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Advanced
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Monitor
Deloitte.



IATI (Israel Advanced Technology Industries)
presents:

Report on the Contribution of Hi Tech to the Israeli economy and to Israeli society

Hi Tech as a National Springboard

February, 2023

Introduction

Given the geographic, political and historical setting within which the State of Israel has existed since its establishment, the country had no choice but to create something out of nothing to ensure its survival and prosperity. With no major natural resources to speak of, and effectively cut off from the region, innovation and technology were the quintessence of the country's unique spirit, one based on pioneering, fulfillment, creativity and proactivity.

This explains why hi tech has been Israel's source of pride for so many years, for a country that had branded itself as the "startup nation." Much larger countries have come and continue coming to Israel to learn about the outstanding achievements that were made, and about the trailblazing inventions that affect so many lives around the world. This source of pride is also an important engine for the Israeli economy, with the rest of the economy following its lead, and it is the main reason for Israel's growth in the past five years.

Beyond its contribution to the GDP, the success of the hi-tech sector leads to increased state revenues, and it allows the state to invest in vital national infrastructure, like education, telecommunications, transportation and health care. Thanks to hi tech, the state can also cope with contingencies that require it to invest substantial sums, as in the case of the COVID-19 pandemic.

However, cynicism toward the hi-tech sector has recently resurfaced, partly through tasteful humor, and partly as a result of being misunderstood and misconceived. This report is designed to explain just how fundamental the innovation

and hi-tech sector is to the growth and prosperity of the Israeli economy and to the country at large.

At times, the word "innovation" evokes a sense of detachment from our daily routines, as if it were part of a cryptic technical lingo known only to a select few living within the narrow confines of the city of Tel Aviv. This report will demonstrate how innovation isn't merely about programming languages or wondrous technology, but rather a complete ensemble of factors that make an extraordinary contribution to society and lead to exceptional achievements in almost all aspects of life in Israel, from improving productivity and social mobility to boosting Israel's image internationally and its national resilience, along with the hi-tech market's great contribution to state revenue and to its outstanding economic achievements.

This report aptly describes hi-tech as 'the national springboard' for good reason. **As an organization that advances this sector, the IATI chose to dedicate itself to writing this report. The report does not seek to glorify the industry. Rather, it conducts an honest assessment of its contribution, and pinpoints where it is that hi tech makes a clear contribution, as well as domains in which its potential contribution hasn't fully materialized.**

Monitor Deloitte conducted the study and drafted the report. Dozens of senior leaders in the hi-tech sector supported this effort, alongside senior figures in academia, government, the media and the public sector who gave interviews used in the report. The research is also based on a comprehensive set of updated reports published by

leading Israeli and foreign organizations, as well as real-time data from professionals in the government, in order to lend validity to the key issues.

Though the State of Israel is considered the nation of startups, everyone knows that we are already the nation of technology, and that, as seen recently, hosting and nurturing large and extensive companies serves as a major driver for growth in each of the aspects mentioned earlier.

Introduction

Substantial challenges jeopardize our ability to maintain and increase the momentum. Thanks to the immense value of local technology sectors, they are receiving astronomical investments from global markets, and the competitiveness of the Israeli hi-tech sector is under threat. Furthermore, educational, academic, and regulatory constraints, as well as insufficient national infrastructure, make it harder to supply the industry with the needed talent and produce large and extensive companies.

The future of the State of Israel hinges on overcoming these challenges. To do so, the government must be brought on board, but that's not enough. The hi-tech sector also plays an important role in contending with these challenges, and it needs to step up to the plate as well. We at IATI are proud to spearhead this effort.

The Israeli and global economies are facing tough times, and the hi-tech industry is feeling the brunt of it. These troubled times have made it harder for companies to raise funds and meet the targets they had set for themselves. Publicly traded companies have experienced devaluation, and the demand for workers has plummeted.

Yet even at a time like this, hi tech companies are engaged in a conversation on furthering national objectives as part of inclusive growth. Now is the time to make the Israeli market more attractive and competitive than ever before.

We must bear in mind that despite the challenges posed by the current economic reality, the Israeli hi-tech industry is still growing. The average annual growth during the five years leading up to 2022 was 21%, and the market has grown by 16% compared to 2020. The hi-tech industry is growing steadily and responsibly, and it will continue leading the Israeli economy forward. Therefore, we must not downplay the role hi-tech industry must play. Instead, we should strengthen the needed infrastructure so that we'll be able to emerge from these rough waters stronger than before and ready to have the industry continue to serve as a national springboard. Long-term business certainty is crucial for ensuring that the hi-tech industry achieves good results and contributes to the economy and society, so that it can continue competing in a challenging global market.

I wish to thank all those who shared their vast knowledge, which contributed to this report, and particularly Monitor Deloitte, which led the research process and the drafting of the report, having been very active in the hi-tech sector and extremely dedicated to its success. I'd also like to thank the members of the steering committee, who represent senior figures in the hi-tech sector and closely supported this process. My gratitude also goes out to over 80 interviewees from various backgrounds and areas of expertise, who contributed to the creation of a comprehensive and in-depth report covering a range of vantage points.

Karin Mayer
Rubinstein,
CEO of IATI

Report methodology

The report on the contribution of hi tech to the State of Israel was drawn up by Monitor Deloitte, and as of now, it will be published annually. This is the most comprehensive report ever created on the contribution of hi tech to Israeli society and the Israeli economy.

The report's findings are based on data published by authoritative sources in the public sector, as well as professional reports published by research institutes, funds and organizations specializing in the hi-tech sector in Israel and hi-tech sectors elsewhere in the world.

