



MIT REAP
Regional Entrepreneurship
Acceleration Program

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Innovation Diplomats

Israel

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Innovation Diplomat

ISRAEL



Executive Summary

In the past few years, worldwide, Israel has become known as the Startup Nation. This past summer, while researching at Tel Aviv University, I set out to learn about what created the ecosystem that enabled the startup revolution, as well as what improvements could be made. I interviewed ten experts on the subject from five stakeholder categories: corporate, government, university, risk capital, and entrepreneur. This report details the findings from the interviews, as well as provides suggestions or how stakeholders can improve current problems to create a richer ecosystem.

Introduction



Israel is a relatively new country, having celebrated its 70th anniversary just this past year in 2018. With a population of around eight and a half million, it is approximately 80% Jewish and 20% Arab (OECD). Despite the country's recent start, it has developed into a technology hub in the Middle East, and become known as the "startup nation." However the birth of Israel began long before its independence in 1948; by the time Israel was declared a state, the foundations of the country had already been laid.

Theodor Herzl imagined a Jewish state and founded Zionism, and by 1880 the first Jewish immigrants came to Israel. Throughout the 1920's and 30's, many Jews immigrated to Israel as refugees, fleeing conflict and antisemitism in Europe. Due to immigration, by 1947 there were 630,000 Jews living in modern day Israel, accounting for slightly more than one-third of the total population (Halevi). These people had already developed some infrastructure for the new state. In 1912, the Technion, Israel Institute for Technology, was founded,

followed shortly by Hebrew University in Jerusalem and Weizmann Institute for the Science outside Tel Aviv. By the time Israel was founded, all three of these institutions were leaders in the education field and had won Nobel prizes (Matalon). Similarly, Tel Aviv had already become a commercial center and was laying the foundations for the future state.

After the declaration of the State of Israel, there were immediately economic problems. For one, the surrounding Arab nations immediately declared war. While managing the cost of the war, there were two influxes of immigrants, each wave containing around 340,000 people, doubling the population by 1951. However despite these challenges, from 1950 to 1965, Israel's GNP grew 11% annually on average with the help of US aid, German reparations, and the sale of bonds (Halevi). Throughout the next few decades there were many more waves of immigration of Jews which at first may have put strain on the economy, but eventually helped it grow.

In the 1990's the Israeli economy shifted to become more modern. In the early days of the country, the economy was made mostly on agriculture and tourism (Matalon). However, with the development of the internet, that began to change. Due to its location, Israel is essentially an island (Blass). The surrounding Arab nations are much less economically developed and none are friendly allies, most are even technically still at war with Israel. Furthermore, unlike many of the surrounding Arab nations, Israel does not have oil to fuel the economy. The internet has a low barrier entry and physical location plays little importance (Solomon). Now, six million of eight million Israelis use the internet, and they have one of the highest rates of smartphone use in the world. It was the internet and the new high tech industry that pushed Israel to become "the startup nation."

Israel now hosts Silicon Wadi, Wadi meaning valley in Hebrew and Arabic, in Tel Aviv and the surrounding area. There are currently 6,000 active startups and 1,300 new startups founded every single year. Backing these startups are good educational institutions, over one hundred established V.C. firms, and mandated army service where people network and learn technical skills. The government spends more money on R&D as a percentage of GDP than any other country in the world. The high tech industry then gives back by contributing 12.5% of the GDP (Goyal). Many technologies have developed in Israel such as cell phone technology, the flash drive, and Waze, a navigation app that was sold to Google for over one billion dollars (Goyal).

Israel has the highest percentage of Ph. D's in the world (Julian). Outside, there are strong ties to the Jewish community, many of whom are wealthy and want to give back to their people. For example, recently a Jewish couple from California donated four hundred million dollars to Ben Gurion University, enabling them to establish new departments and expand their capacity (Goyal).

