Center. The Ben-Gurion National Solar Energy Center at Sde

Boker is an alternative energy research institute established in 1987 by the Ministry of National Infrastructures to study alternative and clean energy technologies. Israeli universities are ranked among the top 50 academic institutions in the world in the following scientific disciplines: in chemistry (Technion), in computer science (Weizmann Institute of Science, Technion, Hebrew University, Tel Aviv University), in mathematics and natural sciences (Hebrew University, Technion) and in engineering (Technion).

There are over 250 foreign R&D Centers in Israel, here is a list of multinationals with R&D Centers in Israel

(Source of facts: Wikipedia and moit.gov.il)

Agricultural research

Agricultural innovations of Israel are remarkable. Israel has shown that how geniuses can turn unfavorable situations into favorable. Israel where more than half of the land is desert has established itself as a leader in advanced agriculture technologies. Israel not only produces its own food but also exports $1.3 billion worth of agricultural produce annually.

Israel's scientists, consultants, farmers and agriculture-related industries cooperate in Agriculture Research activities. Agricultural Research Organization (ARO), widely known as the Volcani Institute is responsible for operating research operations in the country. The Faculty of Agriculture of the Hebrew University of Jerusalem, Tel Aviv University, Bar Ilan University, Ben Gurion University of the Negev and the Weizmann Institute of Science also engage in agricultural research.

Agriculture Research Organization (ARO) – ARO's goal is to develop Israeli agriculture economy. ARO's six institutes are responsible for Plant Sciences, Animal Science, Plant Protection, Soil, Water and Environmental Sciences, Agricultural Engineering, and Postharvest and Food Sciences. ARO operates four research stations, in various parts of the country, and serves as a testing center for agricultural produce and equipment. Israel's Gene Bank for Agricultural Crops is also located on the ARO Volcani Center campus. ARO provides direct and

cooperative technical assistance to developing countries with various national, regional, international and non-governmental agencies.

(Source of facts: http://www.agri.gov.il)

Israel's Key Agricultural Innovations [4]:

Drip irrigation - Israeli water engineer Simcha Blass, discovered that a slow and balanced drip led to remarkable growth. In 1965 Simcha Blass started a company called Netafim that provides drip and micro irrigation products for agriculture, greenhouse, landscape and mining applications. Israel's drip irrigation techniques helped several farming families in Senegal to reap crops three times a year, even on infertile land. The Israeli drip irrigation system, called Tipa ("Drop") includes a cement reservoir, a water pump (that can be operated by hand, solar power pump or diesel generator) and plastic irrigation pipes. This technique uses gravity that sends the water right to the roots of the plants, minimizing evaporation, soil leaching and the need for high volumes of pesticides and fertilizers [4].

Grain cocoons - Grain Cocoons is designed for toxic-free fumigation and safe storage of agricultural commodities. The huge bags, invented by international food technology consultant Prof. Shlomo Navarro, keep both water and air out. Traditional storage baskets or bags are not effective in keeping hungry bugs and micro-contaminants out. Grain Cocoon is an effective solution to keep insect, water, and water vapor penetration into the contents [4].

Biological pest control - Israeli company called Bio-Bee breeds beneficial insects and mites for biological pest control and bumblebees for natural pollination in greenhouses and open fields. Bio-Bee products have enabled sweet-pepper farmers to reduce the use of chemical pesticides by 75 percent. Bio-Bee exports eight different species of biological control agents, plus pollinating bumblebees, to 32 nations from Japan to Chile [4].

Dairy farming - Israeli Dairy Firms like Afimilk (formerly known as SAE Afikim) and SCR Precise Dairy Farming provides advanced systems for herd management, monitoring and feeding worldwide. Afimilk's notable inventions are: The first electronic milk meter, which measures how many liters of milk a cow has produced, the pedometer, which counts the number of steps a cow takes, indicating the right time for insemination, AfiFarm, a milking and dairy herd management

software program, AfiAct, a fertility detection system and AfiLab, a device that analyses the components of the milk and detects bacteria.