This process involved interviewing many dozens of subject matter experts, representing the entire innovation and technology ecosystem in Israel. The list includes the CEOs of Israeli and multinational companies, fund partners, media organizations, academics, research institutes, senior officials in the Israeli Ministry of Finance, directors general of government ministries, and the CEO and director of the Israel Innovation Authority. We consulted closely with the chief economist in the Ministry of Finance, and the report relies on the data she provided, in order to understand how the sector contributed to state revenues. We were also supported by experts from the Aaron Institute for Economic Policy.

The research team was supported by a steering committee chaired by Karin Mayer Rubinstein, which included leading figures in the hi-tech sector (more details on this appear on page 11). This committee provided advice on the research procedure and the insights it produced.

The report was written between May and October of 2022, and it relies on an analysis of long-term trends. Consequently, the main insights reflect the typical state of affairs for the hi-tech sector, disregarding any upheavals that may occur during a particular year.

The report does not address the hi-tech industry's future state of affairs, nor does it analyze potential scenarios and their affect on the current period of time (particularly the financial crisis that is heavily affecting the sector). We'd like to thank all the members of the steering committee and many others who dedicated their time and shared their knowledge. Special thanks to the Aaron Institute of Economic Policy, and specifically to Mr. Shlomo Dovrat and Dr. Sergei Sumkin for their help in keeping the data accurate and refining the insights that served as an important foundation for this report.

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The state of affairs in the Israeli hi tech industry

Technology and R&D Shaping Current Daily Realities

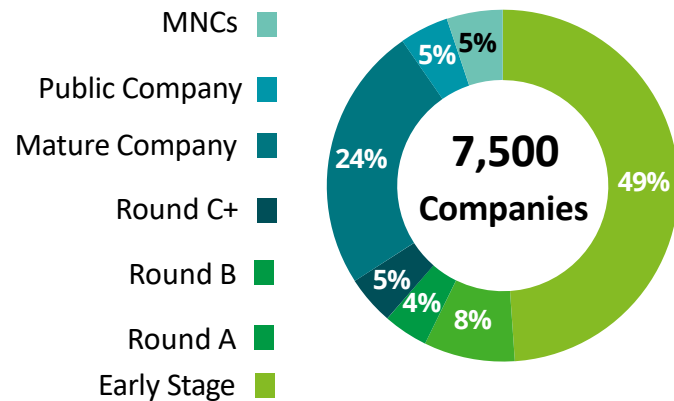
These days, we could hardly imagine a world without technology. Technology is integrated into every facet of our lives – in business, industry, the public sphere, and, of course, in our private lives as well. Every application, piece of software, data network or hardware component begins with R&D processes. These processes don't just spark innovation. They're also ventures that evolve into companies and corporations.

R&D and implementation of new technologies are the hi-tech sector's core activity. This is a well-established and lucrative business segment, but its impact spans over many business segments and can be felt daily by all. It also has the privilege of shaping the public sector.

As of the end of 2021, activities in the hi-tech sector constituted 16.1% of Israel's GDP, and those activities are generated by 11.9% of the workforce whose ages range from 25 to 64, and 10% of the workforce comprised of those aged 15 and above. It involves about 390,000 workers. The sector contains over 7,500 companies of various sizes, operating in various sectors and in diverse fields. This group of companies includes

over 5,000 startups at various stages of maturity, along with about 375 publicly-traded companies and 400 leading multinationals (see Figure 1).

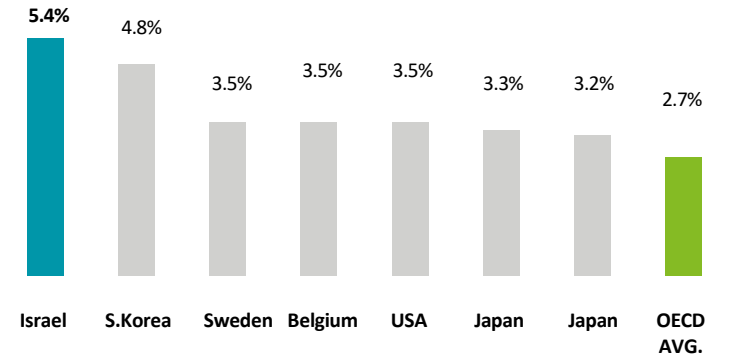
Figure 1: Distribution of hi-tech companies in Israel by life cycle stage



Over the years, this vast activity has resulted in the creation of revolutionary technological developments that have been gaining worldwide recognition, such as personal computer processors, the invention of the Disk On Key, Waze's navigation system, systems designed to enhance road safety developed by Mobileye, and the Iron Dome system.

Israel is the global leader in research and development expenditures as a percentage of its GDP, at 5.4%, ranking above countries with very high investments in technology, such as South Korea (4.8%), and double the OECD average of 2.7% (as of 2020 – see figure 2). This high rate of investment stems from the business sector's substantial investment in R&D and innovation.

Figure 2: R&D intensity: Israel vs. other OECD countries, 2022



¹The Aaron Institute for Economic Policy

²What are the professional skills required of hi-tech workers. The Aaron Institute of Economic Policy, March 2022 roundtable (6)