Despite this success, there have always been setbacks. One of the main issues for the country is security, which leads to the development of new technologies, but also proves expensive for the economy. For example, the Yom Kippur War in 1973 brought most of the labor force out of reserves and back into the army for six months. This took a heavy toll on business (Solomon). And this was not a one-time event, Yavin Altshuler, CEO of Endor mentioned to me during his interview that he had been called back to do reserves in the 2000's while he was building his company. And each time there is a conflict, equipment is needed, bombs are bought and used, and it quickly becomes very expensive for the citizens. And it is not just the army that is expensive, but also the territories. The current right-wing government supports expanding the settlements, but the government spends twice as much per citizen living in a settlement, and three times as much if the settlement is remote. These issues burden the citizens with high taxes and costs of living.

Despite these issues, Israel is still the 11th happiest country in the world (Solomon). The presence of the "startup nation" has put Israel on the map and is connecting the country globally. In the past century, Israel has created a vibrant ecosystem that is an oasis in the middle of the desert.

Methodology

In order to learn about Israel's ecosystem, I interviewed ten stakeholders from five different categories: university, venture capital, government, entrepreneur and corporate. The stakeholders were found predominantly through MIT infinite connection, with the help of MISTI MENA coordinator David Dolev, and through the interviewees connecting me with people they thought would be helpful with the project. I conducted all interviews in English. All interviewees had lived in Israel for most of their lives with the exception of Julian Adams who just began working in Israel about a year ago. A list of the people interviewed can be found at the end of the report.

Innovation Ecosystem

I-CAP: The potential for development of innovation

I-CAP ELEMENT	DESCRIPTION	RELEVANT DATA	INPUT DATA
HUMAN CAPITAL	Pool of skilled innovators Availability of quality education (technical, R&D)	Quality of research institutions Quality of education institutions	Quality of research: Israel's 8 universities register more patents than firms, military labs and private labs combined. Quality of education: Was ranked third in 2006 for academia and higher education.
FUNDING	Public and private funding for research Government incentive programs	Gross domestic expenditure on R&D Company spending on R&D	4.25% of GDP on R&D in 2011 (Source) Company: 43 billion shekels (Source)
INFRASTRUCTURE	Physical infrastructure (transportation, internet) Availability of specialized space (research labs)	Quality of internet (bandwidth, servers) Internet adoption rates (subscribers or %) Internet access in schools	Available cable and DSL reaching 95% of the population. Average upload speed 3.1Mbit/s. Will add Quantum cables by 2020. (Source)
DEMAND	Public and private demand for innovative output	Firm-level technology absorption Availability of latest technologies	Firm level tech absorption: 6.05/7 Availability of latest tech: 6.36/7 (Source)
CULTURE & INCENTIVES	Celebration of invention and innovation Rewards to innovation (tenure, prizes)	Influential inventors Influential researchers	Influential Investors: Adam Neumann, Amnon Shashua, Ziv Avriam (Source) Influential Researchers: Ada Yonath, Amotz Zahavi, Anita Shapira (Source)
INNOVATION OUTPUTS		Number of patents filed/year Number of published papers/year Leading innovations from your region	Patents per year: 3804 in 2015 (Source) Research papers per year: 12,154 in 2011 (Source)

E-CAP: The potential of developing new businesses

E-CAP ELEMENT	DESCRIPTION	FIND THE FOLLOWING DATA	INPUT DATA
PEOPLE	Pool of entrepreneurs Availability of entrepreneurial education	Entrepreneurial intention Quality of management schools Labor force with tertiary education	86% of Israeli's think entrepreneurs have high status (Source) Management schools such as Technion and TAU Highest Ph. D per capita
FUNDING	Availability of entrepreneurial capital (equity, debt, grants)	Ease of access to loans Venture capital availability Domestic credit to private sector	70 active venture capital fund (Source) Proceeds from startups exceed 9 billion dollars Domestic credit to private sector 65.58% (Source)
INFRASTRUCTURE	Physical infrastructure (space, transport) Availability of key services (internet, phone)	Overall logistic performance	One of the highest rates of smartphones in the world As of 2016 almost 6 million internet users out of 8 million (Source)
DEMAND	Government, corporate and consumer demand for new products and services	Buyer sophistication GDP per capita	GDP per capita: 37,292.61 USD (World Bank) 4.11 out of 7 buyer sophistication (Source)
CULTURE & INCENTIVES	Celebration of entrepreneurship Culture of entrepreneurship	Influential business people Influential young entrepreneurs Media attention for entrepreneurship	Business people: Remi Levi, Michael Golan, Stanley Fischer (Source) Young Entrepreneurs: Iddo Gino, Avishai Abrhami, Daljitt Barn (Source) High media attention for entrepreneurs, "startup nation"