SCR dairy has played a significant role in the development of innovative technological solutions for the worldwide dairy industry. During its first 20 years of operations, the company focused on developing electro-mechanical devices for dairy farms, pulsators, and automatic detachers. Over the last 10 years, SCR firmly established its place amongst dairy farmers, leading the industry with advanced cow monitoring solutions based on activity and rumination sensors. SCR is known for its heat detection tag technology, data flow management software for monitoring data, rumination monitoring tag and other advanced and innovative cow monitoring solutions.

AKOL - Agricultural Knowledge On-Line (AKOL) provides a software that help producers grow fruits and vegetables, raise poultry and dairy cows, manage vineyards and make olive oil. AKOL is hosted in IBM cloud, provides Israeli experts advice to farmers from anywhere in the world. Hundreds of thousands of farmers can obtain tailor-made solutions, arrange group purchases of supplies and communicate with colleagues [4].

Desert Potatoes - Hebrew University's Prof. David Levy developed strains of potatoes that flourish in hot, dry climates, and can be irrigated by saline water sources. His development will have a huge impact on potato production in hot, desert regions like the Middle East, where temperatures are scorching, and water resources scarce [4].

Crop protection - Two years ago, Hebrew University's tech transfer company teamed with ADAMA Agricultural Solutions Ltd. (formerly Makhteshim Agan Industries Ltd.) an Israeli manufacturer and distributor of branded off-patent crop protection products including herbicides, insecticides, and fungicides. The Israeli approach incorporates herbicides into micelles or vesicles, which are absorbed onto negatively charged clay minerals to enable a slow and controlled release, reducing leaching to deeper soil layers. This enhances efficiency and reduces the required doses. ADAMA group has manufacturing facilities worldwide with key facilities in Neot Hovav, Beer Sheba, Ashdod, and Brazil. In addition, the group has smaller plants in Colombia, Poland, Spain, and Greece [4].

GFA (Grow Fish Anywhere) - Israel's GFA (Grow Fish Anywhere) Advanced Systems eliminates the environmental problems in conventional fish farming. Specially developed microbes purify fish waste byproducts right in the tank, with no need for spillage and refilling. This system allows for high-capacity aquaculture, with as much as 100 kg of fish per cubic meter of water [4].

Hardier seeds - Hebrew University agricultural scientists Ilan Sela and Haim D. Rabinowitch developed TraitUP, a trademarked technology that enables the introduction of genetic materials into seeds without modifying their DNA. This method immediately and efficiently improves plants before they're even sowed [4].

List of Agriculture Companies - http://www.science.co.il/agriculture/Companies.php

(Other Source of facts: http://nocamels.com/ and Wikipedia)

Solar Energy

Israel is building world's largest power station 'Ashalim' to produce 121 megawatts of renewable power to the country. The station will provide solar thermal energy, photovoltaic energy, and natural gas. A 30MW PV plant and a 121 MW CSP plant will be established by Megalim Solar Power, a joint venture between Brightsource and Alstom. The station is expected to commence electricity production in 2017. In the year 1950, Levi Yissar developed a revolutionary solar water heater to address the energy shortages of the country. In 1953, he started NerYah Company, Israel's first commercial manufacturer of solar water heaters and by 1967 around 50,000 solar heaters had been sold. With the 1970s oil crisis, Harry Zvi Tabor, father of Israeli solar energy, developed the solar water heater that now over 90% of Israeli homes use. The expertise of Israeli engineer and Israeli solar companies is needed worldwide. However, even though Israeli engineers have been involved in both photovoltaic and concentrated solar power, the Israeli companies which have become market leaders in their respective fields have all been involved in concentrated solar power.

Companies like BrightSource, Solel, and Brenmiller Energy deal with utility scale projects. Israel's goal is to produce ten percent of the country's energy from renewable sources by 2020. The electricity generated at the facility will be enough

to supply 120,000 homes with clean energy and will avoid 110,000 tons of CO2 emissions each year over the course of its life. The Ministry of National Infrastructures estimates solar water heating saves Israel 2 million barrels of oil a year.

Solar Power Research:

The Grand Technion Energy Program (GTEP) started with an aim to bring together Technion's researchers to discover alternative and renewable energy sources, promote more efficient energy use, and reduce the environmental damage caused by the production of fossil fuels. GTEP is interdisciplinary, with members spanning the range from nanoscience to applied engineering.

