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What is the driving force behind the Israeli tech industry?

Saar Kraus

Master in International Management

Supervisor:

Professor Renato Pereira

ISCTE Business School

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I hope you will enjoy skimming - reading, would be too much to ask for - through this dissertation, and maybe you will learn something new. I sure know that I have learned a lot from you all!

Resumo

Israel ficou conhecido nos anos mais recentes como a "nação inicial". Este artigo teve como objetivo descobrir qual foi a força motriz de Israel por trás de seu sucesso na indústria de tecnologia. Para fazer isso, dois tópicos principais foram cobertos: (1) Qual é a natureza da inovação israelense? e (2) qual é o papel do funcionário nesse ecossistema? primeiro tópico foi coberto por uma extensa revisão multidisciplinar das pesquisas mais atualizadas disponíveis (histórica, sociodemográfica, financeira e política). Quanto ao segundo tópico, um questionário comportamental foi entregue a uma empresa Fintech israelense e uma amostra de 200 participantes foi entrevistada. A pesquisa da literatura existente encontra uma forte conexão entre o obrigatório serviço militar, falta de recursos naturais, imigração, infraestrutura e políticas políticas para caráter inovador do país (demonstrado pela tecnologia bem-sucedida e rica em tecnologia setor). A pesquisa comportamental realizada na empresa Fintech apresentou resultados moderados para a inovação e resultados relativamente superiores para a criatividade, o que destacou que não há um ligação positiva significativa entre o sucesso de uma empresa (e a indústria de tecnologia em geral) e o caráter inovador de seus colaboradores. Israel é um fenômeno complicado de país, e sua indústria de tecnologia de sucesso é uma das melhor, globalmente. Esta pesquisa prova o que é aceito como o principal impulsionador do sucesso - o serviço militar obrigatório, como resultado da percepção de ameaça permanente à segurança de Israel, e os funcionários não contribuíram de forma inovadora para isso.

Classificações JEL L26, O3, O4
Palavras-chave: Inovação, Criatividade, Israel, Alta tecnologia.

Abstract

Israel became known in the most recent years as the "start-up nation". This dissertation aimed to find out what was Israel's driving force behind her success in the tech industry. To do so, two main topics were covered: (1) What is the nature of Israeli innovation? and (2) what is the employee's role in that ecosystem? The first topic was covered by an extensive multidisciplinary review of the most up-to-date research available (historical, socio-demographic, financial and political). As for the second topic, a behavioural questionnaire was handed over to an Israeli Fintech company and a sample of 200 participants was surveyed. The research of existing literature finds a strong connection between the compulsory military service, lack of natural resources, immigration, infrastructure and political policies to the innovative character of the country (demonstrated by the successful, technology rich tech sector). The behavioural research carried out in the Fintech company showed moderate results for innovation and relatively higher results for creativity, which highlighted that there is not a significant positive link between a company's success (and the tech industry at large) and the innovative character of its employees. Israel is a complicated phenomenon of a country, and her successful tech industry is one of the best, globally. This research proves what is accepted to be the main driver for success - the compulsory military service, as a result of the perception of permanent threat to Israel's security, and employees were not found to contribute innovatively to it.

JEL classifications L26,O3,O4
Keywords: Innovation, Creativity, Israel, High-tech.

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1. Introduction

The purpose of this study is to better understand the Israeli tech ecosystem from a behavioural point of view. In order to achieve this goal, two main questions will be addressed: the first, what is the nature of Israeli innovation? In other words, what makes it so fruitful in terms of density and productivity when compared to various nations around the world? The second question is: what is the employee's role in that ecosystem? This study will explore how employees contribute to the efficiency of the market and, equally importantly, can we reproduce their characteristics and apply them in other locations, globally?

The study uses both empirical research and a comprehensive review of the most up to date theories and data available. The unique selling point of this dissertation comes from the perspective taken when examining the Israeli landscape. There are a wide variety of existing studies and ideas that have been published already, but in this dissertation a slightly different approach has been used. The employees, not the entrepreneurs, are the main focus here: the idea was to go out to the industry and contact a company with an innovative character, then learn about its employees and, finally, draw some conclusions about their nature from a behavioural point of view.

As for the first question, extensive research had to be carried out in several fields of study. Firstly, the history of the state of Israel was looked at: what were the main stimulants that have led to its people becoming world leaders in tech-focused industries (compulsory military service is of great importance)? How do we measure success in this field? What type of statistical measurements are being used today in asserting the levels of innovation of nations? One of the tools used is the number of start-ups per capita (the start-up density of a country). It is then necessary to determine where Israel is versus other countries in relation to start-up density and valuation, demonstrated by its rankings in highly respected journals and institutions (The Annual Bloomberg Innovation Index is an example). The following questions should be answered: What is innovation? How does it correspond with creativity and other qualities? How do we measure innovation, is it environmental or inherited? Is it possible to train others to become more innovative? It is also necessary to give a general overview and review of the tech market, its leaders and its main sources of income. Finally, attention must be given to thoughts for the future - for example, will it keep its status as start-up leading manufacturer? - as well as the impacts of COVID-19 (accelerator or decelerator) of the Israeli tech-ecosystem.

In order to answer the second question about the employee's role in the Israeli tech ecosystem, a behavioural questionnaire was formulated and distributed to a large and innovative financial services company in Israel. By analysing the responses of the employees to the questions, it was possible to draw conclusions about their character, while taking into consideration that it is not enough to merely have a visionary entrepreneur to create a successful start-up, but it is essential to have a team of ambitious and highly capable professionals behind the leader as well. This is key in order to execute his or her vision, when at times said vision can be very abstract and not so easily comprehended.

The questionnaire's focus was creativity, flexibility, independent thinking and other qualities (or the lack of them) which can be related to a profile of a "typically innovative person". Any correlation of these markers with the nature of the surveyed company can help lead to better understanding of how employees are integrated within companies and how they influence their employers to achieve greatness. Later on, other companies and nations can be assisted by the generated insights with the allocation of their human resources more efficiently.

The research was limited in time and resources and only one Israeli company has been surveyed, thus expanding the research to a larger number of companies and sectors can improve its validity and precision.

2. The Israeli tech ecosystem

Israel, a member of the Organization for Economic Co-operation and Development (OECD), is considered as a strong economy and ranked 19th in the world in 2020 by the United Nation Human Development Index (United Nations Development Programme, Human Development Report, Israel) The country is located to the east of the Mediterranean Sea; has a population of 9.3 million (2021); and a GDP per capita of $43.7 (Israel, Wikipedia, 2021). “Israel is considered a global leader in ground-breaking research in a number of areas including solar energy, water conservation, geothermal energy, software development and communications technology, and life sciences” (Kumar et al., 2018).

The first thing to understand about the nature of the innovative characteristics of the Israeli tech industry is that there are many different ways to look at them; some related to the demographic nature of the country, some to the geographical restraints Israel faces, and others relating to the history of the Jewish people.

3.1 History and Environment

In the early 1980s researchers started investigating the developments and frequent changes of the Israeli tech industry. It seems that the narrative of Israel’s innovation may stem from the fact that Israel is surrounded by enemies; Lebanon, Syria, Jordan and Egypt, all hostile countries (Senor and Singer, 2011). Domestically, Israel is divided by the Green Line - the agreed border between the Israeli and Palestinian sovereignties, which was established right after the war of independence in 1949 (Senor and Singer, 2011). It is not just the fact that Israel, as a country, feels so threatened by its neighbours, but it must also be taken into consideration the reality that historically the Jews have been spread all over the world for the past 2,000 years, without a nation state to call home. It was only relatively recently - after the well-documented horrors of the Second World War and the crimes of the Nazi regime were laid bare for the world to see - that Israel was founded. The survival of the Jewish people throughout these millennia of persecutions and terrible events certainly left their mark on the Jews who built the country, driving and boosting their drive for excellence and their longing for a sustainable future for their children.

The basic idea of a "stand alone" country surrounded by enemies led its people to become much more dependent on their ability to think creatively and outperform their counterparts who outnumbered them at any given moment. Also, the fact that military service is mandatory for a

period of two to three years (time served varies based on your sex or the nature of your role) is also related to high levels innovation and creativity of the Israeli people (Senor and Singer, 2011).

3.2 Accelerators

The government realised that knowledge-based industries could become a major asset and be used to strengthen Israel's competitive advantage in trade and in other diplomatic ways. As a result, the political leadership began investing taxpayers' money in R&D (research and development), creating hubs for innovation and technology, and encouraging MNCs (multi-national cooperation) to open their own incubators there, as it would help to position Israel as a world leader in innovation (Kon et al., 2014). As described in the report "A Panorama of the Israeli Software Startup Ecosystem" the government invested in and opened programmes like "Yozma" (initiative), created to encourage VC (venture capital) and investment of government funds by applying tax incentives, as well as providing R&D grants and so on (Kon et al., 2014). These actions were taken in order to create and sustain a healthy environment for the creation of start-ups and cutting-edge technologies.

Most of the R&D investments originated in the military itself and its supporting industries. (Kon et al., 2014) It was an act of survival which was performed wisely by the local leadership, but even prior to the actual founding of the country of Israel, the "Zionists" - thrilled supporters of the idea of a "Jewish country", preferably in the geographical location of what was once called Palestine (Zionism, Wikipedia, 2021) - understood that the sustainability of this desolate dry land lay within its human capital. Therefore, some highly respected establishments were created to support and develop science, behavioural studies and other topics. "The Technion", "Hebrew university", "Weitzman Institute" are all top ranked institutions in global rankings (Kon et al., 2014).

Another key promoter for the development of Israel, according to the authors of the report mentioned above, are donations of capital from Jews around the world. The concept of "Kibbutzim" (independent settlements, where ideals of socialism and shared economies take place) helped a lot by supporting and funding the new country (Senor and Singer, 2011). This seemed to inspire the Jewish global community and foster a great deal of interest and boost the long-forgotten brotherhood, which was essential to the survival of the country in its early days. Donations helped build the academic institutions, military industry, and through angels (investors) and funds, some of its biggest start-ups (Kon et al., 2014).

One of the earliest decisions made by the top universities of Israel was to found bridging entities as "these institutions have the preoccupation of applying the science and technology developed within their organization to real-world products via technology transfer to the industry" (Kon et al., 2014). The mindset was focused on helping the local ecosystem harvest knowledge and nurture academia, which would lead to the strengthening of the country as a whole, rather than merely uplifting individuals. This strong tie between the academia, military and private sector led to the growth of Israel in terms of innovation, the development of novel technologies and military professions. Some examples of entities established for performing a bridge are "Yeda" (knowledge), "Yissum" (application) and the "Technion technology transfer office" (Kon et al., 2014).

Finally, venture capital (VC) is a major driver for innovation and creativity in Israel; private funding is highly accessible, and many national and international funds are on the permanent look-out for the next "Waze" to be found. (Senor and Singer, 2011). These are "high risk-high value" investments and generally promise - especially in the "seed" phase - a very big margin line in cases of success. The VCs' share of GDP in Israel is the largest in the world at 0.5 percent, which underlines the fact that start-ups are a major thing in Israel; there is one start-up per 2,000 citizens. (Senor and Singer, 2011). The expectation of making an exit - by selling the venture to large foreign companies and making a dramatic profit - is constantly driving investors to go and put their money and faith in the hands of these entrepreneurs. (Kon et al., 2014).

3.3 Statistics and data

When looking at the data, one may be deceived and think that Israel is, at least as big as the US in population size; of course, this is not the truth. In fact, Israel is tiny, nothing but a grain of dust compared to the world's population (approximately 9 million residents as of 2021), but its technological and academic achievements are surprisingly noticeable (Wikipedia, Israel, 2021). Again, many different drivers are linked to the whys and hows of its enviable place in the world's tech hierarchy. Some say that the strength of the Israeli tech industry is nothing short of a miracle (Senor and Singer, 2011).