<p>ENTREPRENEURIAL OUTPUTS</p>		<p>Total early stage entrepreneurial activity New businesses registered Nascent entrepreneurship rate Leading examples of entrepreneurship Most well known innovation-driven enterprises</p>	<p>Early stage entrepreneurial activity: 11% of population (Source) Entrepreneurship examples: Invented the cell phone, Waze, and many military technologies. 5.9% established business ownership 24% with entrepreneurial intention (Source) Names the start up nation</p>
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Key Findings

University

In Israel, the general attitude towards STEM contributes to the high tech sector and the international business success. Israelis believe their STEM education to be a top source of national pride, and 94% believe that it is essential for Israel's economic success.

Furthermore, 34% of Hebrew speaking children and 45% of Arab speaking children say that they want to become scientists (Drori). Entrepreneurship courses are offered at all the major Israeli Universities and many people who complete a STEM major for their first degree will do entrepreneurship for their second.

The universities in Israel are very strong, some of the strongest in the Middle East. At the university that I was doing my MISTI internship, Tel Aviv University, there was an entire building dedicated to the business school. I spoke with Dr. Sagit Bar-Gill who teaches at TAU's Coller School of Management. Her research focuses on the online environment and user engagement. She explained that many of her personal projects are done in connection with international business affairs. This is due to the fact that Israel is a very small country, so to be successful in business they have to work with people abroad.

Many people who create startups in Israel begin them directly after their mandated army service or after their first degree, but without formal business training. According to Sagit, most of the MBA students are going back to school to advance their careers and learn about business from their engineering backgrounds. They work part-time as they complete their degrees.

Tel Aviv University also recently created its own accelerator/venture firm. I met with Shira Gal to learn more about this program. She said that this hopes to build a bridge between the real startup world and the entrepreneurship courses that the students are taking. The program is very new with only three employees and seven investments. However, they believe that their venture will be successful as 50% of Israel's entrepreneurs pass through Tel Aviv University at some point during their career.

Venture Capital

One of the things that has led to Israel's startup success is the abundance of venture capital. However, it has not always been this way. Just as Israel was transitioning to a technological economy in the 90's, the government started a program called Yozma to help start venture funds in the region (Matalon). This program provided ten drop-down funds with twenty million dollars and at the same time began making direct investments ("Overview"). There are now over 100 venture capital firms in the region (Kalish). I spoke with Shlomo Kalish, the founder and CEO of Jerusalem Global Ventures, one of the first and now largest venture firms in all of Israel. He told me that when he started JGV in the 90's there were no VC firms, there were simply engineers with good ideas. He managed to raise over 100 million dollars to start his firm and make it what it is today. Gal from TAU Ventures told me that in Israel there is so much venture capital that you don't need to be amazing, if you are even just good, you can find someone to finance your idea. However, Shlomo Kalish chose to direct his money to certain fields, now that Israel is booming with technology, he looks for ideas that are the next big thing such as augmented reality and big data.

Fadi Swidan and Itzik Frid are both trying to create a venture firm to tap a new market, the Arab sector. Because there are many difficulties for Arabs trying to start new businesses (See Problem 2), their firm follows a different model. They do not immediately take equity but initially work with the entrepreneurs as co-founders. They meet at least twice a week and work with the entrepreneurs to develop their ideas and build them into companies. Initially, they don't have any commitment and they only later negotiate the terms. Frid told me that this model is more expensive for him, but in the long run, he thinks it will be worth it.

Government

Unfortunately, I was unable to interview anyone directly involved in the government. In Israel, it is hard to contact government official due to security issues. The closest person I managed to speak with was Itzik Frid, the former senior advisor to the Minister of Finance. However, most of the people I interviewed mentioned the role of the government in entrepreneurship.

The government has done a significant amount to promote entrepreneurship and create the startup nation. From the Yozma program mentioned earlier to the spending on R&D, the government is investing money to help entrepreneurs. Now, they are pouring money into the Arab and Ultra-Orthodox sectors to expand the startup nation.