Ben-Gurion National Solar Energy Center founded in 1987 by the Ministry of National Infrastructures to study alternative and clean energy technologies. In 2007, David Faiman, the director of the center, announced that the Center had entered into a project with Zenith Solar to create a home solar energy system that uses a 10-square meter reflector dish.

Jacob Blaustein Institutes for Desert Research- The Jacob Blaustein Institutes for Desert Research facility was founded by Amos Richmond in 1974. This institute conducts research in diverse fields and its solar energy research program has developed several innovative techniques that help in the development of passive heating, involving the mitigation of extremes of heat and cold in the desert through efficient storage from day to nighttime. A blend of 90 scientists, 60 technical and administrative staff members, and over 150 Israeli and foreign research students perform basic and applied research related to “Desert Sciences".

Weizmann Institute Solar Research Facilities Unit- The solar research facilities of the Weizmann Institute of Science are among the most advanced laboratories in the world for concentrated solar energy research. Tareq Abu-Hamed, an Israeli scientist at the University of Minnesota, with colleagues Jacob Karni and Michael Epstein, head of the Solar Facility at Weizmann, were the developers of a new method to produce hydrogen fuel more cheaply, efficiently and safely while solving storage and transportation issues. Other innovations include harnessing sunlight for space communications and meteorological information; controlling light-dependent chemical reactions; and developing photodynamic cancer therapy.

(Source of facts: Wikipedia, in.bgu.ac.il, and other government's website)

Military Engineering

As per the report 'Global Aerospace and Defense Outlook 2016' (published by Deloitte), Israel is 7th in the world in Defense spending. According to Globes, Israel spent $15.9 billion on its military overall in 2014.

Israel Defense Force (IDF) is famous for its modern technology, innovation in cyber warfare, intelligence, precision armaments and electronics. The IDF is one of the most technologically advanced armies in the world.

Sharing some of the most critical military capabilities of Israel [5]:

The IDF Unmanned Ground Vehicle - Guardium Unmanned Ground Vehicle (UGV) patrols the Israeli border without an onboard human presence. The Guardium is equipped with 360-degree cameras and a loudspeaker. It is highly mobile, which means that it can stream images from various angles and gather more data than a stationary camera can. Infantry soldiers often patrol alongside the Guardium, which can detect threats from a distance. If it spots something suspicious, the soldiers in the command room immediately notify the foot soldiers in the field of the danger.

Mobile Radar - IDF has developed a new mobile radar that will be attached to armored and infantry brigades, and will be able to respond immediately to rocket fire. The mobile radar will identify the source of fire against the brigade, including short-range shooting.

The Trophy System - Trophy is a military active protection system for vehicles. The trophy is the product of a ten-year collaborative development project between the Rafael Advanced Defense Systems and Israel Aircraft Industries' Elta Group. The main purpose is to supplement the armor of light and heavy armored fighting vehicles. The Trophy's detection system creates a 360-degree protective shield around the tank. This system instantly detects and neutralizes any threat to the tank by firing a missile of its own.

The Iron Dome Rocket Defense System - Iron Dome is a mobile all-weather air defense system developed by Rafael Advanced Defense Systems and Israel Aircraft Industries. The System has been deployed in the south of Israel since early 2011 in order to protect the citizens. On 10 March 2012, The Jerusalem Post reported that the system shot down 90% of rockets launched from Gaza that would have landed in populated areas. By November 2012, official statements indicated that it had intercepted 400+ rockets. By late October 2014, the Iron Dome systems had intercepted over 1,200 rockets. The system is the first of its kind in terms of speed, accuracy, and capability. As soon as an enemy rocket is fired into Israel, the radar station detects and tracks its trajectory and launches a missile of its own to intercept and neutralize the enemy rocket before it can cause any harm.