Some numerical data is required in to put things into order; the term "start-up nation" is not a gimmick. One can quite easily conclude by brief internet research that there is indeed something special going on in Israel, this small, dusty country, located on the far eastern shores of the Mediterranean Sea. For instance, Israel is ranked at the very top in terms of the number of start-ups, second only to Silicon Valley, and the country has the largest number of companies

registered in NASDAQ outside of the US (Kon et al., 2014). Furthermore, in relation to amounts of R&D expenditure, Israel currently lies in a very respectable second place, just behind South Korea, which means that Israel is continuing to mobilise her resources towards further development and maintain her status as a technological pioneer. “The Annual Bloomberg Innovation Index" ranked Israel in the sixth place worldwide and improved its position from eleventh to tenth place in the “Global Innovation Index" (Keren-Tzur and Levin, 2019). In addition, Israel kept its same score on the “Global Startup Ecosystem Ranking" of number six worldwide (Keren-Tzur and Levin, 2019). “Another strong indicator of Israel’s success is FDI inflow (Foreign Direct Investment) and it is in sixteenth place among the top 20 host countries worldwide as of 2020, most of the investments directed to ICT and manufacturing” (X. Zhan, 2020). Also, “The FDI stock was about USD 166 billion in 2019, an increase of USD 100 billion when compared to 2010”. (Doing Business, Nordea trade, 2019)

The most profitable buyouts by a foreign company in Israel (related to tech companies) are:

1. Mobileye – US $15.3 billion, acquired by Intel in 2017. (Mobileye, Wikipedia, 2021)
2. Mercury- US $4.5 billion, acquired by HP in 2016. (Mercury, Wikipedia, 2021)
3. Playtica- US $4.4 billion, acquired by a Chinese consortium in 2016. (Playtica, Wikipedia, 2021)

This short list demonstrates Israel’s ability to create highly innovative companies, with a very high value in the market. The end result (acquisition by a larger foreign company) is in some way related to Israel’s nickname of “start-up nation”, Investopedia’s definition for a start-up is “a company in the first stages of operations. Start-ups are founded by one or more entrepreneurs who want to develop a product or service for which they believe there is demand. These companies generally start with high costs and limited revenue, which is why they look for capital from a variety of sources such as venture capitalists” (Grant, M. 2020). This means that from the very beginning, the entrepreneurs leading these companies were on the look-out for capital, initially to fund starting up the company’s operations and then later for market capitalisation.

Another important consideration is that of reward, where founders get a very generous offer for the agreement of stepping down from the company (partly or completely) and start-ups are also related to businesses surrounded by high levels of uncertainty. “A start-up is a human institution designed to create a new product or service under the conditions of extreme uncertainty” (a little like Israel’s political landscape at large). (Eric Ries, The Lean Startup, 2011). So, in a way the future is blurry and unpredictable, meaning that having the opportunity to live with full pockets is the very essence of investment.

3.4 Technological innovation: how does Israel compare with other Global North nations?

The world has seen a great deal of technological development since the third industrial revolution almost half a century ago (mainly atomic energy and the extensive use of computerised machinery). Israel, in her earlier days, was primarily known for innovation in the agricultural sector, for example "Drip Irrigation In 1964 Israeli Netafim developed the first practical surface drip irrigation system. Today, Israeli drip irrigation technology is used in over 110 countries" (Fisher, Y., 2018); the dry weather and lack of water were the main drivers for thinking outside of the box and coming up with the best possible solutions to sustain the settlement.

More recently, with the onset of the fourth industrial revolution (or the so-called age of the internet), the world has been taken one step further towards the future. Israel, again, was a pioneer in the ICT (information and communication technology) sector and was also a leader in other tech inventions and developments, such as "the first USB Flash Drive was created by M-Systems in 2000, and quickly became a must for every professional and student around the world" (Fisher, Y., 2018). The military was and still is a very powerful accelerator for innovation in the field, as, for example, the ability to track terrorists and improve communication between all the moving parts of the very complex security network were crucial for the wellbeing of its citizens (Senor and Singer, 2011).

3.5 Promoters for technological excellence

There were many reasons for Israel to always search for solutions, whether that be a solution to the lack of resources (mainly water and food), or a solution for a variety of other threats, foreign or domestic; there was no time for resting. (Senor and Singer, 2011) Bearing in mind that physical space is another feature here - there is just nowhere to go - so the population keeps on growing, not only Israelis but the Palestinians too. Thus, real estate must be handled wisely. It is not accidental that housing prices in Israel are among the highest in the world; according to GPG (the Global property Guide), Tel Aviv is in fourth place globally in both rental and asset prices, just behind Hong Kong, London and New York) (World's most expensive cities, 2021). This is surprising when looked at from a market-size perspective, as Israel is by far a smaller

market compared to the US or China, yet still one will have to spend a fair amount of money before he or she will own an apartment in TLV (Tel Aviv).

The price of living in Israel is also amongst the highest in the world; as at 2021, Israel is in eighth place worldwide (cost of living rankings by country, 2021). Living in Israel is very expensive, even though the average income stands at US $43,110 per year (which is relatively high, ranking 23rd worldwide) (cost of living rankings by country, 2021) it is not in line with the cost of living, making it difficult for the average person to save money, let alone owning a house.

There is also the issue of trade, as most of the Arab nations have no diplomatic relations with Israel, limiting its trade potential (Arab League boycott of Israel, Wikipedia, 2021). Israel's main export is technology, which can be either advanced machinery or sophisticated software; as of 2015, about US $45 billion related to high-tech products, of which around 42% were tangible and the rest, intangible (Fisher Y., 2018). When compared to other countries, companies that are engaged in business with Israel are more likely not to come across too severe political and bureaucratic obstacles. This is due to the fact that Israel is controversial in some Muslim countries' eyes; the "Arab League" - composed of 22 nations - is a group of countries that Israel has very few formal relations with (Arab League boycott of Israel, Wikipedia, 2021). In 2020, Israel established diplomatic relationship with some member states of the leagues - The Emirates, Bahrain, Sudan and Morocco – and with the support and mediation of the United States, "The Abraham Accord" was formulated (Israel–United Arab Emirates relations, 2021).

Today there are over 300 R&D centres in Israel, and most of the world's biggest MNCs are currently operating an active hub there (Lifshitz R., 2019). This is an important signifier of the global market's trust in Israel's human capital. When looking at Tel Aviv, a large number of companies from all over the world either own an office or are in active relations with a local one, trying to gain access to the newest technologies and the most cutting-edge developments. Lifshitz (2019) states that the term Multinational Technology Companies (MNTC) refers to a foreign corporation that controls the R&D facility or owns a high-tech company in Israel (some entities such as Intel and HP have in addition to R&D centres, large manufacturing facilities in Israel). With the growth of M&A activity in the last two decades, the presence of MNCs has become an integral part of and a major contributor to the Israeli tech ecosystem. According to a recently published report, there are 362 active multinationals in Israel (in 2019), employing approximately 62,000 employees (Lifshitz R., 2019).

In the 2017 OECD's report "World's top R&D investors", 75% of the biggest R&D investors headquarters (2,000 entities in total) are located in six main locations: the USA, Japan,

UK, Germany, China and Taiwan. 25% of total investment is focused on the ICT industry, and 65% of Israel's R&D investment share is ICT-related. (Fisher Y., 2018). 17% of the total headquarters are from the ICT industry (above average) and 35% are subsidiaries. Besides Israel, only Taiwan is so oriented toward the ICT sector (56% of total headquarters are from the ICT industry) (Fisher Y., 2018). The report used headquarters density as an indicator for R&D performance and there were some promising results for several economies including Israel "The distribution by country of the top corporate R&D performers (by headquarter location) and the changes between 2012 and 2014 can be seen in Figure 2.2. The US, China, the UK, Israel and Ireland saw the number of top corporate R&D performers' headquarters grow by at least 5%" (Daiko T et al., 2017). Israel specialises in the ICT industry; this is demonstrated by looking at its export products "Israeli ICT exports grew by over 25% in the last four years, to over 23 billion USD. ICT services constitute above 60% of its service export" (Fisher Y., 2018), and by looking at the engineers per capita index of "135 per every 100,000 residents Israel is one of the most highly educated countries in the world with the highest number of engineers, scientists and PhDs per capita" (Why Israel?, 2015).

When looking at education in general, Israel is ranked third globally, with 49.9% of its adult population holding a degree. "The OECD defines a country's adult education level as the percentage of people ages 25-64 who have completed tertiary education in the form of a two- or four-year degree or vocational program" (Here Are the 10 Most Educated Countries in the World, 2019). In 2019 there were approximately 50,000 new bachelor's degree graduates (0.5% of the population) (Education- Statistical Abstract of Israel, 2020). This is related to the previous (export products), and due to its highly educated population, Israel is able to keep reinventing itself and continues to create value to its trade counterparts. (Why Israel?, 2015).

Israel's main trade partner is the US (28% of total exportation products), and a free trade agreement between the two was signed in 1985, and since then, trade kept growing dramatically; most trade is centred around SaaS (software as a service) from the ICT industry, Antivirus software's, navigation systems and more (Why Israel?, 2015). The intimate relationship between Israel and the United States goes beyond trade and incorporates politics, culture and security (Israel- United States relations, Wikipedia, 2021) A large portion of Israel's defence budget comes from the US and "to date, the United States has provided Israel $146 billion (current, or non-inflation-adjusted, dollars) in bilateral assistance and missile defence funding" (M. Sharp, 2020). Indeed, since the foundation of the country, the US has been Israel's closest ally, sharing democracy, capitalism and other values. (Israel- United States relations, Wikipedia, 2021)

The application of technology is key to understanding the country's level of innovation, for instance the 2020 GII (Global Innovation Index) ranked Israel 13th out of 131 economies in innovation. (Global Innovation Index, 2020) Business sophistication was Israel's highest score (3 overall), and institutions and infrastructure (40 and 35 respectively) were its weakest, although still high (Global Innovation Index, 2020). The use of cutting-edge technologies in Israel is strongly felt in the health and defence systems. Israel's health services are ranked among the best in the world, according to Bloomberg's Health Efficiency Index (2020) Israel is ranked in the 5th out of 57 economies. "The Bloomberg Health-Efficiency Index, first conducted in 2013, tracks life expectancy and medical spending to determine which health-care systems have the best outcomes" (J. Miller, 2020). As for Israel's defence industry, Israel Aerospace industries and Rafael Advanced Defence Systems (Ranked 44th and 46th respectively) on (Top 100, 2020) global ranking. The ranking was based on the company's US dollar revenues, Israel's government being the holder of the controlling interest in both companies.

As for working hours, Israel is ranked among the "longest working hours" countries in the OECD. The annual average is 1,885 hours per employee (36.25 hours per week), although this does not necessarily reflect effectiveness and total productivity. (OECD, Average annual hours actually worked per worker, 2020) Germany is considered one of the strongest economies (World population review, Germany, 2020) nowadays and its average working hours per week is about 26 hours long (OECD, Average annual hours actually worked per worker, 2020). Still, the amount time spent by Israelis in their jobs surely reflects their level of work ethic and ambition. When correlating working hours with high salaries and highly innovative and fruitful environments, it is reasonable to assume that this time does not go to waste.

Looking at patent registration, Statista's 2019 report placed Israel's patent office in the "top 20" global ranking for most grants (19 out of 20) (M. Szmigiera, 2020). Israel was also placed in 25th place (out of 143 countries) in a different report by WIPO (the World Intellectual Property Organization), for the most patent applications by residents (World Intellectual Property Indicators, 2020). Patent application shows how many new inventions - both tangible and/or intangible - are being submitted by a company or individual to the patent office, in order to protect the inventor for a period of time from theft and replications. Among other countries, patent registration is highest in South Korea, China, Japan and Switzerland (World Intellectual Property Indicators, 2020).

In terms of sustainability, Israel, like many other countries, is taking steps to ensure its future (Sustainable Development Report, 2020). It is not enough to create highly innovative

businesses and redefine old industries; steps must be taken in order to maintain a stable ecosystem. The annual sustainable development report measures 17 different parameters (for example, clean energy, clean water, responsible production and consumption) and it placed Israel in 40th place out of 193 countries (Sustainable Development Report, 2020). Looking at sustainability as an indicator for future investment (FDI - Foreign Direct Investment), countries, companies, individuals and other entities can analyse rates like poverty, infrastructure, education et cetera, and base their strategies on how likely the country is to run into crises, as investors like to have as much information as possible on both the company and country before committing to a contract. (Tevjan P., 2019)

Finally, an examination of the Israeli political landscape is necessary. When looking at Israel from a political-stability perspective, one must take into consideration several different factors in order to understand the fragility of the governance, when compared to other nations. According to "the global economy" website, in order to determine the country's level of stability index, parameters like "the likelihood of a disorderly transfer of government power, armed conflict, violent demonstrations, social unrest, international tensions, terrorism, as well as ethnic, religious or regional conflicts" are considered (Country Rankings, 2019). Israel's location in 156th place (out of 195), makes it reasonable to assume that because of the underlying nature of the country - home to most of the population who are an isolated ethnic group, surrounded by hostile nations - there is always something going on, and it is very difficult to accomplish political stability (Senor and Singer, 2011). As well as this, in Israel the population is also made up of the Orthodox Jews (30% of the Jewish population) and Arabs (20% of the total population) (Demographics of Israel, Wikipedia, 2021) making it extremely difficult to find consensus on every political decision. Still, the political party "Likud", led by prime minister Benjamin Netanyahu, can maintain its position as the country's leader since 2009 (Benjamin Netanyahu, Wikipedia, 2021).

3.6 Key Elements for Success

As previously discussed, Israel is one of the most innovative countries in the world today. Compared to other nations, Israel can be seen as a competitive economy with a promising future (Senor and Singer, 2011). It is important to understand how Israel, as a nation, is able to be so fruitful and keep coming up with so many different new start-ups every year (Senor and Singer, 2011). Beyond the long-term governmental strategy for research and development (R&D) spending and other environmental influences, there are some important components in the Israeli business and political ecosystems that deserve attention.