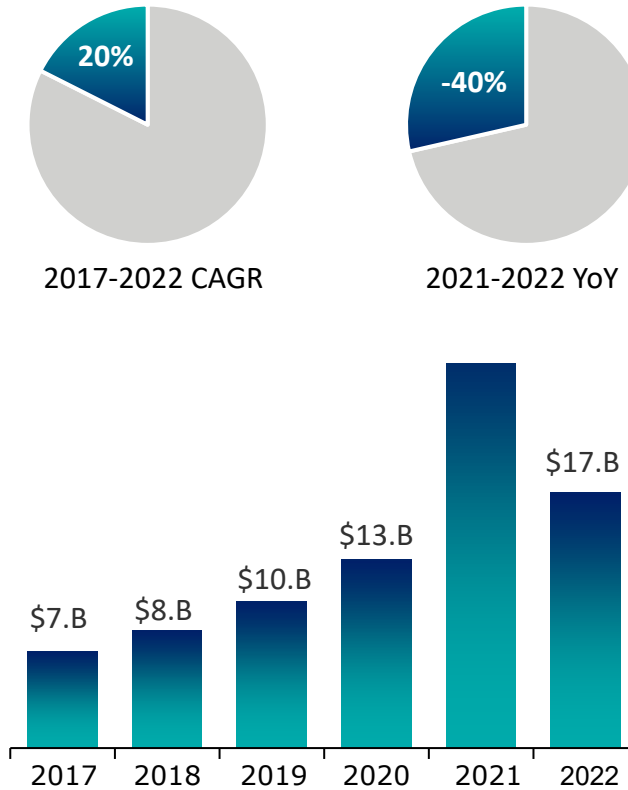
³Interesting Engineering, May 30, 2019

⁴Adapted from OECD data by Deloitte

The Israeli ecosystem stands out in terms of human resources, as well. Israel has a high concentration of skilled and educated workers. As evidenced by the fact that Israel has the highest percentage of scientists and engineers per capita in the world, and the highest ratio between the number of university graduates and the number of academic publications. Israel is also strongly positioned in terms of the number of patent applications submitted, and in 2019, it had the fourth highest number of employees, and ninth-highest number of researchers, with respect to its population.⁶

In recent years, hi tech has been experiencing accelerated growth, characterized, among other things, by a sharp increase in the amount of money raised by technology companies. Beginning in 2016, fundraising volumes have risen at an annual rate of 40%, peaking in 2021, with investments totalling \$26 billion. However, capital raising in the sector has slowed during 2022 due to market stagnation and drops in the stock markets. In 2022, the sector raised a total of \$17.1 billion, reflecting a 40% drop compared to the previous year.⁸ These drops typify technology markets worldwide, and greatly affect the sector's activities. Nonetheless, it should be noted that the upward trend has continued, if we disregard 2021, and even though the hi-tech sector entered a tailspin necessitating a response and preparations, it is still a strong and significant sector in the economy. The impressive growth of seed investments serves as further evidence of the robustness of the hi-tech sector, even at a time like this. In spite of the complex business environment, seed investments grew by 22% during 2022, when compared to 2021.

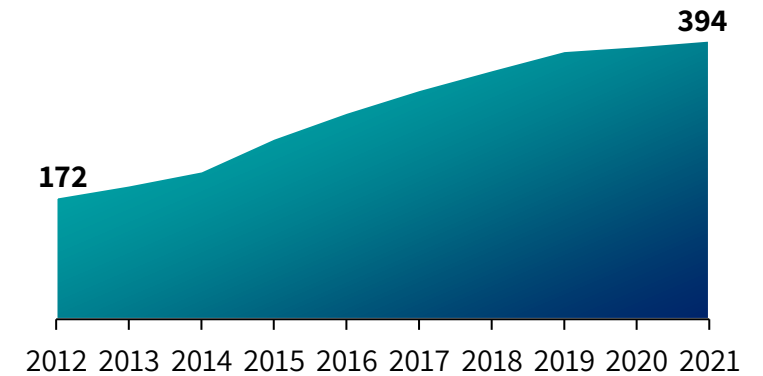
Figure 3: Fundraising volume for Israeli hi tech



⁹ Analysis of the R&D centers of multinational corporations in Israel, Dun & Bradstreet, 2021 Report by the Israel Innovation Authority (32)
¹⁰ R&D Centers, the Ministry of Economy & Industry (3,9-10)
¹¹ The Israel Innovation Authority

Thanks to the uniqueness and technological leadership of the Israeli ecosystem, about four hundred multinationals made Israel a strategic destination for establishing R&D centers, making Israel the country with the highest percentage of R&D centers per capita in the world. For example, Israel took pride in hosting Microsoft's first R&D center outside of the United States, and Apple's largest R&D center outside of the United States.

Figure 4: The number of R&D centers opened by tech multinationals in Israel has more than doubled in the past decade

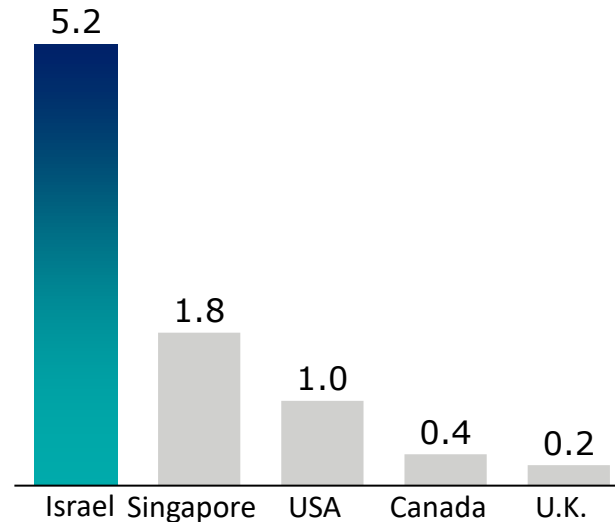


⁵ Data from the OECD
⁶ Final report on Israeli R&D output, the Samuel Neaman Institute
⁷ Bank of Israel data, Aaron Institute of Economic Research conference, June 7, 2022
⁸ Viola – 2022 EoY Report
⁹ 2022 Report: Israeli Tech Ecosystem

From a startup nation to a nation of growth companies

As the local hi-tech sector matures, Israel has not only focused on startups. In recent years, Israel went from being a startup nation to a scale-up nation, with the emergence of local megacorporations joining a long list of mature and established companies that had developed in Israel over the years. Another 42 Israeli companies became unicorns during 2021, including private companies with a valuation of over a billion dollars, such that currently, in Israel, there are 92 unicorns – a disproportionately high number for a country of its size. In 2021, Israel had the highest number of new unicorns in the world, at a rate of 5.2 new unicorns per one million inhabitants, far surpassing Singapore, which ranked in second place.