IDF's Dolphin-class Submarines - Israel's most critical military capability is their small but very deadly submarine fleet. The new submarine 'INS Rahav' is Israel's fifth Dolphin-class submarine. The new submarine is equipped with the most up-to-date naval weapons systems and improved detection capabilities. The INS Rehav is 220 feet long, it is capable of reaching a top speed of 25 knots underwater and can operate without resupply for up to 30 days under normal operating conditions. This new submarine uses air-independent propulsion (AIP) to stay submerged for weeks at a time and it is extremely quiet in comparison to its predecessors. Other boats in Israel's fleet are Dolphin, Tekuma, Leviathan and Tanin, the first three of which are Dolphin 1 class, with the Tanin being the first of the improved Dolphin 2 class. Dolphin class, in general, is based on Germany's highly successful line of submarines starting with the Type 209, but is most similar to the Type 212, although the Dolphin class is larger. The Dolphin 2 class is even larger than the Dolphin 1 class [6].

Israeli Military's Innovative products [7]:

PillCam - Given Imaging is an Israeli medical technology company. Given Imaging pioneered the capsule endoscopy technology with 'PillCam' a capsule with two tiny video cameras that enables visualization of patients' intestines without the need for endoscopy. This idea was developed by Dr. Gabi Iddan while working with missile division of Rafael, where he envisioned that missile technology could be miniaturized to create a medical product. He used miniature missile-guiding technology to craft this groundbreaking medical imaging device.

Emergency Bandage (Israeli Bandage) – It's a specifically designed first aid device that is used to stop bleeding from hemorrhagic wounds caused by traumatic injuries in pre-hospital emergency situations. It was invented by an Israeli military medic, Bernard Bar-Natan. Developed through Israel's Technology Incubator Program, the Emergency Bandage saved so many US lives in Operation Iraqi Freedom and Operation Enduring Freedom that it became known as the Israeli Bandage in the North American market.

DiskOnKey USB flash drive — USB flash drives were invented by Amir Ban, Dov Moran, and Oron Ogdan. In 1989, Dov Moran founded the M-Systems and patented the first flash drive. They also created the True Flash Filing System (TrueFFS) which presented the flash memory as a disk drive to the computer. Dov Moran served Israeli navy for seven years and was commander of its microprocessors department. His M-Systems Flash Disk Pioneers Company was acquired by SanDisk in 2006.

Selman Surgical Rehearsal Platform - Retired Israel Air Force officers Moty Avisar and Alon Geri created a revolutionary neurosurgery simulator that lets brain surgeons rehearse challenging microsurgical procedures before making a single incision. The system generates 3D images from the patient's CT and MRI scans and provides a preview of how surgical instruments will interact with the patient's tissue and how the delicate brain structures will respond. It was launched at the Congress of Neurological Surgeons in October 2012 and is named after Dr. Warren Selman, the surgeon who commissioned the former officers to devise the system.

Through-Wall Vision - The Xaver (a product of Camero) through-wall radar imaging systems use 3D image reconstruction algorithms, signal processing techniques, and a unique proprietary sensor to generate 3D images of objects concealed behind cement, plaster, bricks, concrete or wood. The product line ranges from security cameras with advanced micropower radar technology to a handheld device intended for search-and-rescue workers. Amir Beeri (former head of IDF's R&D department) after spending 14-plus years in military intelligence, in 2004 founded Camero. Now Camero is a leader in development and marketing of radar-based imaging systems. Camero is a part of the SK GROUP, a leading global defense and security group that includes Israel Weapons Industries(IWI), Meprolight, Israel Shipyards, PI Systems, Uniscope and more.

IAI Heron - The IAI Heron is a medium-altitude long endurance unmanned aerial vehicle (UAV) developed by the Malat (UAV) division of Israel Aerospace Industries. It is capable of Medium Altitude Long Endurance (MALE) operations of up to 52 hours duration at up to 10.5 km (35,000 ft). Heron can carry an array of sensors, including thermographic camera (infrared) and visible-light airborne ground surveillance, intelligence systems (COMINT and ELINT) and various radar systems, totaling up to 250 kg (550 lb). Heron is also capable of target acquisition and artillery adjustment.

IDF has developed several other critical and innovative military products, these are the most talked about, Israel is truly a leader in military engineering.