Generally, the Israeli market is a free market, which can be defined as an: Economic system based on supply and demand with little or no government control. It is a summary description of all voluntary exchanges that take place in a given economic environment. Free markets are characterized by a spontaneous and decentralized order of arrangements through which individuals make economic decisions (Barnier, 2020).

3.7 Venture Capital and Research and Development

Financing is highly accessible to both foreign and domestic companies, mainly via venture capital (VC) and specifically for start-ups from the tech industry (Senor and Singer, 2011). Entrepreneurs are willing to take risks and experience failures (publicly) due to a cultural mindset of improvisation and "out of the box thinking", originating in the military service (Senor and Singer, 2011).

When looking at financing, it is important to understand that this in-flow of cash into new ventures is crucial to whether a new business will eventually fail or succeed. So, in a way, financing is as important as human capital for a start-up. According to Fisher (2018), the first appearance of VCs in Israel occurred in the mid 1990s after the establishment of "YOZMA" (initiative) fund. This fund was designed to help companies to kick-start their businesses, and it was based on the Silicon Valley VC model of early-stage investment (Fisher, 2018). There were only four active VCs in Israel in the early 1990s, but by the early 2000s there were more than 50, with investments worth more than US $8 billion. The rise of the VCs in Israel was related to the emphasis on industry-focused research and development (R&D), specifically on exported products and "with the success of the VC industry, the Israeli high-tech industry was transformed from being dominated by the military to a successful private high-tech cluster" (Fisher, 2018).

3.8 US Relations and Immigration from Ex-Soviet Countries

The strong connection between Israel and the Jewish community in America laid down foundations for the bridge between Israeli companies to NASDAQ (Fisher, 2018). As Fisher (2018) further explains, the BIRD (Binational Industrial Research and Development) - an Israeli American foundation founded in 1977 - was very important for the future successes and the strong bond between American MNCs (Multinational Cooperation) and Israeli start-ups. Because the Israeli market is so small (less than 10 million residents), companies must look beyond the national borders and "think big" (Senor and Singer, 2011). Most of the service providing companies do not even look for private consumers and define themselves as B2B;

"Business-to-business refers to business that is conducted between companies, rather than between a company and individual consumer" (Chen, 2020). This is related to the lack of marketing capabilities and volume to handle the mass market (Senor and Singer, 2011).

Immigration from the former Soviet Union has also impacted on the tech ecosystem in Israel. During the late 1980s and 1990s, there was a very large group of Jews who made "Aliyah" (onboarded to Israel from foreign countries), Jews are eligible to immigrate back to Israel under the rule of "Shvut" (to return) from all around the world, whenever they wish (Lan, 2020). During the later days of the Soviet Union, under the leadership of Mikhail Gorbachev (the last leader of the Soviet Union, and General Secretary of the Communist Party there) the Union opened its gates to the world (Mikhail Gorbachev, Wikipedia, 2021). Many Jews had felt unsafe inside their countries (Russia, Ukraine et cetera) for a long time and suddenly Israel seemed to be very attractive to them (Lan, 2020). Many of them were highly educated, with more than 50% of having had 13 years of formal education, compared to the rest of the population in Israel (only 28%) (Lan, 2020). That was a crucial factor in boosting the Israeli tech industry during the 1990s (Senor and Singer, 2021).

The Soviet-Jewish in Israel community is highly educated, and many of them have higher education in fields like engineering, teaching and science (Lan, 2020). The combination of the 1990s tech outbreak, Israel's growing VC industry and the sudden growth in highly qualified manpower led to the positioning of Israel in the top of the world's tech market. According to Senor and Singer (2011), many of the new immigrants were hired by rapidly growing companies within Israel and helped to develop many of the products these companies created. In a way, the need was served by the supply of the many newcomers to Israel which in different circumstances would not have been possible to be fulfilled, and certainly not as efficiently.

Israeli-US relations were and still are a very determinative and dominant feature of Israel's success in the tech industry and, more generally, to its economic growth. From the birth of Israel as a nation, the US government has supported Israel in several ways, mainly by bolstering the country's defence budget and through private donations to R&D, academic interchange and support (Senor and Singer, 2011). This relationship has grown stronger and closer over the years; for instance, one of the most popular assault rifles in the IDF (the Israeli Defence Forces- the national armed forces) is the M-16 (made in the USA) (M16 rifle, Wikipedia, 2021), and the Israeli Air Force's top combat jet is the F-16 (which is American as well) (General Dynamics F-16 Fighting Falcon, Wikipedia, 2021) When looking at academia, many of Israel's universities are highly dependent on the Jewish-American community, as they keep pumping

capital into university departments, allowing them to keep growing and developing (Senor and Singer, 2011).

3.9 The Israeli Military

Military service is perhaps the most important factor in the country's success. The combination of extreme conditions, the fact that Israel is a melting pot for different cultures and mindsets, and the idea of there being a constant existential threat to Israel's existence, combine to produce a model of highly innovative society. According to Senor and Singer (2011), where there is no complex hierarchy - as there is not in the Israeli military - people from all sorts of different backgrounds can talk freely with each other, ranks are not strict in the sense that lower ranked soldiers are allowed to express their thoughts and ideas around their superior officers, decisions can be made collectively and "everybody knows everybody". This unique ecosystem has turned out to be fertile ground in terms of manufacturing thousands of start-ups and patents and have resulted in Israel becoming a temple for research and development (R&D) for most of the top S&P 500 companies (Fisher, 2018). Now other countries are tempting to imitate this melting pot in order to maybe someday become the next start-up nation.

3.10 Creativity and innovation

"Creativity and innovation are nuanced concepts that each incorporate a number of distinct but closely related processes that result in distinct but often closely related outcomes" (Anderson et al., 2014). A concept where innovation and creativity have closely linked ideas is important for the understanding of processes and managerial decisions in several different levels of the organisation (Anderson et al., 2014).

Anderson et al. (2014) further develop the aforementioned concept and formulate this definition of innovation and creativity as a process: "Creativity and innovation at work are the process, outcomes, and products of attempts to develop and introduce new and improved ways of doing things. The creativity stage of this process refers to idea generation, and innovation to the subsequent stage of implementing ideas toward better procedures, practices, or products. Creativity and innovation ... will invariably result in identifiable benefits at one or more of these levels-of analysis".

3.11 Creativity

Creativity studies, according to Robert, are commonly associated with E. Paul Torrance and J. P. Guilford in the era of the 1950s to the 1960s of the last century. “To this day, the Torrance Tests of Creative Thinking (Torrance, 1974) remain the most widely used assessments of creative talent” (J. Sternberg, 2006). In his article, Robert is discussing two main theories: first is the psychometric theory (related to Guilford and Torrance) and the second is the confluence theory (related to Robert and his peers) (J. Stenberg, 2006). The investment theory of creativity is a confluence theory based on the idea that creative people are “smart investors” and in Robert’s (2006) own words they know how to “buy low and sell high”. They chase and promote unpopular ideas, ideas that might even seem to the “common wisdom" as worthless but then later on are able to move themselves and their surroundings to better places and therefore they “sell high” (J. Sternberg, 2006). The investment theory determines that creativity will take place when “six different - but related - resources are found: intellectual abilities, knowledge, styles of thinking, personality, motivation and environment” (J. Sternberg, 2006). Each one of the components of the confluence theory will be briefly introduced.

1. Intellectual abilities - the ability to look at problems in an innovative manner and think “out of the box”, as well as having the wisdom to invest in the best ideas and being a great salesman of your own ideas. Here tests like analogies, sequence completion, et cetera, help determine how creative a person really is (J. Sternberg, 2006).
2. Knowledge - in order to innovate in a certain field, one must first know the field well. Nevertheless, being too narrow and less familiar with different types of information will eventually lead to limited creative abilities. Moreover, it seems that people who are deeply embedded to one field of knowledge and demonstrate expertise will more likely be affected negatively from changes to the field (disruptions) compared to less knowledgeable individuals in the field (J. Sternberg, 2006).
3. Thinking styles - “in essence, they are decisions about how to deploy the skills available to a person” (J. Sternberg, 2006). Legislative style is, according to Robert, a key thinking style and it consists of the will and ability to think in new and creative ways. It is not enough to be able to think differently; one must be engaged in thinking creatively.
4. Personality - there is some correlation between creativity and several other personality characteristics. Attributes like the “willingness to overcome obstacles, willingness to take sensible risks, willingness to tolerate ambiguity, and self-efficacy. In particular, buying low and selling high typically means defying the crowd, so one has to be willing

to stand up to conventions if one wants to think and act in creative ways" (J. Sternberg, 2006). It refers to an independent personality who is able to stand up to "common wisdom" and move things to his or her direction.

5. Motivation - the task-focused individual will most likely take into action his or her creativity. According to Robert (citing Amabile) a person who truly enjoys his work will be able to set free his or her full creative potential. It is important to add that motivation is not inherent to a person, and, therefore, sometimes must be acquired intentionally by focusing on the more appealing side of one's job (J. Sternberg, 2006).
6. Environment - the idea is that a person should have a supportive and welcoming environment for his or her creativeness. If the outer environment cannot act provide this, a person might not be able to exercise his or her creativity. Robert (2006) further argues that normally, environments do not support creativity. It can be demonstrated by criticising one's ideas or even threatening his or her wellbeing if unorthodox ideas are being discussed. One must be able to endure the criticism in order to succeed. On the other hand, criticism is also important for a complete and full understanding of environments. It has been shown that people tend to be more positive towards creators of their own age group.
7. Confluence - creativity is not about the basic sum of the previous six components; some of them are fundamental for creativity to grow, and without them it will not stand. Robert (2006) refers to knowledge as a prerequisite to creativity. Other than that, some components can compensate for a deficit of others. Weakness in one character can be waived by proficiency in others and relationships between characters may lead to an end result which is "greater than the sum of its parts", which makes it a powerful tool in the right hands. Wisely, Robert (2006) chooses to elaborate on this by stating that as the environment tends to be easily disturbed by initiatives and ideas that threaten the status quo, creative individuals must understand that most of the time the crowd does not comprehend the situation fully and will often lack the will to act.

Robert (2006) pays attention not solely to the attributes above, but also to the decision-making that overlaps them. This means that a person must take action in order to be creative according to the "investment theory", so that being said, it promotes the concept that creativity is a learnable quality (J. Sternberg, 2006). If the environment's mantra is to nurture creativity and welcome it, eventually people will make more decisions about becoming creative (J. Sternberg, 2006). Beyond that, a required decision for the creative person is to start practicing the skill of "switching" between conventional and

unconventional thinking, as by mastering this skill, creativity will have the proper room to grow (J. Sternberg, 2006). Robert (2006) shares few of his decision types with regards to creativity:

(a) redefine problems, (b) question and analyse assumptions, (c) do not assume that creative ideas sell themselves. sell them yourself, (d) encourage the generation of ideas, (e) recognize that knowledge can both help and hinder creativity, (f) identify and surmount obstacles, (g) take sensible risks, (h) tolerate ambiguity, (i) believe in oneself (self-efficacy), (j) find what one loves to do, (k) delay gratification, (l) role-model creativity(m) cross-fertilize ideas, (n) reward creativity, (o) allow mistakes, (p) encourage collaboration, (q) see things from others' points of view, (r) take responsibility for successes and failures, (s) maximize person-environment fit, (t) continue to allow intellectual growth (J. Sternberg, 2006).

The "propulsion theory of creativity", as Robert (2006) clarifies, is about how creativity contributes to its environment, so it is possible to say that creativity could be measured also by how it affects others (novel, elaborative and correlative). It is reasonable to assume that over the course of history, creative people were judged differently and not only that, but the very nature of creativity also matters (J. Sternberg, 2006). So, the creative strain is as important to the surroundings as the amount or level of creativity, and how novel it really was (J. Sternberg, 2006). There is a link between the person to the context of creativity as Sternberg sets out "Given the importance of purpose, creative contributions must always be defined in some context. If the creativity of an individual is always judged in a context, then it will help to understand how the context interacts with how people are judged" (J. Sternberg, 2006).

Creativity, by its very nature, propels fields from point A to point B: therefore, the creator also acts as a leader, and a correlation between creativity and leadership exists (J. Sternberg, 2006). Leadership in creativity is significant and as a result of its importance, the "propulsion model" is based on eight different possible contributions that a creative initiative can make in a given field (from no change to complete disruption) (J. Sternberg, 2006). The eight different contributions divided to three major ones:

1. Accepts current paradigms - (1) replication - tries to strengthen the current field and to confirm that it is in the right place, no movement at all; (2) redefinition - to redefine the current field and make a different perspective about it visible, but in large part the field stays where it is; (3) forward incrementation - helps move the field to the same direction it is already going, thus leads to movement; (4) advanced forward incrementation -

moves the field forward but further than the environment is willing to go, leading to dramatic movement in the same field (J. Sternberg, 2006).