One cannot talk about Israel's entrepreneurial success without talking about the army. Nearly everyone whom I spoke to mentioned the army's role in promoting entrepreneurship. First, the army is a good way for people to be identified for their skills. Someone can come from the middle of the desert in Israel, but when the army sees their potential, they will be identified and can be put into an elite unit. In this unit, they can be taught skills such as engineering or programming. In this way, the army provides social mobility and allows anyone to become an entrepreneur. Furthermore, the army provides a framework for networking, that people continue to use once their service is over. Lastly, the army gives young people confidence that they later use for business. From flying planes, and defending the border, people as young as eighteen are given extreme responsibility. The army gives people confidence, so they then believe that their idea will be successful and are not afraid to attempt their own startup.

There is one particular elite army unit, 8-200, which turned out many successful entrepreneurs. This unit focuses on cybersecurity and intelligence and provides the members with technical training. Two people whom I spoke to, Sagit Bar-Gill and Yaniv Altshuler were both parts of this unit. Both of them mentioned that 8-200 maintains a strong alumni network which people used to get started on their business ventures. In fact, Altshuler told me that he originally had an offer to be a professor at Cornell, but a friend from 8-200 convinced him to carry out his idea and so they started Endor, a predictive analytics company, together. From an outside perspective, conscription may seem like an unnecessary burden, but in Israel, it teaches young people independence and leads to the startup nation.

Entrepreneurs

It is not surprising that there are so many startups in Israel, the country itself is practically a startup. In seventy years Israel has grown from an idea into a developed and modern country. Since there are few natural resources and friendly borders, Israelis have to

improvise to make a successful nation, which is why there are so many entrepreneurs. Many startups came out of this need to improve the country, such as drip irrigation, and desalination technology, both of which are needed for a country in the desert.

Because the ecosystem is so rich, it is fairly easy to get the resources needed for a new company. Most of the companies and startups are in Tel Aviv and its surrounding areas because of the resources.

Most of the startups in recent years are in software or hardware, while fewer are in fields like biotech, chemicals, or consumer products. There are a few reasons behind this. For one, since the army often leads to startups, these skills are the most directly correlated. The Israeli Defense Force is doing a lot of work related to coding and cybersecurity, but not nearly as much relating to something like biotech. Also, the size of the country makes something like tech more appealing. For consumer products to be a successful venture, the entrepreneur would have to look to sell in a bigger market like the US or Europe. Expanding something like an app to those countries is much simpler than trying to bring something physical. Furthermore, the abundance of money floating around in Israel does not compare with that of a larger company. In my interview with Julian Adams, CEO of Gamida Cell, he told me that he needs to raise one hundred million dollars to develop his next drug. That type of money is not available in Israel so he is looking to Wall Street.