(There are many other interesting products, you can read in detail at http://www.israel21c.org/20-top-technology-inventions-born-of-conflict/)

Hi-Tech Companies

Israel is a hub of many thousands of high technology companies in a wide range of fields such as telecommunications equipment, software, semiconductors, biotechnology and medical electronics. High-tech companies are located throughout the country: in central Tel Aviv, in the suburbs of Jerusalem, even in development towns in the Galilee and the Negev. But the main centers are in Tel Aviv's Atidim Industrial Park, to the north of Tel Aviv in Herzliya Pituah, and to the south in Rehovot, adjacent to the Weizmann Institute, as well as in Tel Aviv's northeastern suburbs [8].

There are over 250 MNCs research and development centers in Israel, 80 of them Fortune 500 companies including a large number of US companies. The world's most important tech companies run Israeli research centers, including Cisco, Microsoft, Google, Apple, IBM, Oracle, SAP, EMC, Motorola, HP, Facebook, and eBay.

Let’s take a look at some major R&D centers and their contributions [9]:

Intel: Intel is an American MNC and one of the largest and highest valued semiconductor chip maker based on revenue. It is the inventor of the x86 and x64

series of microprocessors, the processors found in most personal computers. In March 2014, Intel embarked a $6billion plan to expand its activities in Israel.

Notable contributions of Intel's Israeli R&D Center: the development of the first PC processor, the 8088 (used by IBM for its machines) in 1979 by Intel's Haifa team, the Pentium MMX processor released in 1997 the most widely distributed processor of the 20th century also developed in Haifa, development of the various generations of the Pentium laptop processors (Dothan, Banias, etc.) as well as the Centrino processor, the first laptop processor with Wi-Fi, development and production of the latest Intel tech, including Thunderbolt, Sandy Bridge, Ivy Bridge etc.

Google: Google's Israeli R&D center has done significant work in search, innovations like Google Suggest, Google In-Page Analytics, and YouTube Annotations. Google Israel's work in digitizing text 'The Digital Dead Sea Scrolls' project allow users to examine and explore these most ancient manuscripts from Second Temple times. Google and Israel Museum partnered for this project. The website gives users access to searchable, fast-loading, high-resolution images of the scrolls, as well as short explanatory videos and background information on the texts and their history. The project, started by a single engineer in Google's Haifa office, has become the standard for more ambitious Google digitizing projects, with the Paris office using the system developed in Israel to digitize what will eventually be thousands of historic archives and documents.

HP: HP has eight major facilities in Israel, one dedicated to the country's local business along with seven R&D centers. Established in 1994, Hewlett-Packard Labs Israel is an excellence center focusing on research in big data analysis, machine learning, and data mining. The Haifa lab is taking the lead in reinventing analytics for the era of Memory-driven Computing and in building the platforms, technologies, and tools required to gather, synthesize and interpret massive volumes of data in real-time.

IBM- IBM Research - Haifa is the largest lab of IBM Research Division outside of the United States. Founded as a small scientific center in 1972, it grew into a major lab that leads the development of innovative technological products and solutions for the IBM corporation. The Lab works with IBM development and

services arms, partners with clients to answer their needs, and collaborates with universities to promote industrial research. Its major projects are related to cloud, storage, big data, social analytics, mobile, security, and quality. The lab also focuses on two industry domains: healthcare and retail. IBM Israel also has a software lab ILSL and cybersecurity center of excellence.

Marvell Technology Group - A producer of storage, communications and consumer semiconductor products. The company was founded in 1995 and has approximately 7,500 employees, 1,200 of whom, or nearly 20%, are in Israel.

Marvell Software Solutions Israel is a wholly owned subsidiary of Marvell Technology group that specializes in LAN technologies.