2. Rejects current paradigms - (5) redirection - attempts to move the field to different directions, so movement is taking place, but not into the same direction; (6) reconstruction - tries to move the field backwards in order to later start moving it into a new direction than it is currently going; (7) re-initiation - an attempt to start over but in a novel starting point and by redirecting the field in a new direction, so movement is taking place in new directions (J. Sternberg, 2006).
3. Integrates multiple paradigms - (8) integration - tries to combine two separate directions into one, by creating a movement of two separate fields moving into two different directions into an integrated movement (J. Sternberg, 2006).

3.12 Innovation

Innovation is the practical implementation of ideas that result in the introduction of new goods or services or improvement in offering goods or services (Innovation, 2021). Innovation studies (IS), as Monica (2018) explains, is a field of study where the application of technological advances and other scientific discoveries in the industry (in the form of processes and other implications) is being studied and analysed by scholars. During the early 1960s, innovation was rarely seen and when it was, it was only used by corporations in western countries and focused on research and development (R&D) purposes, in their own facilities (Edwards-Schacter, 2018).

Invention - unlike innovation, as Monica (2018) explains - is not necessarily commercialised but can only be idealistic or hypothetical. As long as an invention is not commercialised, it is irrelevant. It is not like innovation in the sense that it has to be linked with some economic value. These two terms are alike in the way that they correlate a change in technology but not always with economical value.

Although it is reasonable to look at innovation as a phenomenon which can be found only in places where technology is a dominating factor, there are cases, however, of innovation in places that are less R&D related, places like low-tech and services industries (R. Martin, 2016). Marketing a product in a new and unique method, for instance, is also innovative (R. Martin, 2016). Therefore, it can be said that "innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new

organizational method in business practices, workplace organization or external relations" (OECD, 2005).

Another perspective - as Martin (2016) sets out - is the difference between innovation for the sake of wealth creation and innovation for the development of wellbeing. This means that there are some stakeholders which are not necessarily financially compensated by the innovative initiative but gain different outcomes from it (better infrastructure and less waste, for example). So, innovation is also shown in places that produce no direct monetary revenues, thus it is "responsible innovation" (R. Martin, 2016).

Innovation - as Schumpeter (1942) argues in his double patterned model "Mark 1&2" - can first be seen in an individualistic level, Mark 1, as in this pattern, the entrepreneur is developing his new idea. The Mark 2 pattern is directed to the larger organisation, and within its own structural model, developing new ideas and decisions (A. Schumpeter, 1942). Both patterns are equally important and not always separated from each other: sometimes the individual is responsible for the idea itself - and later the organisation - for its development (A. Schumpeter, 1942). Innovation is also related to all the systems working together in information sharing, community life, policy making and all other activities where people work together in order to create and promote innovation in our society (A. Schumpeter, 1942). They typically engage in information exchange, problem solving, and mutual learning as part of the process of innovation and during this process, they establish "relationships" that may be interpreted as forming organisations, networks, clusters, or even "innovation systems." (Garud et al., 2013).

According to Monica (2018) there are ten different types of innovations (technological, product, process, service, business model, disruptive, radical, design driven, social, responsible). The first and the most fundamental type is technological innovation, and it is important to look at all of the different variants of innovation, in order to understand the depth and importance of innovation studies and practices nowadays (Edwards-Schacter, 2018).

Technological innovation is centred around the idea that an old product/process is going through a change (mutation) and eventually, when the transformation is finished, the new one is leading the whole ecosystem into a new direction (Edwards-Schacter, 2018). Mostly relevant in the manufacturing industries and based on intense R&D, "typically, technological innovation is investigated by linking inputs in terms of investment in R&D to outputs in terms of patents or new products and manufacturing processes." (Garcia and Calantone, 2002). There are also three important factors to take into account when looking at technological innovation nowadays; (a) The fourth industrial revolution is mostly driven by AI (artificial intelligence), IOT (internet of things), cloud computing and mobility, pushing toward a future of smart

everything (Edwards-Schacter, 2018); (b) Technological gaps between areas, countries and regions (most innovation occurs only in a few economies) (Edwards-Schacter, 2018); and (c) Innovation focused on sustainability and the study of innovation in paradigms of non-Western countries (like China and India) (Edwards-Schacter, 2018). According to Monica, one final consideration is to look at organisational innovation as a precondition for successful technical innovation to occur, "Organizational innovations focus on aspects that improve organizational structures, learning processes, and their adaptation to the environment (including institutional frameworks and markets)" (Edwards-Schacter, 2018).

Product innovation, the most common type of innovation, can be described as "a product, made available to potential users, that is new or significantly changed with respect to its characteristics or intended uses". (Gault, 2018). There are seven sub-categories for product innovation according to Kenneth (2018):

1. *Cost reductions*- create a price reduction for a product, without changing it. The aim is to create price-based competitive advantage in the market.

2. Product improvements - the creation of improved products, better than before. The shape and/or function of the product will be changed, and the former will cease to exist.

3. *Line extensions* - extension of the product line, upgrading the "package offering" and incorporation of complementary goods. The former product will still be available.

4. *New markets* - delivering products with minimal changes to new markets.

5. *New uses* - new ways of using a product without changing it. The expansion of possible uses for an existing product and by that increasing its market share, and without the need to invest resources in the development of an entirely new product.

6. New category entries - a company starts to deliver/manufacture an already existing product/service for the first time.

7. *New-to-the-world products* - the introduction of entirely new products/services that never existed before, these are considered to be disruptive to the market and radical by nature.

According to Monica (2018), the book "Democratizing innovation" by Von Hippel (2005) shines light on a perspective where there are two main ways on how to look at product innovation; the first is "manufacturer centred" meaning everything occurring inside the firm, mainly whatever is related to intellectual property protection (patent registration and so on). The second is the "user centred" approach, which is more about whatever happens outside, mainly marketing and social communities and the relationship between the firm and its end customers (Hippel V., 2005). With the development of ICT (Information and Communication Technologies), it is becoming more and more relevant for NPD (New Product Development)

purposes to facilitate efficient channels of communication between firms and users and in a way, making consumers product innovation experts for firms (Edwards-Schacter, 2018). Monica (2018) adds that IoT, 3D-printing and big data analytics are very important tools for the development of even more independent "user centred" environments and promote what is called "open innovation", where ideas and initiatives are circulating freely between users and manufacturers, research and development (R&D) costs are lower and a larger number of innovations are taken into consideration in several different ways and with a lower risk (Edwards-Schacter, 2018). Product innovation, when regarded as a market capitalisation strategy, is further divided into the four elements of the "product-market matrix" (market penetration, product development, market development and diversification) (Kenneth, 2018). These four factors can be elucidated upon in the following ways:

1. *Market penetration* - strategy intended to increase market share, without modification of the product. Cost and product improvements are features of that strategy (Kenneth, 2018).
2. *Product development* - the intention here is to increase sales by expanding the product line. New users and market are characteristics of product development strategy (Kenneth, 2018).
3. *Market development* - the main focus here is to reach new customers and to increase sales volume. No technology changes are being pursued, only the entering of the product to markets never existed before. New markets and new uses are examples of this strategy (Kenneth, 2018).
4. *Diversification* - when new business opportunities are the firm's goal and technology intensive products and new markets are the way to achieve it, with new-to-the-world products and new category entries being part of this strategy. The matrix goes from low (market penetration) to high risk (diversification) and "this exemplifies how product innovation can be considered portfolio management due to each type of new product having an associated risk of success." (Kenneth, 2018). In order to manage the portfolio in an optimal way, the firm must implement all four strategies in the pursuit to maximum returns.

Process innovation, a topic closely related to product innovation, but lacking the resources invested in the aforementioned by scholars, can be described in the following way "product innovation that creates the need for process innovation and vice versa, process innovation that generates the need for a product." (Edwards-Schacter, 2018). Process innovation, in practice, is

built on the three stages of the innovation cycles: discover, develop and deliver. These three stages can be set out in the following way:

> In the discovery phase, the organization scans the landscape for potential opportunities and delineates these opportunities. Promising opportunities enter the development phase, in which technical specifications are determined and the design of the offering is realized. In the delivery phase, the offering is introduced and put to purposeful use, which could include being sold in the marketplace" (Edwards-Schacter, 2018).

Here, all the techniques, methods and materials that are being used in order to produce a product or a service at a lower cost and in higher quality will be taken into account (Edwards-Schacter, 2018). Monica (2018) also discusses the concept of "lean thinking", an idea closely related to process innovation is "a structured approach that helps in developing early-stage ideas and concepts (i.e., inventions) into marketable products, processes, or services" (Edwards-Schacter, 2018). Furthermore, the concept of "lean manufacturing" is also introduced in the same context, where companies decrease volume and act in higher precision, lower costs and waste and early-stage companies can use this paradigm in order to serve market needs with lower costs (Edwards-Schacter, 2018). Kenneth (2018) places importance on the relationship between process and product innovation. Where process innovation is mainly concerned with cost reduction, product innovation is all about effectiveness and consequently - at least in early stages - costs will rise (Kenneth, 2018). This leads to a managerial paradox "as the market becomes increasingly vulnerable to performance competition, attempts to continue reducing costs diminish the organization's ability to respond to this kind of competition." (Kenneth, 2018).

Service innovation - services count for an increasingly larger part of the global GDP, but innovation is not as popular in this sector, in comparison to manufacturing (Edwards-Schacter, 2018). A service is characterised by the initials IHIP (intangibility, heterogeneity, inseparability and perishability) (Edwards-Schacter, 2018). Most - if not all - of the sectors are provided by or providing a service (logistics, pharmaceuticals, communications, for example) (Edwards-Schacter, 2018). Another idea introduced by Monica (2018), "the KIBS (knowledge-intensive business service) sector has attracted greater interest in recent years. These firms (KIBS) serve other companies when they intend to design, produce, offer, and sell complex service and product combinations. These firms play a significant role in designing and redesigning services with the application of the latest enabling technologies" (Edwards-Schacter, 2018).

Business model innovation is considered as distinct to the rest of the categories (product, process, for example) and it is a helpful tool on its own to help foster innovative ideas, but also

provides structural innovation as a field of study (Edwards-Schacter, 2018). The internet has helped empower BM (Business Model) innovation and has helped expand it beyond its fundamental elements, such as suppliers and customers and eventually will collect revenues (Edwards-Schacter, 2018). As Monica (2018) lays out, BM innovation is increasing mostly thanks to digital and/or social innovations, low-cost markets that challenge the firm's abilities to minimise costs and maximise value added to its customers and orientation towards sustainability and eco-friendly markets (Edwards-Schacter, 2018). A well-defined BM, with satisfactory technology, may turn out to be more useful than a piece of brilliant technology with a poor BM (Edwards-Schacter, 2018). BM innovation can be further divided into three main categories: (1) *Industry model innovation* - improving the value chain by moving from/changing the industry by the usage of the firm's strongest assets; (2) R*evenue model innovation* - creating revenues by the adjustment of the current product or service price model; (3) *Enterprise model innovation* - modifications of the firm's relationships with its stakeholders in order to outperform (Giesen et al., 2007).

Disruptive innovation takes place when an old way of doing something for someone who values it no longer satisfies them; in other words, there is a better way of serving one's needs and while doing so, it has to keep being as least as profitable as before, but hopefully even more so (Edwards-Schacter, 2018). According to Monica (2018), for disruptive innovation to occur, two preconditions must exist: performances far greater than what currently available on the market must be demonstrated and there must be a significant incentive to switch from a functioning BM to a disruptive one (Edwards-Schacter, 2018). "Innovations do not have to embody radical advances in either technology or product functionality in order to be disruptive innovations. In fact, disruption refers more to a market/business phenomenon rather than a major technical breakthrough" (Edwards-Schacter, 2018). Technological breakthroughs are not by definition "disruptive", as disruptive innovations to the market can come in much less technical ways like; "cost innovations" (decreasing costs and maintaining the same or higher value):"BM innovations" (adjusting an existing business model to the current market opportunities); and "application innovations" (finding new and creative ways of using an existing product) (Edwards-Schacter, 2018).

Radical innovation, as Monica (2018) puts it, is a dramatic change to the business climate (e.g., the development of a completely new communication model). It is different from incremental innovation, where changes of the status quo are taking place in order to keep the product relevant. Innovation must turn the whole process upside down. In this sense, uncertainty levels are high and value potential is far greater. In order for an innovation to be considered as

radical there are three different criteria that must be applied: novelty, uniqueness and transformability (Edwards-Schacter, 2018). Nevertheless, any innovation must have a dramatic impact on the market in order to be declared as radical. Furthermore, it usually takes place in R&D rich environments, and on many occasions, it can be considered as subjective, because of the relationship between the developers of the invention and the ones who measure the levels of radicalness (Edwards-Schacter, 2018).

Design-driven innovation: Here the focus is on the prediction of the possible applications of the emerging product and the ability to influence them. According to Monica (2018), the main difference is when comparing "push-technology innovations", where the technical breakthrough gives birth to a meaning (or not), and a design-driven innovation, where there is no necessity for a technical breakthrough to create a meaning, but a well-defined socio-cultural campaign surrounding a product that creates an innovative mindset and change of habits. What matters the most is the meaning, not the invention itself. An existing technology with the right design focused on the creation of new needs in the market is innovative as well (Edwards-Schacter, 2018).