Corporate

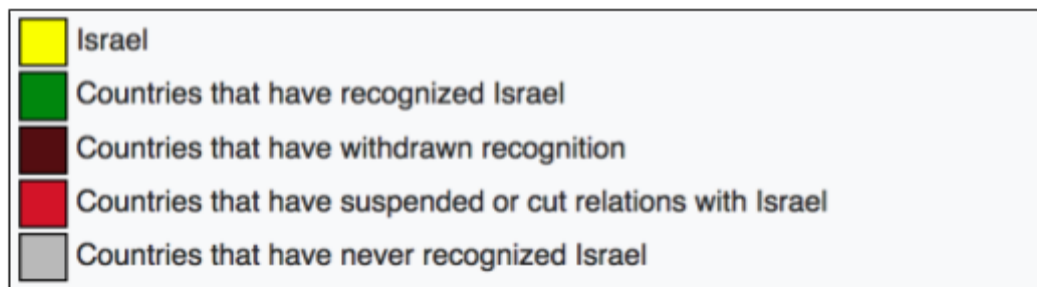
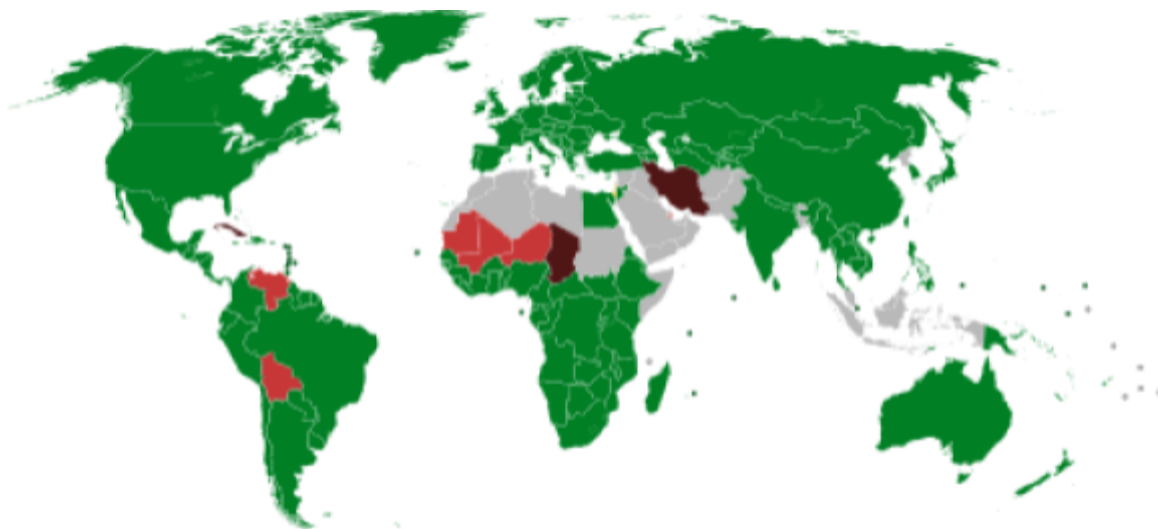
Israel is an attractive place for companies looking to expand into the Middle East. It is very western, most people speak English, and in Tel Aviv, you wouldn't know that you were even in a foreign country. Because of this, many companies have set up a branch in the Silicon Wadi. While in Israel I saw signs for Microsoft, Google, and Amazon to name a few. Tel Aviv is the third largest economy in the Middle East after Abu Dhabi and Kuwait City, both of which get their economic status from oil.

Many of the major corporations come from abroad and were not started in Israel. Adams told me that he believes that Israel may be good at startups, but they are still figuring out how to run companies. "Just look at Waze, one of the most successful Israeli startups and they sold it off to Google." He says that Israel just needs time, and then people will figure out how to grow their startups into major companies.

Problems and Recommendations

Problem One: The Geopolitical Situation

Israel is a tiny country surrounded by many nations that either minimally tolerate the country or outright deny its right to exist. This creates a variety of problems for business in the country. For one, Israel must have a very large army. While as previously discussed this army helps lead to a startup nation, it is also very expensive. This makes Israel have very high taxes. Number two, since Israel is small, it is not a big enough market to have your product successful just in Israel. Naturally, it would also be marketed to surrounded countries, like in the EU, but because of the political situation, this is also not possible. My labmates at TAU (in the zoology department studying sea sponges) told me that it is unsafe for Israeli Jews to go to even Jordan or Egypt to conduct research, let alone other Arab countries that do not have peace treaties. This would also continue over into business, not just academic research, making it difficult for Israel to have business connections with surrounding nations.



While the ideal solution to this problem would be peace in the Middle East, waiting it out until this is achieved may not be a practical solution for an entrepreneur. However, finding another international market like the EU or America would be possible and a strategic way to expand the business. Stakeholders, therefore, need to promote international relationships. Universities should encourage students to study abroad, the government should make strong international connections in these places, and venture firms should invest in ideas that will be applicable outside of Israel. Furthermore, as more Israeli Arabs become involved in the high tech sector, they can form connections with other Arab nations. Frid told me that as he is working with the Arab sector in Israel, they are looking to form connections with people in Jordan. This is a step in the right direction to eventually being able to expand into this market. And hopefully, when stakeholders from Israel become involved with stakeholders from Arab nations it will be the first step to humanization and therefore peace in the Middle East.