Figure 5: The five leading countries in number of new unicorns per one million inhabitants in 2021:



The number of unicorns in Israel grew significantly in recent years. For comparison's sake, in 2020, there were only 19 unicorns in Israel.

This trend is a clear testament to the maturation of Israeli companies and the ecosystem's development. A growing number of technology ventures are evolving into significant companies whose headquarters are in Israel – companies that employ the full gamut of roles typically found in a business corporation.

The maturation process that the sector has gone through, in which startups become "full-fledged" companies, has a significant and broad affect on the economy. Naturally, the availability of investment capital over the past two years greatly contributed to the surge in the number of unicorns. Similarly, market trends in 2022 are expected to substantially slow the creation of new unicorns in Israel and abroad, affecting the degree to which companies can grow their human resources.

However, despite the market volatility of the past few months and the drops in the Israeli and international stock markets, in the long run, the growth of larger larger companies in the local hi- tech market with extensive volumes of activity is expected to continue. Moreover, in the past, after waves of contractions, the market showed clear and steady signs of growth once more, and according to senior experts in the field, we may see quite a few Israeli companies reach valuations of \$25-50 billion or more by the end of the decade.

An impressive number of companies are becoming unicorns, with an equally impressive number of companies leaving this prestigious club to go public. During the past five years, not only did the number of issued companies increase – their valuations increased as well. In 2021, which was an unprecedented record year, 21 technology company IPOs were conducted, raising over a billion dollars. The total number of IPOs in 2021 was 72, with an overall valuation of about \$70 billion.

¹⁵"\$82 billion exits: Israeli hi-tech continues breaking records in 2021", Yediot Achronot, 15.12.2021

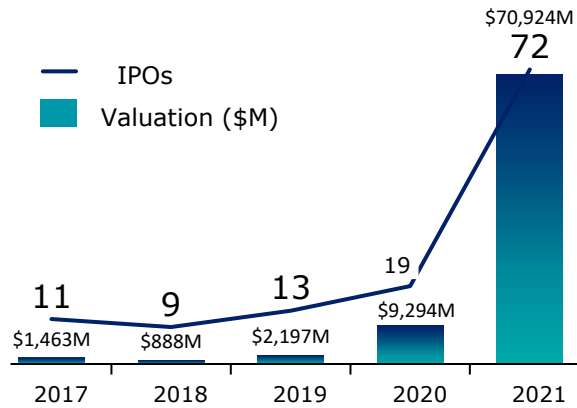
¹³Tech Aviv

¹⁴The 2021 Exit Report

¹⁰R &D Centers, Ministry of Economy & Industry (3,9-10) Tech Aviv ¹¹

¹²Viola Ventures report for 2021 (18)

Figure 6: Increase in the number of IPOs and IPO valuations: 2017-2021



These figures position Israel in third place in the global ranking of companies traded on NASDAQ, just after the United States and China.

In recent years, despite the maturation of the Israeli hi-tech industry, there has been a decline in the number of new startups established. According to data from the Israel Innovation Authority, 520 startups were opened in 2020 – a third of all companies opened in 2014.

Unicorns

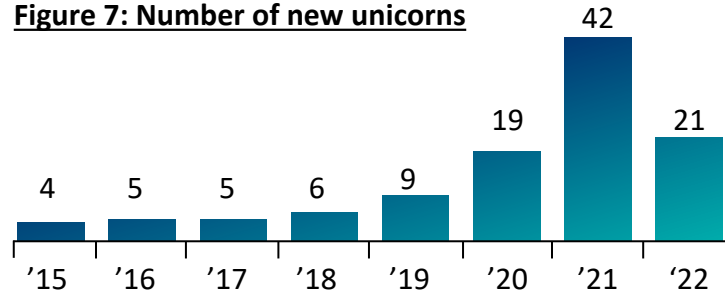


#1
Unicorns
per capita



92
Currently
active

Figure 7: Number of new unicorns



How do we define hi tech?

The extensive impacts of the world of technology, and the development of specific uses and applications responding to various needs, has led to the emergence of specialized technology sectors that integrate technological uses with defined market characteristics such as fintech, agrotech, foodtech, and medtech.

As the distinctions between technology companies and standard business corporations fade, having a conversation on how to best the hi-tech sector in Israel and across the world becomes increasingly important, since hi tech leads the way for other parts of the economy, and the more universally available technology

becomes, the blurrier the boundaries between specific sectors, and the more technical professionals become integrated into all other sectors of the economy.

Companies tend to be defined as hi-tech companies as a function of how much R&D they do, that is, their level of innovation and how central that innovation is to the company's activities. The hi-tech sector can be categorized into two main activity segments: services and industry. The industry segment includes pharma and the manufacture of medications, computers, electronic and optical equipment, aerial vehicles, space shuttles and electronic accessories. The service segment includes companies engaged in fields like computer programming and IT services, data processing, storage, ancillary services, websites and R&D centers, including natural science and engineering centers. The service segment has been growing in recent years, and currently accounts for over 70% of the hi-tech sector (in terms of the number of employees). Essentially, the trend has reversed in the past few decades. Hi-tech in Israel, which was once centered on industry, has shifted its focus to the service sectors. In the past four years, the number of people employed in the service sectors grew at an annual rate of 10%, while the number of people employed in industry sectors decreased, so the service sectors are the source of increases in the number of people employed in hi tech.