Social innovation: As a field of study, this is relatively new, even if it is actually an older idea when compared to technological innovation and all the technical aspects surrounding it. The core "innovation purpose" is to create and transform social norms, change consumption habits and empower minorities. The innovation occurs less from a technological perspective and more from a social one. New institutions, different governmental structures, largely the way people communicate better in order to reach mutual goals in higher efficiency. It is mainly seen as a complementary field to technological innovation in the sense that it is innovative in how technical advances are communicated or implemented better in civil society. What really distinguishes SI (social innovation) from other types of innovation is the value proposition, SI is less concerned with profitability generation and more concerned with social needs (Edwards-Schacter, 2018).

Responsible innovation; Originating (quite recently) in Europe and the US. Its main concerns are, as Monica (2018) says, the ethical and ecological usage of novel technological advances, mostly related to the fourth industrial revolution. Inventions like 3D printing, artificial intelligence (AI) and other cutting-edge technologies must be utilised responsibly in order to properly meet society's biggest threats and dilemmas and must be "A transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view on the (ethical) acceptability, sustainability, and societal desirability of the innovation process and its marketable products." (Schomberg, 2011).

The European Commission introduced a six-component programme called "Horizon2020" to facilitate the pillars on which a responsible innovation economy will stand upon (Edwards-Schacter, 2018). The Nature of Science, Technology, and Innovation (NoSTI) helps reinforce the idea behind RI (responsible innovation), in the sense that the nature of political, social and economic innovation systems is disassembled into the core values of each component; (i) "nature" of science and scientific production; (ii) "nature" of technology and technological knowledge production, and (iii) "nature" of innovation, which in turn involves technological and non-technological innovations." (Edwards-Schacter, 2018).

Innovation is everywhere nowadays, not only in academia where, as a field of study, it keeps growing and diversifying, but also by the way that different organisations and other governmental institutions address the topic; from the mission statement through to the assigning of personnel like a Chief Innovation Officer (CIO) within companies, and even down to the way politicians talks about every-day's issues. As Kenneth (2018) elaborates in his work "Understanding Innovation", the frequent use of the term has led to (in some cases) unfortunate results, where innovation became "elusive" and misleading. Underpinning the basis of the phenomena lies the assumption that innovation must be radical. Incremental innovation alone is not sufficient for an organisation to flourish in today's rapidly changing market (Kenneth, 2018).

Another common mistake is to look at innovation in one, instead of two, perspectives. Innovation is defined in one of two ways: "(1) the introduction of something new, or (2) a new idea, method, or device" (Innovation, 2021); the first is innovation as an outcome and the second is innovation as a process (Kenneth, 2018). A firm must be able to distinguish between the ambition to create and deliver the most modern and unique products to its end users (outcome), and the creation and implication of the most up to date systems and the employment of the most pioneering minds inside the firm (process) (Kenneth, 2018). If a firm finds itself talking about innovation without acting in an innovative manner, it will doom itself to certain failure. Kenneth (2018) adds another (third) perspective crucial for the understanding of the term innovation and it is "mindset", which is how firms take action and communicate the concept of innovation. Moreover, a firm is overly concentrated on the outcome will most likely consume its resources ahead of time, whereas a firm which invests too much in the process will eventually become clumsy and over-dependent on layers of complex bureaucracies, which strangle innovation (Kenneth, 2018).

The three main innovation categories as Kenneth (2018) argues (outcome, process and mindset), consist of all the previous ten sub-categories; product, technology, process, service, business model, disruptive, radical, design-driven and social and responsible.

Innovation as an outcome is about: product innovation, process innovation, marketing innovation, business model innovation, supply chain innovation and organisational innovation. Innovation as a process consists of the "innovation cycle" (discover, develop and deliver) and innovation as a mindset is mostly related to the organisational atmosphere (Kenneth, 2018). The latter is composed of the five main individual skills which enhance organisational innovation:

1. *Associating* - crossing lines between unrelated dots, the ability to draw conclusions.
2. *Questioning* - the ability (and courage) to question common wisdom.
3. *Observing* - the willingness to scrutinize your stakeholders and learn from them:
4. *Experimenting* - *the* conducting of educational activities, going to places people might not be willing to go to.
5. *Networking* - constantly searching for new relationships, and a willingness to expand social interactions.

According to M. Christensen et al. (2018) these five skills implemented at an organisational level will lead to a fruitful innovative environment. Moreover, cross-functional thinking is key to the founding of a successful and innovative organisation. Concepts like the T-shaped individual relate to people who specialise in one field but have a broader understanding of the system as a whole and by that acting better as components of a unit. Design thinking is crucial for the implication of the former concepts according to Kenneth (2018), as the concept is built around a pragmatic mindset of "iterative design, in which the interest is to generate many possible solutions quickly, develop simple prototypes, and then iterate on these initial solutions informed by external feedback toward an eventual solution" (G. Luchs et al., 2015). Several characteristics for innovation must correspond with design thinking and process, such willingness to fail, cross-disciplinary thinking, multifunctionality and other factors.

As Kenneth (2018) concludes, innovation is a broad concept, composed of many components, and all of them must be linked together if the organisation is to succeed - if they do not, failure is risked. It is undoubtedly true that:

> The more an individual or organization demonstrates a fuller understanding of innovation, the greater propensity to attain innovation. This means that there is an understanding that innovation is an outcome, a process, and a mindset, where outcomes

arise from an innovation process accentuated by mindset. Innovation is not a binary phenomenon, but comes in degrees" (Kenneth, 2018).

3.13 Israel and Innovation

When looking at the reason for the high levels of innovation in Israel, one can see that it is mainly related to a few key components of Israel's political atmosphere. Because of the perception that the country's neighbours pose an existential threat to Israel's existence, there is a need to have a high-paced, technologically advanced and ever-changing security system. This has most definitely helped to push Israel's economy toward its modern form as a cutting-edge, technological hub. Moreover, the multicultural characteristics of Israel have also helped to create a melting pot of creativity and out-of-the-box thinking.

The facilitation of financial instruments such as venture capital (VC) funds, were the main trigger for the "boom" of local tech companies and the expansion overseas. There is no doubt that Israeli American relations were and still are a dominant factor in the internalisation of local companies. The VC model itself was imported from the US and implemented in Israel with some adaptations for the local market in Israel (Senor & Singer, 2011).

As well as all the environmental and geopolitical components, there are factors like individual creativity and innovative behaviour. It is crucial to measure how creative Israelis are, and not to look at the founders and CEOs of the industry's "top guns" but find out whether the employees themselves are as innovative and creative as they are.

To measure levels of Israeli innovation, it is crucial to find out whether Israelis are relatively more innovative than their equivalents overseas or not. The fact that Israel is at the very top of the technological game, and the vast amount of academic research supporting theories regarding the effects of socio-demographics and security constraints on Israel's excellence in the realm of innovation, was not enough. It is vital to find out if these so-called "promoters of innovation" are in fact transmitted down to the lowest ranked employee. If only the founders are innovative, there are less "spontaneous innovation" phenomena within the system, people will less likely transform and disrupt the "everyday protocols" and work routines and will be somewhat clumsy with the adaptation to cutting-edge, high-frequency improvements that are, by definition, part of the qualifications for a company to be named a start-up.

Israeli tech companies are indeed innovative and most certainly popular, as is demonstrated when looking at the "start-up density index". Many of the entrepreneurs who founded these

companies showed high levels of creativity and innovation and also - as is mentioned in Chapter 6 - success stories, commonly characterised by at least one of the key promoters, (as one may call them) for innovation according to Senor and Singer (2018). So, for example, being a veteran of one of the IDF's (Israeli Defence Forces) elite units is not a rare phenomenon among these entrepreneurs. Also, the ability to swim against the flow of mainstream mindsets and know-hows, and consistently challenge the status quo, is another feature pointing to a creative characteristic. Also, a large part of these companies' success stories is related to how financial instruments characterise them as a high risk- high reward type of investment, drawing revenue-driven individuals and firms to invest in seed-level VC funds. Charismatic pioneers are succeeding, time after time to convince the world that Israel can make you rich and doing so relatively fast as well.

The amount of public attention that is given to Israel grows by the day, and therefore so does the number of new opportunities for new ventures to raise capital from private and institutional investors. There are to raise capital from private and institutional investors. There are thousands of new start-up companies operating nowadays in Israel, but not all survive, even if it is clear that the founders are innovative, creative and intelligent. The successful companies eventually grow, and they must hire people to help them. The question is how these employees are functioning and how innovative are they, in terms of helping to push forward what the world's technological frontier is now? Or is it that they just need to show proficiency at their particular field of work, and nothing more is required?

4. Methodology

An Israeli Fintech company was chosen for the purpose of putting these questions to the test. A survey was conducted among its employees and the inspected criteria was mainly focused on creativity at the workplace and above all- innovation. The questionnaire included 19 different constructs and divided into four main groups- challenging factors, organisational factors, employee behaviours and individual factors. Each group is focused on a different feature of the employee, whether it is how he/she sees the organisation he/she is working at, or how he/she communicates his/her ideas. The respondent then grades his/her level of agreement on a Likert scale from 1 - completely disagree to 7 - completely agree. No time limitations were imposed upon the employees, and they could have replied or not replied at all. Overall, the whole data collection process was built under strict ethical considerations and the best practices from the ISCTE-IUL's Code of Ethical Conduct in Research (ISCTE-IUL, 2016).

The answers were then analysed, and medians were extracted from each item; an average higher than five is considered positive in relation to the level of innovativeness and creativity of the employee. The questionnaire's constructs have all been tested before in the scientific literature in different business sectors. Only the internal grading mechanism was taken into account. A random sample (men and women) of two hundred employees was selected. The data collection process took place in a two-week period in December 2020. Nine questions specifically addressed the topic of innovation to find out how innovative the employees currently working in the company are.

5. Results

To address the question of "How innovative are employees working in the high-tech sector?" there were nine different items (out of 93) specifically relating to the presumed level of innovativeness of the respondent: Items 51-56 and 83-85. Each item is discussed separately and then finally as a group.

Figure 5.1- "I often create new ideas for improvement."

The average was 5 (moderate) with a standard deviation of 1.2 (moderate), meaning that the employees are not so keen to create and innovate on a daily basis, so there are characteristics of innovation, but they are not significant.

Figure 5.2 – "I often search out new working methods, techniques, or instruments."

The average was 5 (moderate) with a standard deviation of 1.4 (moderate). Here again, the topic of how disruptive and change-oriented the employees are, is addressed and how actively they act in an innovative way. The average was good, but not significantly good.

Figure 5.3 – "I often generate original solutions to problems."

The average was 5 (moderate) with a standard deviation of 1.2 (moderate), the perceived image of how creative and original the employee is, and how frequently creative and innovative methods are applied at work, in the context of problem solving. The results were good, but not significantly good.

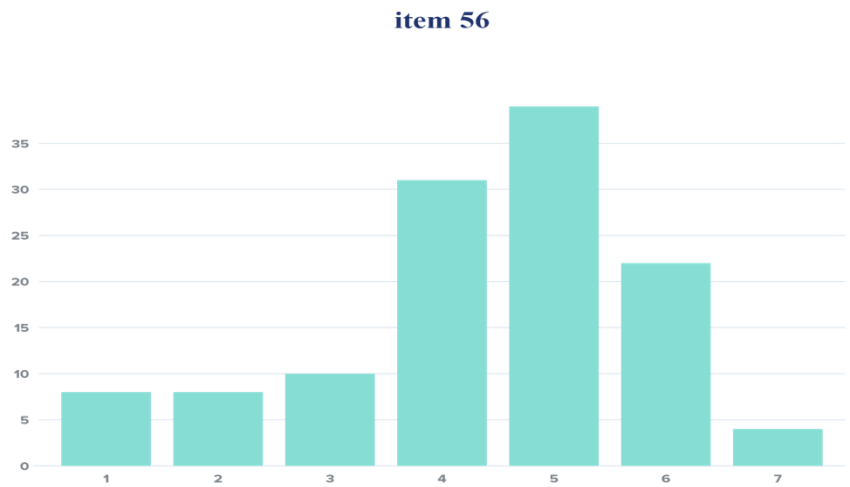
Figure 5.4 – "I often mobilise support for innovative ideas."

The average was 4.6 (moderate) with a standard deviation of 1.3 (moderate) of how employees are responding (actively) to new ideas of others and how likely they will promote and support them within the organisation. Here the direction is also good, but not significantly good.

Figure 5.5 – "I often acquire approval for innovative ideas."

The average was 4.7 (moderate) with a standard deviation of 1.3 (moderate), in terms of how frequently the employee seeks the organisation to acknowledge his/her innovative initiatives and obtain support. The results were good but not significantly good.