Problem Two: Demographics

The Israeli government recently conducted a survey and found that Arabs made up less than 1.5 percent of the high tech sector which was costing the economy nearly 40 billion NIS (Swidan).

After speaking with two Arabs familiar with this topic, there are a several that this is the case. First, there is the problem location. Frid told me that it rare to find someone in Tel Aviv who specifically wouldn't rent their apartment to an Arab. However, the high tech is centered around Tel Aviv and the Arabs tend to live further away in areas like Nazareth and Acre. Some Arabs will try and take part in high tech by commuting nearly two hours each way, but this is not a sustainable lifestyle. And they cannot be expected to leave their communities to become part of the high tech sector.

Second, there are cultural aspects that prevent Arabs from making startups. For one, Arabs are not required to serve in the IDF. Some do, and those numbers are rising, but the majority still do not. Because of this, they miss out on all the benefits described above, but most notably, networking. Also, in Arab culture, there is a huge stigma around risk and failure. This is one of the reasons that Arabs are more present in professions such as doctors or lawyer rather than entrepreneurs. Lastly, Arabs often have a culture of family

business. It is hard to offer a job to your cousin or brother-in-law when you are in the high tech sector because they might lack the skills required for the job.

Demographically, the Arab sector is not the only issue for the economy, but the Ultra-Orthodox, Haredim, sector is also not involved in the high tech sector. Ultra-Orthodox people also do not serve in the army and live in more isolated communities. They are also generally not as educated as the general or Arab population. I reached out to someone trying to get the Ultra-Orthodox involved in high tech, but unfortunately, I was never able to connect with him.

This is a current problem for the economy and it is only growing. In 2016, Arabs on average have 4 children per household and Haredim 6.5 compared to 2.5 in the rest of the population (OECD). Once all these children grow up, it will shift the demographics. Therefore there needs to be a push to get these communities involved in the high tech sector to boost the economy.

The solution to this problem is easy in theory, but hard in practice. To get these people involved in the startup nation, the government has been investing in programs like the ones run by Frid and Swidan. These programs are relatively new, but hopefully, they can begin to make high tech more accessible. Frid told me that he believes once there is a single success story of an Arab startup, then more will follow.

Furthermore, in Israeli society, both communities of Arabs and Haredim are often a little more isolated from Israeli society than other populations. Having programs to mix different populations would also help diversify technology. One example of a program doing this is called Moona. Moona is a makerspace in an area with Jewish and Arab communities. It brings students from both communities together while teaching them tech skills. More places like this would encourage collaboration between Jews and Arabs in Israel and therefore improve business relations. Jewish venture firms would be less nervous about investing in Arab companies because it would no longer be seen as risky. And Jews and Arabs could begin to work together on business ventures, improving the economy. Israel is not completely segregated, but the self-segregation by communities has become detrimental to social and business interactions. Once this gap is bridged, it will not only improve business, but society as a whole.

Interviews

Itzik Frid

Government/Venture Capital–Arab Sector

June 18th at 8:30 a.m.

Cafe Dubnov, 8 Dubnov Street, Tel Aviv

Julian Adams

Corporation--CEO Gamida Cell

June 18th at 4:30 p.m.

Tel Aviv University

Fadi Swidan

Venture Capital–Arab Sector

June 19th at 1 p.m.

Hamada 7, Herzliya

Vered Blass

University – Lecturer at Tel Aviv University

June 24th at 6 p.m.

Tel Aviv

Shlomo Kalish

Venture Capital/Entrepreneurship–Founder and CEO of Jerusalem Global Ventures

June 26th at 4 p.m.

Jerusalem

Sagit Bar-Gill

University–Fellow at Tel Aviv University

July 4th at 12 p.m.

Tel Aviv University Coller school of Management

Yaniv Altshuler

Entrepreneur–CEO and co-founder at Endor

July 10th at 12:30 p.m.

Tel Aviv

Ayal Matalon

Corporate

July 8th at 5:30 p.m.

Givatayim Mall

Shira Gal

University/Venture Capital–TAU Ventures

July 11th at 11 a.m.

TAU Ventures

Yoseph Shaaltiel

Entrepreneur/Corporate founder of Protalix

Interview 10

July 15th at 10 a.m.

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