¹⁷ The definition of hi tech appearing in the Central Bureau of Statistic's website.
¹⁸ 2021 Innovation Authority (29)

¹⁶ U.S. Department of State

Figure 8: Number of people employed in hi-tech (in thousands), broken down by service and industry segments

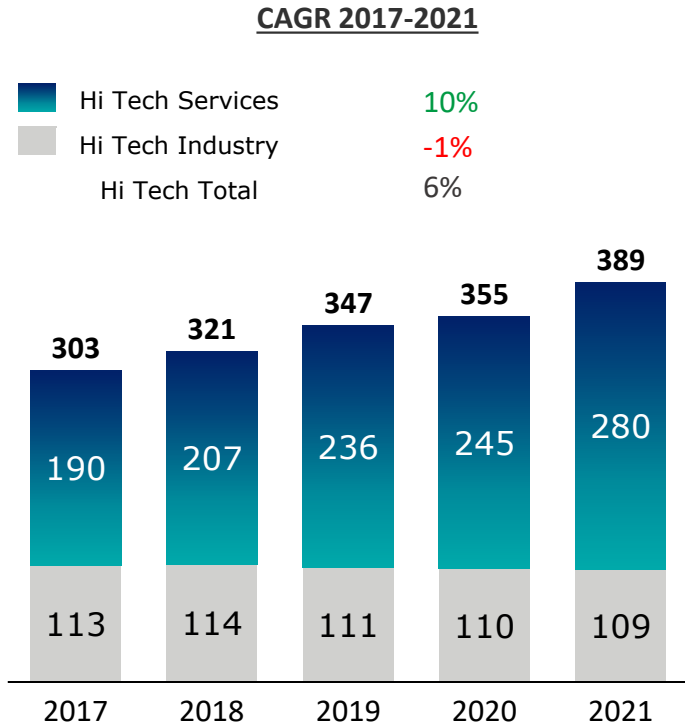
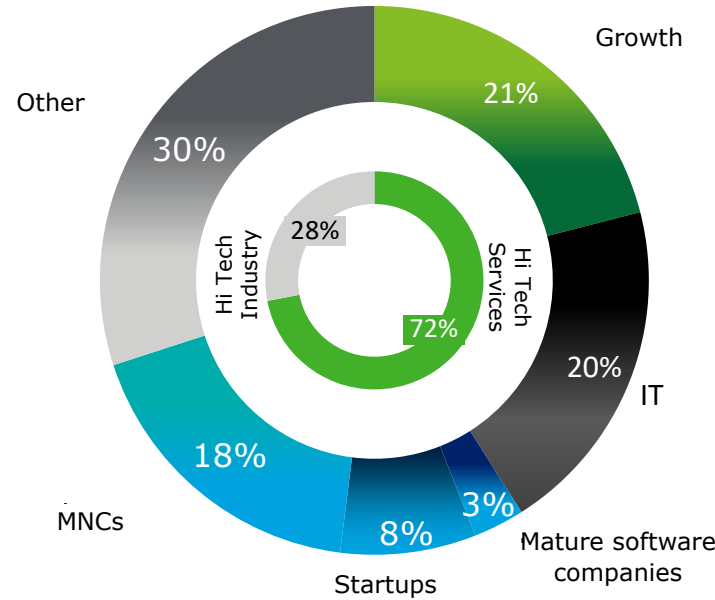


Figure 9: Breakdown of hi-tech workers by company type, comparing the service and industry segments



With the growing need for technology and technological infrastructure, companies that are not part of the hi-tech sector are employing technology workers. A closer look at the number of technology workers in Israel reveals a much broader picture. In 2021, 452,000 people were employed in technological roles in Israel, representing about 14% of Israel's workforce.

This report does not include technology workers employed in other Israeli industries, such as banking and finance, in the total number of hi-tech workers, unless stated otherwise.

The goal of the report

The hi-tech sector is a strategic asset that substantially affects the Israeli economy on many levels. Quantifying its impact is complicated, but it is vital to do so, given how important the sector is to economic prosperity in Israel. The goal of this report is to identify, clarify, and assess high tech's contribution to Israel's economy, both qualitatively and quantitatively.

The report evaluates the hi-tech sector's impact on the Israeli economy on several levels: its direct and indirect contribution to the Israeli economy, its contribution to the country's national resilience, the improvement of work productivity in Israel, and its impact on changes occurring within the sector itself.

The report also discusses the sector's contribution to other sectors and its characteristics as a springboard for social mobility. Part of the report will also address various aspects of the sector's negative impacts on Israeli society. We will map the main challenges and obstacles that the Israeli economy must overcome to maintain hi tech's position as its primary growth engine.

The assessment is based on a generally-accepted methodology for assessing economic impact, surveys, comprehensive interviews with dozens of senior figures in the Israeli ecosystem, and reliable sources of public information. The report was written between May and October of 2022, and it presents an economic snapshot for 2021, as well as a description of the sector's overall contribution, taking a long-term view.



The multi-dimensional contribution of the hi-tech sector

The Israeli hi-tech sector's contribution can be assessed in several ways. The sector's unique characteristics – scope of activity, company type, entry requirements, work conditions, and its model of operations – make it central to the Israeli economy, as well as a major innovation engine for large swathes of the economy. The major economic benefits to the industry also present enormous potential for contending with serious challenges, such as social mobility and preserving the innovative ecosystem, so that the Israeli economy can continue developing.

To reflect a holistic picture of hi tech's contribution to the country, this report examines the sector's role as a national springboard serving as a central economic growth engine for the entire Israeli economy – and one that also boosts national resilience and social mobility. The hi tech sector's contribution and impact can be assessed within five different spheres of influence:

- Hi tech companies' **economic** activity
- **The innovation ecosystem** – A flywheel that ensures continued innovative activity and future growth
- **National resilience** – Branding, positioning, and establishing national infrastructure
- **Other industries** – Improving competitiveness and progress
- **Society** – Inclusive growth and social mobility

To assess these contributions, the report focuses on an analysis of three dimensions: a quantitative analysis of its economic contribution, a qualitative analysis of its contribution to the economy, Israeli society and the country at large, in a number of important categories, and an analysis of the challenges currently facing the sector, which pose a risk to its ability to continue acting as a major national springboard.