Directory of Israeli hi-tech companies: http://www.science.co.il/companies/

Silicon Wadi, a hub of high-tech industries in Israel, similar to Silicon Valley in California, US, it is one of the world's most dynamic startup ecosystems. The area covers much of the country, although especially high concentrations of hi-tech industry can be found in the area around Tel Aviv, including small clusters around the cities of Ra'anana, Petah Tikva, Herzliya, Netanya, the academic city of Rehovot and its neighbor Rishon Le Zion. In addition, hi-tech clusters can be found in Haifa and Caesarea. More recent hi-tech establishments have been raised in Jerusalem, and in towns such as Yokneam Illit and Israel's first "private city," Airport City, near Tel Aviv. (Source: Wikipedia)

Startup Nation

As per the recent rankings, Tel Aviv, Israel's capital city, ranks number five in the top 20 global startup ecosystems in the world. Israel's startup ecosystem is vibrant, Tel Aviv provides all the platforms necessary to facilitate innovation and R&D, simple administrative procedures create ease of doing business environment and foster entrepreneurship. Israel Prime Minister Benjamin Netanyahu has said "As far as the 'startup nation' I think this has a lot to do with entrepreneurial spirit. I have noticed that in Silicon Valley (USA), you hear Indian dialects and you hear Hebrew, sometimes you hear some English, which means there is a lot of spirit for

enterprise in both our countries." Few days back Israeli-born billionaire Haim Saban has announced to set up a new fund to invest $100 million in Israeli startups. The fund will invest in startups in the mobile, social networks, e-commerce, and digital media sectors. Israeli startups are known for cutting-edge technologies, advanced medical devices, FinTech solutions, cyber security, IoT and cool gadgets and apps. Israel's spirit and innovation culture are remarkable.

Let's take a look at some popular and innovative Israeli Startups and their products [10]:

Dojo Labs - Dojo labs designed a security technology that gets connects to the network and acts as the essential layer between smart devices and security and privacy threats. It monitors all data sent by anything connected to the Internet. If Dojo observes any suspicious activity it sends alert on Dojo mobile app and allow the user to remotely turn the device off or block its communications. Dojo is founded in 2014 by Yossi Atias and Smulik Bachar.

SniffPhone - Designed by Prof. Hossam Haick of Technion Institute, this device can sense disease on the breath. SniffPhone uses nanotechnology to analyze breath and it is able to detect lung cancer as well. SniffPhone is a mobile device that can be taken to anywhere, which makes it useful for rural areas.

ZUtA Labs - ZUtA is a mini robotic printer; it connects directly to smartphone and to PCs and allows the user to print on any size piece of paper. This printer is designed by Israeli firm Nekuda, it works on Bluetooth and wireless networks. ZUtA is founded in 2014 by Tuvia Elbaum and Matan Caspi, ZUtA (which means "small" in Hebrew) and it won the best of innovation award at CES 2015.

SkySaver - SkySaver is an emergency backpack that's designed to escape from high-rises when a fire breaks out. This lifesaving kit equipped with a cable cord of approximately 80 meters that, in the case of an emergency, is attached to a pre-installed anchor located near a window. When a fire breaks out, the emergency device is strapped on with buckles that wrap around the waist and between the legs. Founded in 2012 by Eli Gross, SkySaver is truly a life saver!

Singlecue - Singlecue designed by EyeSight Technologies is a home automation device. Through Singlecue, you can control your TV, media and smart homes

devices using touch-free gestures. Just lift your finger and get control over the devices. This device can recognize almost anything with an infrared, Wi-Fi, or Bluetooth sensor. Launched in 2014, Singlecue is a cool gadget in IoT space.

Tridom - Urban development startup Tridom designed a 3D-printed space home for NASA. Founded in 2014 by Yaron Schwarcz and Lior Aharoni, Tridom presented in September a model of an inflatable structure that could be blown up with a small amount of liquefied natural gas once on Planet Mars.

Pixie - Pixie's technology uses a Location-of-Things platform to derive the precise location of our valuables at all times. The system uses Pixie Points, the smart tags that we can affix to anything (even your pet) and a mobile app. After attaching this tag the object gets pixified that is it joins a closed, private network of all of the pixified items that smartphone keeps track of via Bluetooth. Pixie app displays an augmented reality view using your smartphone's camera. Each Pixie Point has a 50-foot range indoors and a 150-foot range outdoors. Pixie is founded in 2011 by Amir Bassan-Eskenazi and Ofer Friedman.

G-RO - It's a smart suitcase that charges our phone and laptop on the go. G-RO is developed by Israeli startup Travel-Light, founded by Netta Shalgi and Ken Hertz, the product was launched in October 2015.