Figure 5.6 – "I often make important organisational members enthusiastic for innovative ideas."

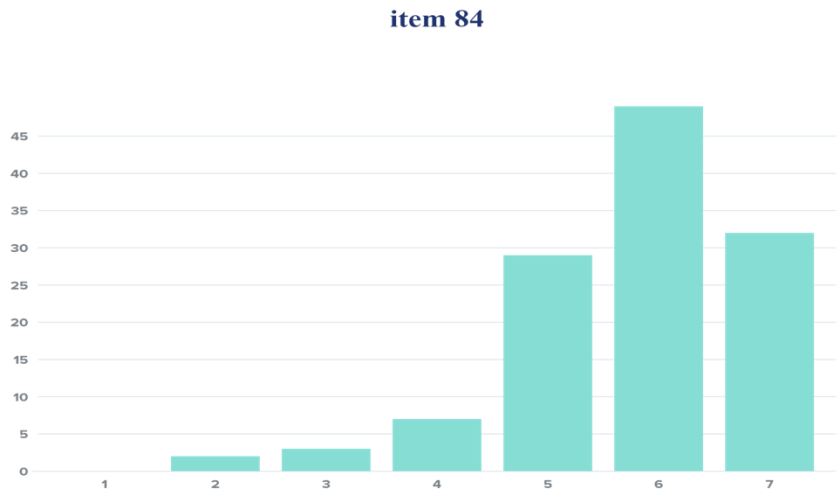


The average was 4.4 (moderate) with a standard deviation of 1.5 (high). The result is moderately low, mainly due to the nature of the item, where there are subjective factors such as the perceived importance of a certain figure in the organisation and how happy he/she was with the employee's idea. Again, this result is not of significant importance.

Figure 5.7 – "I have confidence in my ability to produce new ideas."

The average was 5.7 (high) with a standard deviation of 1.1 (moderate), the result is above average, and demonstrates that employees believe they will be able (if needed) to come up with new solutions and ideas. Here, the score is significantly good.

Figure 5.8 – "I have confidence in my ability to solve problems creatively."



The average was 5.8 (high) with a standard deviation of 1.1 (moderate). The result is positive as well, showing that employees trust their abilities to perform in an innovative manner when facing a complicated situation and they believe they will be able to come up with creative solutions. The average is significantly good.

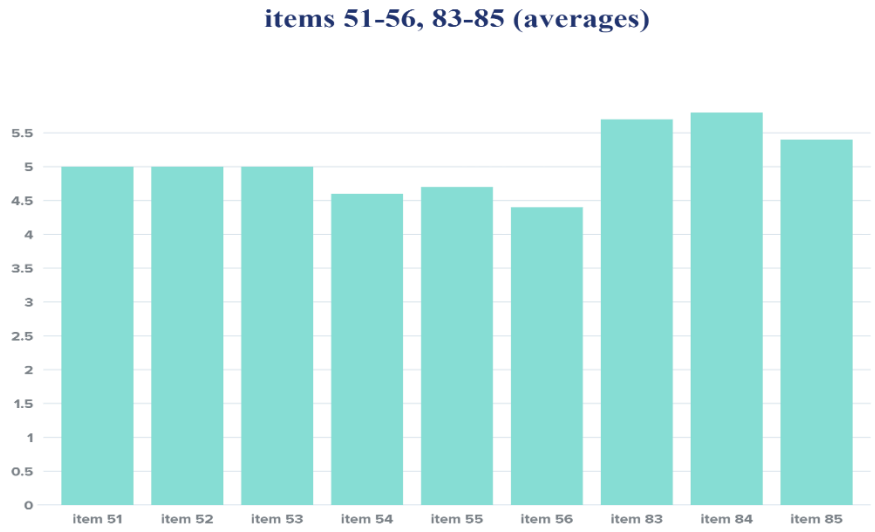
Figure 5.9 – "I have confidence in my ability to elaborate or improve upon others' ideas."

The average was 5.4 (high) with a standard deviation of 1.2 (moderate), a positive result, showing that the employees believe they can develop and even improve their peers' concepts. Like the previous items, it is perceived that the employees have high confidence in their abilities to innovate when it is necessary. Significantly good results.

6. Conclusions

The main difference between the items is the manner of how the respondent has been asked about topics related to innovation, when addressing them in a more hypothetical approach: items 83-85, and when addressing them in a more practical approach: items 51-56. It is visible that the hypothetical approach allows the respondent to be more confident about his or her abilities to perform innovatively in the organisation, when there is a need for it. The average score of items 83, 84 and 85 was 5.6 (high) and the average score of items 51, 52, 53, 54, 55 and 56 was 4.8 (moderate). The nature of items 51 to 56 was much more straightforward and practical, and the respondents were asked about real events of innovation inside the organisation, making their responses more reflective about the real nature of their innovative (or not) character. nevertheless, the average score was still relatively good.

Figure 6.1



The average score of all items was 5 (moderate) with a standard deviation of 0.3 (low), the lowest score was 4.4 (moderate)- item 56, and the highest was 5.8 (high) - item 84. The lowest scored item (4.4) "I often make important organisational members enthusiastic for innovative ideas" and the highest scored item (5.8) – "I have confidence in my ability to solve problems creatively.", Are making an interesting case; although most employees graded themselves as creative thinkers, they were much less (25% lower on average) able to act based on their perceived creativity. Here we can see the main difference between the entrepreneurs, the founders of these companies and their employees. Yes, on average they are both innovative and creative, but innovation - as stated previously - is, together with creativity, a process: "The creativity stage of this process refers to idea generation, and innovation to the subsequent stage of implementing ideas toward better procedures, practices, or products" (Anderson et al., 2014).

Employees are moderately innovative by nature (compared to entrepreneurs), but they can demonstrate high levels of creativity inside the organisation; (on average) they are just not as good at executing: this part (innovation) is more action related. Nevertheless, the main driver of innovation in Israel – and possibly everywhere – is its entrepreneurs, the executors, the "bulldozers" one can say, whose inherent and acquired qualities have led them to be highly successful in innovating and therefore they excel at creating successful start-up companies.

When these small-sized ventures grow, hiring in larger scale inevitably occurs, but as it was shown from the data collection, the employee's "innovativeness" is not more than moderate at best. They are probably mostly affected by the external forces - as discussed in chapters 2 and 3 – which drive them to be creative and innovative, because they were born and raised in Israel.

But they are not as innovative as the entrepreneurs, so their impact on the industry at large, as seen from the data obtained in this particular research, is only moderate.

7. Success Stories - The Nation's Heroes

In order to better understand success in the business world, some definitions must be made first. When looking at value in the stock market, that is "market value", determined by the calculation of the stock price multiplied by the number of stocks outstanding. Based on supply and demand, it is a way of determining how much the company is worth in the public eyes (assuming that the more it is worth, the more successful it is in the business world) (Banton, 2021). Of course, the company must be public, and that term is defined as follows:

> Public company, also called a publicly traded company, is a corporation whose shareholders have a claim to part of the company's assets and profits. Through the free trade of shares of stock-on-stock exchanges or over the counter (OTC) markets, ownership of a public company is distributed among general public shareholders. and therefore, officially traded in the stock market" (Banton, 2021).

When looking at the company's "book value" (which might be a more accurate reflection of the company's true value), this term can be defined in the following way:

> The book value of a company is the net difference between that company's total assets and total liabilities, where book value reflects the total value of a company's assets that shareholders of that company would receive if the company were to be liquidated" (Hayes, 2021).

Thus, successful public companies are ones with relatively high market value compared to other public companies.

There are also privately held companies in the market, and they can be described in this way:

> A private company is a firm held under private ownership. Private companies may issue stock and have shareholders, but their shares do not trade on public exchanges and are not issued through an initial public offering (IPO). As a result, private firms do not need to meet the Securities and Exchange Commission's (SEC) strict filing requirements for public companies. In general, the shares of these businesses are less liquid, and their valuations are more difficult to determine" (Chen, 2020).

Start-ups are another very popular type of private company in Israel, "Israel has earned the nickname "Startup Nation" for a very good reason: With a population of around 8.5 million, it

has the largest number of startups per capita in the world, around one startup per 1,400 people" (Yerman, 2019). Start-ups are companies in their early stages and as Mitchell (2020) from "Investopedia" explains, they are usually focused on a single service or product and at times lack a well-defined and complete business model. Moreover, funding is the main obstacle and many times at the very beginning, is obtained by the founders themselves.

Another relatively newer term relating to start-ups, only recently introduced back in 2013 by the venture capitalist Aileen Lee, founder of CowboyVC, is a:

> Unicorn, what most people in the financial world call a startup that is privately-owned with a valuation exceeding $1 billion. Some of the more popular unicorns based in the U.S. include home-sharing giant Airbnb, video game company Epic Games, as well as fintech companies Robinhood and SoFi." (Chen, 2021).

A unicorn is essentially a start-up, that is, in essence a private company. Successful companies, from a business perspective, are all judged based on their perceived value. Of course, other considerations can be part of the criteria for ranking a company's success, such as if it is ecological, sustainable, humanitarian and so forth.

Israeli entrepreneurs, domestic or foreign, are responsible for many start-ups success stories. But not all of these successful companies were founded and registered in Israel. In some cases, Israelis travelled abroad and collaborated with non-Israeli entrepreneurs, out of several different considerations. These companies are those that left their mark on the industry and became "living symbols" for the strength of the Israeli tech industry. Some of these companies are quite famous in the business world and even quoted on NASDAQ, while others aimed for an acquisition by different other companies and made an "exit". Each company had its own strategy for market capitalisation and/or profit generation. Israel, as it was mentioned earlier, is a small country and some of these companies sought international markets from day one; it was part of their expansion strategy, to grow beyond the boundaries of the country. Internationality is key for the required economies of scale (Fischer, 2018).

The highest valued public and private companies (unicorns) are shown below, as of July 2021, there three from each category.

The most valuable public companies are:

1. NICE - born in Israel. As of July 2021, it has a market cap of over US $18 billion, which makes it the 1,039th highest valued company worldwide. The company specialises in data security, surveillance and telephonic voice recording. The company was founded in 1986 by a group of seven army colleagues and currently has about 6,800 employees. Originally, the company focused solely on the defence industry and then later moved to

the civilian market to realise higher profits. The company's headquarters are located in Raanana, Israel. This is a great example of the uniqueness of the Israeli ecosystem; a group of young men, freshly graduated from the Israeli Defence Force, from the most elite intelligence unit, "8200", who joined forces and formed a company. Initially, the company operated as a contractor for the IDF out of a small apartment in Tel Aviv. It is doubtful that without the non-formal hierarchy structure - which is such a bold characteristic of the Israeli army - that the formation of the venture would be possible. In 1996 it raised US $20 million in its IPO (initial public offering) on NASDAQ (NICE, Wikipedia, 2021).

2. Wix - born in Israel. As of July 2021, it has a market cap of about US $17 billion, which makes it the 1,077th highest valued company worldwide. The company allows users to create websites for free, earning revenues from advertising. Its website builder, based on the "freemium" model, generates revenue through premium upgrades (*Wix*, n.d.). The company was founded in 2006 by three partners - Avishai, Nadav and Giora - and its headquarters are located in Tel Aviv. Venture capital such as "insight venture partners" were crucial to the company's success and, as Senor and Singer (2011) explain, were highly accessible in Israel since the 1990s. In its IPO on NASDAQ, Wix raised about US $127 million (Wix, Wikipeia, 2021).

3. Checkpoint - born in Israel. As of July 2021, it has a market cap of US $16.7 billion, making it the 1,080th most valuable company in the world. The company is best known for its antivirus software "firewall" and generally specialises in IT security (both hardware and software). The company was founded by Gil (CEO), Marius and Shlomo in 1993. Its headquarters are located in Ramat Gan, Israel and as of 2019 has around 5,000 employees. Gil was also a member of the "8200" unit of the IDF, and part of his experience performing his duties were essential to the company's future success. Of course, venture money was part of what made it possible; US $250,000 was provided by venture capital fund BRM Group (*Check Point*, n.d.) (Checkpoint, Wikipedia, 2021).

The most valuable private companies (unicorns) are as follows:

1. eTORO- As of July 2021, valued at US $10 billion, with a total funding of $225 million (last round 2021). Is a social trading and investment marketplace that allows users to trade currencies, commodities, indices, and stocks" (*Israeli-Founded Unicorns*, 2021). "Digital Currency Group" and "Ping An" are among its largest investors. eTORO is a fine example for a company driven by the vision to disrupt an already existing industry, although the heavy regulation and well-established players, innovation in the

financial industry, via "fintech" is proving to be very profitable (*Israeli-Founded Unicorns*, 2021).