The hi tech sector's economic contribution to the Israeli economy relates to three important economic parameters. These parameters exist in parallel (and, at times, they overlap, as well), but each of them has a different significance and different implications for the State of Israel's economic character. These contributions stem directly from the activities conducted by hi tech companies in Israel, along with the indirect contribution from driving the auxiliary goods and services economy.

The hi tech sector's qualitative contribution is significant for the entire population and for the industries operating within it. Hi tech activity creates jobs in technological and non-technological fields, with wages and productivity levels that are higher than the national average. The sector is an important part of national resilience, thanks to its contribution to economic stability during times of crisis and at routine times as well. It has a key role to play in the State of Israel's diplomatic ties, and it positions Israel as a technological powerhouse on the international stage. Hi tech contributes to other industries by training a technological workforce that all industries increasingly need, through collaboration, and by creating infrastructure. Moreover, the hi tech sector is truly a springboard for social mobility, particularly for advancing underrepresented populations in the general workforce, and more specifically, in the hi tech sector. Finally, the hi tech sector is also instrumental in keeping innovation going, by training human resources, making investments, and creating tools.

Finally, this report will also cover the challenges of fulfilling this potential contribution, both today and in the future. These challenges relate to the infrastructure required for ensuring that the sector continues functioning as a national springboard in the distant future as well. Notably, a number of different actors must be involved when tackling these challenges, primarily the public sector. However, the hi tech sector is also responsible for successfully contending with these challenges by committing itself to taking action and collaborating with the relevant stakeholders.

The hi tech sector is a central economic growth engine for the entire Israeli economy, one that both boosts national resilience and social mobility



The flywheel of the innovation ecosystem

- Training human capital for the industry
- Encouraging investment (CVC & VC)
- Ties between the industry & academia
- A springboard for future entrepreneurs & creating an advanced management standard



The contribution to other industries

- Training and promoting a technological workforce
- Adopting technologies and innovation, and boosting competitiveness
- Developing infrastructure and technological tools
- Creating a management standard and serving as a source of inspiration



Inclusive growth and social mobility

- A true opportunity for social mobility
- Encouraging groups with inadequate representation in the labor force to work in a highly productive industry



A substantial part of national resilience

- Economic stability at times of crisis
- Strengthening diplomatic ties
- International branding and positioning
- Contributing to security & defense
- Stemming the brain drain



Boosting employment and productivity

- A larger workforce in the sector with the potential of earning large salaries
- Increasing productivity in Israel, and reducing the gaps vis-a-vis the other OECD countries

Israeli hi tech as a growth engine for the economy: The economic contribution of the hi tech sector

The widespread view of the Israeli hi tech as a growth engine for the economy is well-founded on key macroeconomic data that reflect the sector's direct impacts on the Israeli economy.

Hi tech's significant contribution to the GDP and to reducing productivity gaps between Israel and other developed countries are major drivers of economic growth in the State of Israel. Furthermore, about 12% of the labor force in Israel (aged 25-64) earn their livelihood directly from the hi tech sector, earning salaries that greatly exceed the national average.

The hi tech sector is also a key component of state revenues, and is expected to become even more central in the future. The sector's relative contribution to state revenues is significantly greater than its relative share of the population.

This contribution also manifests in establishing the state's ability to invest in substantial infrastructure, like education, transportation, telecommunications, security, and to reduce social gaps. Regarding its contribution to state tax revenue, the contribution is estimated at 50-60 billion ILS. Additionally, its contribution to exports was about \$67 billion (~54% of total exports) in 2021.

The hi tech sector's total contribution to the GDP is estimated at about 310-360 million ILS, of which 240 million ILS stem directly from the sector's activities, with the indirect activities of its supply chain accounting for the remainder.

Figure 10: The hi-tech sector is a growth engine for the Israeli economy and makes a major contribution

240

billions of ILS

The hi tech sector's direct contribution to the GDP in 2021 (~16% of the GDP)

45%

of growth

Between 2017-2021, 45% of GDP growth in Israel originated in the hi tech sector

50-60

billions of ILS

State revenue from the taxation of the hi tech sector: ~34% of employee income tax, and ~65% of total individual taxes

310-360

billions of ILS

Hi tech's total contribution to the GDP, including the indirect contributions

67

Billions of USD

Hi tech exports: ~54% of total exports in Israel



Hi tech as an engine for economic growth

Economic growth is the expansion of a market's potential to produce or consume products, which generally leads to an increase in the country's economy. It generally relates to the behavior of the national economy, i.e. the aggregate performance of all sectors of the economy. This growth is measured using the gross domestic product (GDP), a central measure used in economics.

Assessing the hi tech sector's economic contribution to the Israeli economy and the country's economic growth begins with assessing its contribution to the GDP. The contribution of hi tech companies is not limited to the direct impacts of their financial activities. It also includes the indirect impacts that result from the spread of their financial activity into other sectors of the economy. This permeation includes the activities of companies that provide services to the hi tech sector and how the economy benefits from hi-tech employees' available income. Economic studies conducted around the globe reveal that the indirect contribution resembles the sector's direct contribution, and even surpasses it.

The analysis of the economic contribution to the GDP relies on impact analysis, an accepted economic methodology for analyzing economic impact. Leontief's input-output model defines three sources of economic impact: direct impact, indirect impact, and induced impact (see Figure 12).

The first source – direct impact – includes the added value of companies that belong to the sector, which is added to the gross domestic product. The added value reflects the output of the goods and services net interim consumption (i.e. what needs to be spent in order to create the output). The second source – indirect impact – reflects the impact of the hi tech sector's activities on other industries in Israel, expressed through the interim consumption in the supply chain, from raw materials to fine dining and janitorial services.

The last source – induced impact – measures the increase in household incomes that leads to increased private consumption, more household purchases, and more taxes paid by households.