HomeBioGas - This biodigester turns organic waste into fertilizers and biofuel for cooking. It's a new "Off the Grid" biogas system, produces daily clean cooking gas for 3 meals and 10 liters of clean natural liquid fertilizer. It is really an amazing product for home and environment. HomeBioGas is founded by Ron Gonen and Thomas H. Cullhane.

Cyber Security

The combination of Israel's defense expertise and technological capabilities has turned Cyber security into one of its most important exports. According to Israel's National Cyber Bureau, Israel accounted for 10 percent of global security technology, and sales of its security software topped $60 billion in 2014.

In the words of Dudu Mimran, CTO of the Cyber Security Research Center at Ben-Gurion University "The challenging environment Israel faces in the Middle East in the physical world has reflections also on the cyber world. Security is a subject that can be taught theoretically, but nothing is a substitute for a real hands-on experience and we've got lots of it." Israel's cyber security ecosystem is a perfect blend of mature companies like Check Point, venture capitalists such as Jerusalem Venture Partners (JVP) Cyber Labs and research collaborations such as the Deutsche Telekom Innovation Laboratories and Ben-Gurion University [11].

Some popular Israeli cyber security companies are:

CyberArk Software, Imperva Data Center Security Solutions, ThetaRay, CyberSeal, BioCatch, Seculert, Votiro, Argus Cyber Security, SenseCy, Check Point Software Technologies, Covertix, and Lacoon Mobile Security.

Advanced Technology Park of Israel: In Sep' 2013 Israel's Prime Minister Benjamin Netanyahu inaugurated Advanced Technology Park on the campus of Ben Gurion University in Be'er Sheva. The primary mission of the Advanced Technologies Park is to promote technology and commercialization of cutting-edge research and innovation being developed through BGU (BEN-GURION UNIVERSITY) and affiliate institutions. ATP creates a symbiotic relationship between three potent entities: Academe, Tech companies, and Israeli Defense Force. Dr. Moti Herskowitz (Dean of Research and Development, BGU) said "Our research model is that we have no model, which is the strength of it. We deal with it case by case". I appreciate his view because R&D team should think like this. One of the BGU's key catalysts in bridging the gap between academe and industry is its commercialization arm, BGN Technologies, which uses a unique model of technology transfer, under this model the university takes valuable ideas and brings them to market by partnering with a company or selling the company a patent. So far BGN Technologies has signed agreements with over 150 companies, including ExxonMobile, Johnson & Johnson, Siemens, and General Motors. BGN Technologies has been so successful at this that universities from the U.S. and Europe are studying their approach [12].

In this case study, I have covered the most attractive sectors of Israel and I believe there is still a lot to cover. While I was writing this case study, I observed the latest

trends of **BDS movement. Boycott, Divestment, and Sanctions** is a campaign that was started in July 2005 by Palestinian NGOs to make economic and social pressure on Israel. I believe Israel, as a nation is accustomed to handling all this and such trends, **can not affect the spirit of Israel.**

About the Author

Devsena Mishra is the founder of a2zstartup and director of DappsTech. Devsena promotes advanced technologies, startup ecosystem and government's business and technology related initiatives like Digital India, Make in India and Startup India etc. through her portals, articles, videos, and books.

Devsena is Certified Scrum Developer, Certified Scrum Product Owner, Certified Scrum Master, Six Sigma Black Belt, Lean Certified, PRINCE2 practitioner and ITIL certified. She has earned some 29 international certificates in different technologies (Java/Oracle/Microsoft/SAS) and build up expertise in four methodologies- Scrum/Agile, Six Sigma, PRINCE2 and ITIL.

Some of her initiatives to promote Brand India are:

A2zstartup.com - To Promote Indian Startup Ecosystem, Advanced Technologies, and Government Programs.

Integral Humanism and Spirit of Enterprise (IHSE) - Digital Diplomacy Platform

DigitalChannel - For business, technology, and government programs

Devsena has written two books on Digital India, 'DREAM OF A DIGITAL INDIA: RESEARCH REPORT 2014-15' **and** 'Digital India Research Report 2016-17'

Her other books are:

'Lean, innovation and the spirit of enterprise'

'A guide to Scrum Developer'

Articles Published at Indian Military Review are:

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