2. Tanium - as of July 2021, valued at US $9 billion, with a funding of US $1 billion (last round 2020). The company was founded in 2007 by two sole founders - David Hindawi and his son, Orion. The headquarters are located in Silicon Valley, USA. "Tanium is a security and systems management solution that allows real-time data collection at enterprise scale" (*Israeli-Founded Unicorns*, 2021). Andreessen Horowitz and T. Rowe Price is among its main investors. David served in a technological unit in the IDF and later emigrated to the states. Again, in yet another example of market disruption, Tanium turned around an already working system and showed that there is a different and more efficient way of doing what it does. But drawing some venture money first was required in order to make such innovation possible (*Israeli-Founded Unicorns*, 2021).

3. The We Company (WeWork) - as of July 2021, it was valued at US $9 billion, with total funding of US $22.5 billion (last funding in 2019). Founded in 2010 by Adam Neumann and Miguel McKelvey, the headquarters are located in New York. "WeWork is a commercial real estate company that provides shared workspaces for technology start-ups and services for other enterprises" (*Israeli-Founded Unicorns*, 2021). Its top investors are Softbank, Goldman Sachs and Benchmark. Today there are about 6,000 employees working at WeWork, and there are over 800 locations in more than 120 cities around the world. Adam served as an officer in the IDF navy branch. The company under Adam's leadership has managed to raise billions of dollars, which demonstrates the trust that investors have for Israeli start-ups and entrepreneurs. WeWork is yet another example of market disruption and, in this case, in a more traditional business sector (*Israeli-Founded Unicorns*, 2021).

In addition to IPOs and huge funding rounds, there are exits - a business exit strategy is an entrepreneur's strategic plan to sell their ownership in a company to investors or another company. An exit strategy gives a business owner a way to reduce or liquidate their stake in a business and, if the business is successful, make a substantial profit (Hayes, 2021). are another popular topic for discussion in Israel for the past 20 or so years, as Israeli entrepreneurs from various sectors looked for multinational giants to buy their companies (Senor and Singer, 2011). Lack of marketing capabilities and other managerial skills led Israeli entrepreneurs to the conclusion that it is more profitable to sell out than making it all by themselves (Fischer, 2018). Mobileye, which was responsible for the biggest exit in Israel's history, was sold to Intel for

US $15.2 billion in 2017. It was founded in 1999 by Shashua and Ziv Aviram and "… the company's product is based on cameras and advanced computer vision technologies that alert to hazards in the road, such as crossing pedestrians, reckless driving, proximity to other vehicles on the road, and more." (Alkeslasi, 2021).

The CEO, Shashua, is an example of the strength of the Israeli academia, where as a researcher at the Hebrew university, he found that innovation is accessible not only for the sake of science but also for business purposes. The Hebrew university is known for its initiatives and profit generation mechanisms through royalties (Senor and Singer, 2011). Shashua also served as an officer in the IDF armored forces. His personal wealth is estimated for NIS 4.3B and he is ranked among the 100 wealthiest Israelis. (Amnon Shashua, Wikipedia, 2021)

After reviewing Israel's top success stories, a correlation is almost always visible between the meaningful service in one of the most elite units of the IDF and innovation in the business world. Moreover, it is very obvious that the accessibility to venture capital funds helped push forward each of the companies, as each and every one of the companies above had a venture capital fund behind them, "fuelling their tanks", and supplying them with enough funds to allow the products and process to ripen. The goal after all is the global - not local - market.

Finally, MNEs (multinational enterprise) truly seek to play a part in the Israeli tech industry, with companies establishing (research and development) R&D centres around the country, in order not only to scout for the best local talents and to gain control over intangible assets of all sorts, but for the benefit of acquiring these raising companies "cheap", and then later sell them high, or even just to avoid any future competition with such market disrupting companies. For them to have "boots on the ground" in Israel is becoming almost a trivial thing (Fisher, 2018).

8. The Future?

Some say that Israel's tech industry has reached the point where her well-known moniker as "the start-up nation" no longer qualifies; now, it is the time of the unicorns and the NASDAQ companies (Bordo, 2018). The "scale-up nation" might be Israel's new brand from now on:

> While Start-Up Nation is focused on building innovative startups that can be quickly acquired, Scale-Up Nation is focused on building large, successful multinational companies that are headquartered in Israel and operate on a truly global scale, with thousands of employees and significant revenues." (Bordo, 2018).

The main difference here is that the Israeli tech market is a more mature one now than it was ten years ago. Many firms are able to stay private and keep investors intrigued, so as Bordo

(2018) said companies like "Via" and "Lemonade" raised about US $0.5 billion from growth rounds (not series A and seed rounds); they are "scale-up companies" and investors trust them to handle their money properly:

> According to estimates, investments in scaleups in Israel between 2015-2019 increased by 66% compared to the previous five years. In this time period, Tel Aviv also became the 15th biggest global Scaleup Hub by funding growth, with 290 scaleup funding rounds between 2015-2019" (Sapiro, 2021).

Moreover, the growth companies are important to Israel's labour market, as they are large employers and are able to create and sustain many jobs for the country and perhaps most importantly, demonstrate high resiliency during crises in terms of value generation, in the past year this model has proved itself when "scaleups reacted quickly to the COVID-19 outbreak with policies aimed at securing revenue, with most maintaining positive growth outlooks into 2021." (Sapiro, 2021).

Sapiro (2021) adds that for a company to be named a "scaled-up company", it has to show revenues of US $10 million annually, demonstrate an annual 20% growth rate and have a headcount of 50 to 1,000 employees. According to the report, these companies are very resilient and flexible, even though they are bigger and thus, processes might be cumbersome and slower. The past year has shown a strong case for their resilience, as when many sectors dramatically slowed down as a result of the pandemic, these scale-up companies were able to maintain their growth and keep the Israeli export market afloat. (Sapiro, 2021).

Not only that, but these companies were even able to keep raising money during the most uncertain and darkest moments of the COVID-19 outbreak, while many other companies and sectors almost reached the stage of complete stagnation and were artificially "ventilated" by the government in order to survive. (Israel's Ministry of Finance, Economic plan for coping with the coronavirus crisis, 2021)

8.1 Changing of old habits?

In direct correlation to Israel's market resilience lays an even bigger potential for growth in a less "pendulum"-like environment. Israel's former Minister of Strategic Affairs, Avigdor Liberman, said back in 2008 that Israel's annual growth rate of five percent is not where the country could have been, if circumstances would have been different:

> A more tranquil situation with our neighbors and a sort of normalized relations, involving at least the sense of the beginning of direct talks between the different

parties to the Arab-Israeli crisis would allow Israel its real growth potential of around 7 percent per year" (Sher, 2008).

Israel is indeed a resilient country; the past 70 years of its existence have been quite a rollercoaster. The political leadership has changed from its socialist beginnings to a more capitalist government, tech took over agriculture and security hazards metamorphosized dozens of times. (Senor and Singer, 2011) Still, maybe a more relaxed ecosystem would have allowed its people to be less uncertain and more long-term oriented, so systems and infrastructures would be better designed, and decisions will be taken easier. Altogether security is both a driver and a preventer of growth, the Arab Israeli conflict has proved to be able to play the two different roles at the same time.

The Israeli Defence Forces (IDF), as have been described previously, have had a major role in the shaping of the Israeli tech industry:

> The spill over of military technology to the civilian sector in the form of technology spinoffs has been a major force behind the creation of a flourishing civilian hi-tech sector, which, in turn, becomes an important source of technology for the defense establishment" (Evron, 2020)"

It is important to understand that the transformation - even if it originated within the IDF itself and then was later "outsourced" to the private sector by its intelligence veterans - is now "backfiring" on the IDF. (Evron, 2020) The 4IR (fourth industrial revolution) affects the IDF as much as it is affecting all other aspects of society. Now, the way that the IDF used to plan and execute its military strategy has almost completely turned around. It is a "closure of a circle", as in the nation's early days the need for security caused its people to "innovate for their lives". (Senor and Singer, 2021) Decades later the IDF has positioned itself as the strongest military force in the region, and naturally the threat lessened. But Israel is still resource poor, and the creation of value has become its main threat for survival. (Evron, 2020).

8.2 A Forecast by a Local CEO

When Nir Yerushalmi, CEO and founder of "Precise" - an Israeli fintech company with a headcount of about 300 employees and offices in Tel Aviv and New York - was asked about his thoughts of the future of Israel in an interview conducted in the company's headquarters in Tel Aviv, he was very optimistic and spoke highly of his country. Nir was chosen to be interviewed, in order to fill the gap between what the main journals and papers estimate to be the future of Israel's tech superiority, and what the local leaders actually think. There was also

interest in what projections do they make about the future, and even how "invested" they really are in their own ecosystem.

A semi-structured, one-to-one questionnaire was created for the sake of the interview. Ten different open-ended questions, all high-tech industry related, were formulated. The session was limited to a 30-minute timeframe. The interviewee was led by the interviewer and was guided to answer freely, but briefly.

1. Do you think that Israel will preserve its status as a world-leading tech nation?

Nir's response was "Absolutely yes, we continue to develop in the field mainly because of the army, and the Jewish mind". Nir recognises the strength and depth of the country's mandatory military service as a sustainable source of innovation. He continued, "Learning how to keep the companies in the country will solve our problems." The scaleup model previously mentioned is, according to Nir, the country's solution. Israel's main problem is, as Nir identified it, a lack of management know-how, "Let Israel set up companies and the Americans to run them." He referred to Israeli dominance in the realm of innovation and the need to export management to better suited nations. Finally, Nir stated that:

"The continuation has to be related to the country's survival threat and no existing natural treasures", therefore the high-tech industry is the country's main source of income and must be sustained.

2. What, in your eyes, are the main drivers for its success?

The hi-tech sector is made of technological initiatives and capabilities. Nir adds that a "significantly larger scale" of doing businesses is itself a driver for success (one can simply name it - ambition). He proceeded with "initiative and speed of response". In Nir's eyes, not only the idea itself is sufficient, nor the decision of acting based on it, what important is how fast a "need" is identified, and how quickly the entrepreneur responds in order to serve it.

3. What in your eyes are the main obstacles for its success?

Nir starts by asking "What is good about our (Israel) conflict with our neighbors (the Arab nations)? He answers, "It makes us work together, and not slaughter each other". Afterwards, Nir quotes Adolf Hitler, "We (Jews) are not good as a collective". In Nir's perspective, one of the nation's greatest obstacles is the inherited lack of collectiveness. "Only as a result of direct threats from the outside, must we remain united". And these so-called "threats" are not always as intuitive as one may conclude. Another "warning sign" is what Nir refers to as "a noble layer of high-tech workers", that are currently starting to

take form. Nir calls for more extensive regulation in the sector, otherwise workers in other sectors might start "rethinking their standing professions" and it can become dangerous.

4. Regarding the Coronavirus, how worried are you (or not) about the Israeli market's flexibility to comply with the forced "new reality"?

"Over time, the Coronavirus will not matter, it is an infectious plague, but humankind will endure". Nir is overall very optimistic, the market has taken a hit and is now gaining back its balance. According to Nir, "Vaccines are the key" to help the country get back on its feet, both quickly and efficiently.

5. If you would have been asked about question one two years ago, do you think your mindset was any different?

"Would not change. It would have remained the same". Nir is well based in his beliefs, no matter what threat is lying ahead. He adds that the Coronavirus would even have helped Israel push itself further up in the race for technological superiority. "The pandemic has boosted our economic status in 20 years within a year". "As long as remote work develops, Israel develops. These two processes are now bundled together".

6. To what extent do you think that your industry is exposed to market disruptors?

"Not so relevant to Precise. A unique company". "Our customers' (civil engineering and law firms) were and will remain". Fintech is a versatile sector, and it serves many needs, according to Nir.

7. If it is indeed exposed to disruptions, where in the supply chain it is most likely to occur?

"Cannot answer". Nir is arguing that the "weak spot" is found both inside the company and within its customers. Nir stated, "As long as high-tech dominates the market and draws the talents. The companies will suffer". Many young bright minds are moving to the high-tech sector and therefore talents are harder to find. Nir is pointing out that the company is not immune to automation. And automation can happen, "but it is very difficult". Moreover, Precise already has software for streamlining processes outside and inside the organization.

8. Do you think that your industry will play an important part in the continuous success of the Israeli tech industry? If not, which industry would it be?

Nir replies that he is "not well versed in the subject". But "if it will play a part, it will be indirect".

9. Who will be Israel's most important allies in the future?

Nir spoke of different allies. In Nir's opinion, externally the Americans are Israel's most important allies. "I have not yet encountered a situation where a person or country conveys a powerless message, everything is related to power, compromises and

relationships. And they are built on interests and threats". Internally, "Israel's most powerful ally will be its military force". The (IDF) takes care of the country's priorities and agenda. Lastly, Nir is highlighting that the high-tech sector is Israel's second internal source of strength, "as long as we can maintain it and keep ourselves politically stabilized, our success will be preserved".

10. What do you think Israel's leadership should do in order to endure the current crisis and keep Israel's position as a start-up nation?