In this report, conservative estimates were used to calculate the hi tech sector's economic contribution. Though we recognize the existence of induced impacts stemming from an increase in available household income, only the direct and indirect impacts were used to calculate the sector's total contribution (i.e. two of the three impact sources), which mainly relate to the sector's impacts on service providers and the supply chain.

The hi tech sector's direct contribution is about 240 billion ILS

Hi tech is an important component of Israel's business output. According to data from the Innovation Authority and the Central Bureau of Statistics, in 2021, 16.1% of the GDP, or 240 billion ILS, stems directly from the hi tech sector. The hi tech sector's contribution to the output has grown rather consistently in recent years. In the past five years, the output of Israeli hi tech has grown by an average annual rate of nearly 11%, contrasting with the much lower growth rate of the other sectors of the Israeli economy (4%).

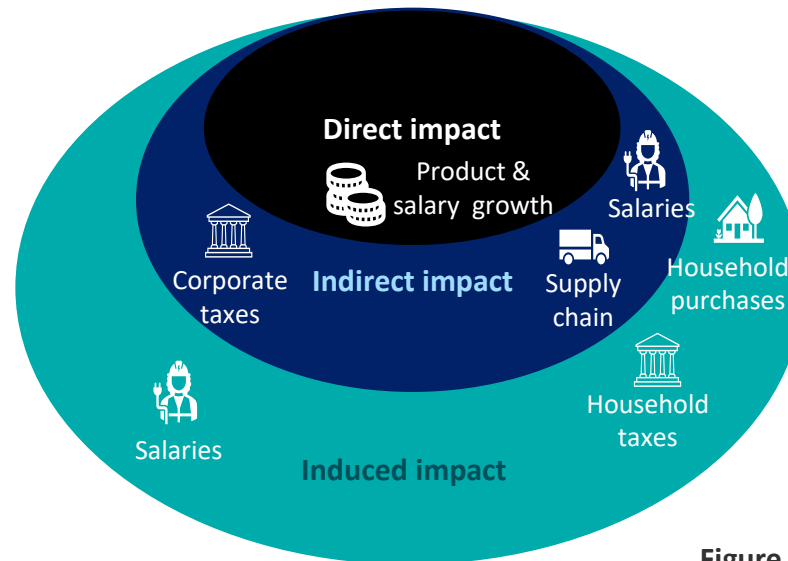
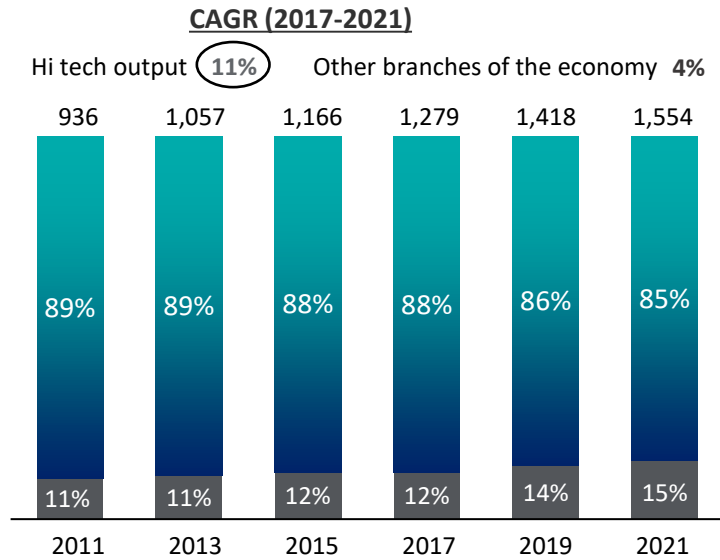


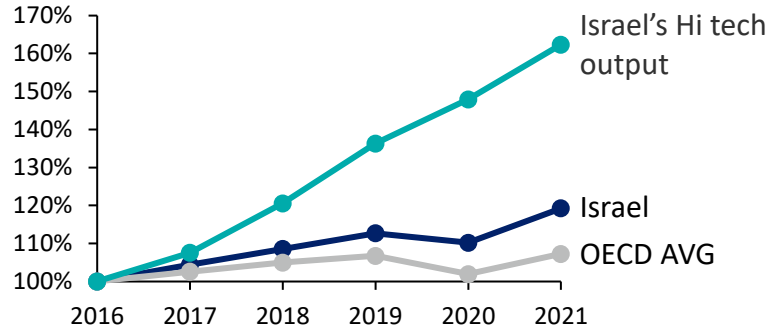
Figure 11

Figure 12: The increase in hi tech output vs. the increase in the other sectors (in billions of ILS), 2011-2021:



In the past few decades, the State of Israel has experienced impressive economic growth that surpassed the OECD average. Between 1995 and 2016, Israel's average annual GDP growth was 3.9%, vs. just 2.2% in the OECD countries. This gap widened in recent years, which saw significant growth in the hi tech sector. The average annual growth of Israel's GDP between 2017 and 2021 was 3.6%, vs. just 1.4% in the OECD countries.²⁰

Figure 13: The GDP growth rate in Israel and in OECD countries, and the output of hi tech in Israel, 2017-2021:



The hi tech sector is growing faster than the rest of the commercial sector, so it can be seen as a significant part of economic growth. Hi tech more than doubled its share of the GDP in 2011, and the relative share grew from 10% to 15% (and 20% of the GDP from businesses).²¹

The hi tech sector's contribution to growth (2021 prices, in real terms) between 2017 and 2021 is much greater than hi tech's relative share of the GDP. If we were to multiply the hi tech sector's average share of the output between 2017-2021 (14.2%) by the average growth of hi tech output during that period (10.4%), we'd end up with a total contribution to the output's annual growth rate of 1.5%. Given that the average growth of the GDP in Israel during those years was 3.4%, one can conclude that **the hi tech sector accounted for about 45% of total economic growth in Israel between 2017-2021.**

²⁰ Aggregate activity: GDP and employment, the Bank of Israel, 2021 (5)
²¹ 2022 Innovation Report (12)

The hi tech sector relies mainly on a workforce of employees aged 25 and above, while employees of other sectors of the economy are aged 15 and up. Thus, we can state that the estimate provided above for its substantial share of the contribution to the GDP (~45%) is lower than the actual share, and if we were able to make a more accurate calculation that takes employee age into account, we could expect an even greater rate for its contribution to growth.²²

An earlier assessment of economic growth would present a slightly different outlook. Between 2004 and 2017, hi tech's growth rate resembled that of the entire economy. The significant rise in the number of academic hi-tech occupation employees makes hi tech the growth engine, with substantial surplus growth.