Nir said it was "multidisciplinary". The country must act on several different frontiers, infrastructure, and social. For example, "higher integration of the ultra-Orthodox in the economy". The country must allow as many market segments as possible to participate successfully in the tech industry, otherwise the gaps will become too dramatic. "Education is very important", Nir underlined that Israel must preserve its future in the high-tech industry and education is key to accomplish the task.

Nir sees that Israel's future walks "hand with hand" with the high-tech sector. According to him, the pandemic was not so terrible (economically), and even helped move Israel a little further towards its bold vision. The fact that the country is so deeply invested in the tech sector was key to its capability to stay "afloat" during the hardest part of the outbreak and more importantly, keep its stakeholders satisfied and optimistic about the country's resilience and ability to cope with crises. He values education and shouts that all parts of society (Arab, Orthodox and secular populations) should participate; none should be left behind. The country's relationship with the US is crucial to its future success and politicians must preserve the "statuesque" between the two. Although Precise is not directly related to the country's technological prosperity, it is still affected by it, and implements a lot of know-how and mindsets related to it, in order to keep growing and leading the market.

9. Conclusion

Israel has been through quite a journey since its birth seventy years ago; a journey of transformation from socialism to capitalism, agriculture to high-tech and so forth. Now it is clear that Israel is among the countries leading the race to digitalisation, globally. In this dissertation two main topics were addressed: (a) what is the nature of the Israeli innovation? And (b) what is the employee's role in that ecosystem? Both questions aimed to find out what the driving force behind the Israeli tech industry is.

Regarding the first topic: the nature of the Israeli innovation (what makes it so productive and successful in producing technological start-ups and breakthroughs), it was clear, after an extensive review of the literature, that the most dominant factor was the compulsory military service, more precisely the service in the IDF (Israeli Defence Forces). The external threat of Israel's well-being, as a result of the fact that Israel is surrounded by hostile countries and the Mediterranean Sea, means there is just no place to go. There is not only the threat from the outside, but from the inside, the Palestinians who are living among the Israelis, thus on many occasions the conflict was and is internal. Moreover, the issue of the lack of resources - water, gas precious metals and so forth - has led the Israeli people to become creative and innovative in order to defend themselves against their neighbouring countries and make up for their lack of natural resources. Another dominant factor is Israel's sociological and demographic structure – a cultural melting pot. The most recent addition which is strongly related to the1990s technological boom was the immigration wave during that decade from the former Soviet Union.

Another important factor is that after the country matured and based her position as one of the most powerful military countries in its region, what became very important to its survival and advantage at the business world was US-Israel relations, led by the strong Jewish-American community. The Silicon Valley VCs (Venture Capital) model that Israel adopted from the States, allowed its talents to move out of the military and the defence industry, mobilising themselves into the private sector. Also, it became possible to access capital outside of the traditional channels of banking. The VCs' transfer of capital was faster, easier and on a much bigger scale. Moreover, the managerial know-how is of great importance too; these VC funds had a lot of managerial knowledge and experience in the business ecosystem, and they helped

young, unexperienced but talented entrepreneurs to manage their companies properly, regarding all business aspects. The internationalisation of Israel's tech companies was very much related to the VCs.

Government policies (pro-technology) and active international PR (Public Relations) made doing business for these companies much easier, not only for Israeli start-ups, but foreign companies too. The fact that so many others were already participating in the Israeli tech frenzy started to hammer home the point that it is not only PR, but it is a reality of prosperity and success. Thus, a lot of the biggest companies (S&P 500 companies) moved parts of their activities and interests to Israel. They also moved their R&D facilities there and recruited many local talents and while doing so, they used a strong local network and scouting activities to ensure success.

The scaling-up of Israel's companies (privately and publicly held), from a start-up nation to scale-up nation is now the reality of the local market, where companies are becoming significantly larger. It is a sign of the strength and resiliency of the Israeli tech-industry. It shows that Israelis are not only good at creating and inventing successful companies, but they are good in nurturing them and managing them too. Israel's entrepreneurs have shifted from innovating and exit, to innovating and managing; this part is important for the future and sustainability of the Israeli ecosystem.

The COVID-19 outbreak was (and still is) a driver for these companies by largely driving digitalisation globally and the opening of many different sectors to the concepts of innovation in the workplace. As a result, the demand has grown dramatically for technological solutions and so has the supply: more and more sectors are more digitally centered and during the hardest moments of the outbreak, the Israeli hi-tech sector keep increasing its revenues, when the rest of the market froze and had to be supported by the government. This was important for Israel's ability to show strength during a crisis and because of that, these companies were able to even keep raising capital during the global lockdown.

As for the second topic: It seems that the employees' role in the country's success is not of great importance in factors related to innovation. Meaning, the employees in these companies are creative thinkers according to the research, but they are less innovative in their essence. There is no doubt that they are part of the company's success, but mostly in the operational aspects and less in the entrepreneurial aspects of the business. As it was shown, employees were found to be moderately innovative (at best) in the research. But there is a room for future research in other companies and sectors in order to validate and further examine the results. Therefore, the entrepreneurs (the founders and CEOs) are more innovative and their role in

pushing the industry forward is bigger because they are - beyond being creative - better at executing their vision and initiatives; one can say that they are better in the leadership aspects of a business. As was shown in the literature review, innovation and creativity are related and can be viewed as a process, each relating to a different part of a company, and so are the employees and entrepreneurs in the Israeli hi-tech companies; each is better at different aspect of the process. Nevertheless, the average score in the innovation construct of the survey was five, and in the creativity construct it was leaning towards six. So, at large, employees in innovative firms (based on the research at "Precise") are moderately innovative, but mostly creative.

Together, the picture is clearer on what the environmental and behavioural aspects of the driving forces behind the Israeli tech industry are. Further questions which can be asked in future research include: what will happen to the ecosystem if the military service is no longer compulsory and how can the characteristics of the employees can be transferred to other companies and nations?

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Annexe A

The questionnaire given to employees of the Israeli tech industry. Please indicate your agreement or disagreement with each of the statements. There are no right or wrong answers. It is normal that there is wide variation among employees in terms of how they rate each of the statements in the survey. Further, be assured that your responses are strictly confidential. Hence, please answer the questions as honestly as possible.

Please indicate your agreement or disagreement with the following statements.

1 = Completely disagree
2 = Disagree to a great extent
3 = Somewhat disagree

4 = Neutral
5 = Somewhat agree
6 = Agree to a great extent

7 = Completely agree

Demographic characteristics

1 - What is your gender?

2 - What is your age?

3 - What is your highest education level? (secondary, post-secondary [professional, technician], bachelor/university, masters/university, PhD/university).

4 - How long have you worked for the organization?

5 - How long have you worked in your current job in the organization?

6 - What is your current functional area (sales & marketing, production & operations, research & development, accounting & finance, human resources, information systems)?

7 - What is your level in the organization (top manager, supervisor, intermediate, line worker, other).

Challenging factors

8 - I have difficulty keeping the threat of COVID-19 out of my mind.

9 - There is little I can do to protect myself from COVID-19.

10- I frequently think about the threat of COVID-19.

11 - There is nothing I can do to defend myself from future COVID-19 threats.

12 - The threat of COVID-19 often enters my mind.

13 - I worry that COVID-19 will only get worse as time passes.

14 - I think that I am completely helpless in protecting myself from COVID-19 in the future.

15 - I worry that the threat of COVID-19 will never end.

16 - I often dwell on the threat of COVID-19.

17 - I believe the future is dark with respect to the threat of COVID-19.

18 - I do not have a lot of power in keeping myself safe from COVID-19.

19 - I frequently find myself preoccupied with thinking about COVID-19.

20 - I lack control in defending myself and my loved ones against COVID-19.

21 - Family-related strain interferes with my ability to perform job-related duties.

22 - I have to put off doing things at work because of demands on my time at home.

23 - My home life interferes with my responsibilities at work such as getting to work on time, accomplishing daily tasks, and working overtime.

24 - Things I want to do at work don't get done because of the demands of my family or spouse/partner.

25 - The demands of my family or spouse/partner interfere with work-related activities.

26 - My colleagues and I often get angry while working together.

27 - There often are tensions in the relationship between my colleagues and myself.

28 - My colleagues and I do not get along well with each another.

29 - My colleagues and I generally dislike interacting with each other.

Organizational factors

30 - My organization’s procedures allow for requests for clarification or additional information about a decision.

31 - My organization’s procedures provide opportunities to appeal or challenge a decision.

32 - My organization’s procedures are constructed to hear the concerns of all those who are affected by a decision.

33 - My organization’s procedures allow people to collect accurate information for making decisions.

34 - My organization’s procedures generate standards so that decisions can be made with consistency.

35 - My colleagues and I spend significant time together in social situations.

36 - My colleagues and I maintain close social relationships with one another.

37 - My colleagues and I know each other on a personal level.

38 - My relationship with colleagues is very informal.

39 - My colleagues and I share a similar vision regarding the organization's future.

40 - My colleagues and I think alike on most issues with respect to the organization

41 - Most of my objectives are fully aligned with those of my colleagues.

42 - My colleagues and I perceive our work-related problems as mutual problems.

43 - My colleagues can always be trusted to do what is right for the organization.

44 - My colleagues always keep the promises they make.

45 - My colleagues are perfectly honest and truthful with me.

46 - My colleagues are truly sincere in their promises.

47 - My colleagues would not take advantage of me, even if the opportunity arose.

48 - I know exactly what is expected of me.

49 - I know that I have divided my time properly.

50 - Explanation is clear of what has to be done.

51 - I feel certain about how much authority I have.

52 - I know what my responsibilities are.

53 - Clear, planned goals and objectives exist for my job.

54 - My colleagues and I often have conflicting opinions about projects.

55 - My colleagues and I often have conflicting ideas.

56 - The tasks pursued by my colleagues and myself are often incompatible with each other.

57 - My colleagues and I often have disagreements about task-related issues.

Employee behaviors

58 - I often create new ideas for improvement.

59 - I often search out new working methods, techniques, or instruments.

60 - I often generate original solutions to problems.

61 - I often mobilize support for innovative ideas.

62 - I often acquire approval for innovative ideas.

63 - I often make important organizational members enthusiastic for innovative ideas.

64 - I undertake action to protect the organization from potential problems.

65 - I have a cooperative relationship with my boss and others in the organization.

66 - If necessary, I am prepared to work overtime.

67 - I develop the necessary skills and knowledge that are of benefit to my organization.

68 - I advise other colleagues against undesirable behaviours that would hamper job performance.

69 - I speak up honestly about problems that might cause serious loss to my organization, even when dissenting opinions exist.

70 - I dare to voice out opinions on things that might affect efficiency in my organization, even if that would embarrass others.

71 - I dare to point out problems when they appear, even if that would hamper relationships with other colleagues.

72 - I proactively report coordination problems in my organization to my boss.

73 - I help others who have been absent.

74 - I help others who have high workloads.

75 - I assist my supervisor with his/her work, even when not asked.

76 - I take time to listen to my co-workers' problems and worries.

77 - I go out of my way to help new employees.

78 - I take a personal interest in other employees.

79 - I pass along information to co-workers.

Individual factors

80 - I love to work.

81 - I look forward to returning to work when I am away from work.

82 - I derive most of my life satisfaction from my work.

83 - I accomplish a lot at work because I love to work.

84 - Sometimes I wish that I could be at work when I am not.

85 - I enjoy finding solutions to complex problems.

86 - I enjoy coming up with new ideas for products.

87 - I enjoy engaging in analytical thinking.

88 - I enjoy creating new procedures for work tasks.

89 - I enjoy improving existing processes or products.

90 - I have confidence in my ability to produce new ideas.

91 - I have confidence in my ability to solve problems creatively.

92 - I have confidence in my ability to elaborating or improving upon others' ideas.

93 - I am able to control my temper so that I can handle difficulties rationally.

94 - I am quite capable of controlling my own emotions.

95 - I can always calm down quickly when I am very angry.

96 - I have good control of my own emotions.

97 - If a peer gets a prize, I would feel proud.

98 - The well-being of my peers is important to me.

99 - To me, pleasure is spending time with my peers.

100 - I feel good when I co-operate with my peers.

Annexe B

The future of Israel as a startup world leader. One-to-one questionnaire: Semi-structured questionnaire Interviewee- Nir Yerushalmi, CEO and founder of "Precise"

Open-ended questions

1. Do you think that Israel will preserve its status as a world-leading tech nation ?
2. What in your eyes are the main drivers for its success ?
3. What in your eyes are the main obstacles for its success ?
4. With regard to the Coronavirus, how worried are you (or not) about the Israeli market's flexibility to comply with the forced "new reality" ?
5. If you would have been asked about question 1 two years ago, do you think your mindset was any different ?
6. To what extent do you think that your industry is exposed to market disruptors ?
7. If it's exposed to disruptions, where in the supply chain it is most likely to occur ?
8. Do you think that your industry will play an important part in the continuous success of the Israeli tech industry ? If not, which industry would it be ?
9. Who will be Israel's most important allies in the future ?
10. What do you think Israel's leadership should do in order to endure the current crisis and keep Israel's position as a startup nation ?