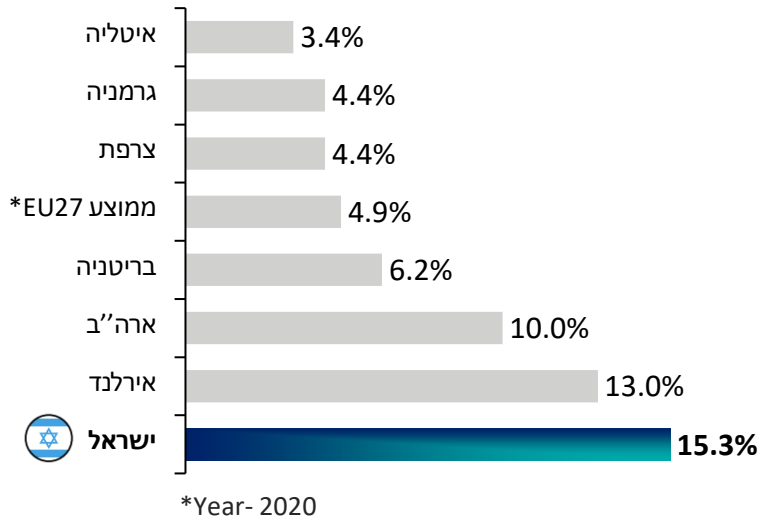
Growth over many years now positions Israel among the top twenty economies in terms of GDP per capita, with a GDP per capita of almost \$58,000, placing ahead of older, developed economies like the U.K., France and Japan.²³

²² Data from the Central Bureau of Statistics

²³ IMF Data, 2023, GDP per capita, current prices, 2023

This situation, in which the hi tech's share of the contribution to the GDP is so high, is unique to Israel. In Israel, the share of the GDP from hi tech is among the highest in the world, surpassing the United States, where it's about 10%.^{24 25}

Figure 14: Hi tech's share of the GDP, international comparison, 2019



The hi tech sector's indirect contribution to other industries is estimated at 70-120 billion ILS per year, which is reflected in its annual contribution to the GDP.

The hi tech sector's direct purchases from local vendors drive a series of purchases throughout the vendors' value chain, which creates value for the economy in a wide variety of sectors. This "rollover" value drives the economy, and it is much greater than impact measured according to the companies' actual expenditures. An input-output model is traditionally used to assess the impact on the entire economy that stems from the added value produced directly by a particular industry. The multiplier is an expression of contributions in the economy resulting from the activities of hi tech companies.

Using the multiplier to quantify economic contribution is a commonly accepted methodology for impact analysis on investments in the economy, found in studies and articles published by states and universities. Moreover, it can be found in many studies conducted to gauge the impact of investments made by foreign companies in local economies. Examples include a study published in *Copenhagen Economics*, which examined the impact of Google's expansion of their plants in Belgium in 2015, or a Deloitte study that examined Facebook's impact on the global economy. In all of those guides and studies, the authors understand that the activities conducted by hi tech companies in the economy have indirect impacts, as local sourcing drives a broader contribution to the economy.

The value of the indirect multiplier (which includes the direct and indirect contribution) will generally be a number greater than 1, since it represents the overall value of the contribution, and its future and rollover potential. For example, a multiplier value of 1.8 indicates an 80% increase to the company's direct contribution. When just the "indirect impact" multiplier ranges among OECD countries were examined, it turned out that the range of values was between 1.2 and 1.9. A number of studies sample these indirect impact ranges, including Intel's 2018 report, which estimates the multiplier in different geographies. According to that report, the indirect multiplier for the company's added value is as follows: The United States – 1.39, Europe – 1.36, Latin America – 1.67, and Asia – 1.7.²⁶









The multiplier is expected to vary in accordance with the assessed geography and industry.²⁷ The smaller the geography in which the impact is assessed, the lower the multiplier is expected to be. That is because in a large economy, most of a company's procurement will be through local vendors, while many purchases from foreign companies will be done in smaller economies, such that this value will "leak" into other countries. Moreover, there are industries that rely more on the local economy for raw materials and human resources, and there are those that rely more on imports. Usually, capital-intensive industries rely more on imports. Since the State of Israel is a relatively small country with a heavier orientation towards a service industry (and less oriented to a capital-intensive industry), the multipliers are not expected to be on the high end of the scale, and range from 1.3 to 1.5.

²⁶ Intel, "Global economic impact and supplier diversity report", 2018

²⁷ Wayne P. Miller, "Economic Diversity Report"

²⁴ Data from Statista

²⁵ Eurostat data and Deloitte analyses

		Total	Induced	Indirect
Findings from the Samuel Neaman Institute for National Policy regarding Intel Israel's impact on the local economy, 2018		x0.95	x0.70	x0.25
An Intel study on economic impact and supplier diversification, 2018		-	-	x0.39 (United States)
In the U.S. <i>The Economist's</i> research division found that a similar figure had existed when assessing the software industry's economic impact, 2019		x1.0	-	-
Report on the consumer technology sector's economic contribution, 2019		x1.16	-	-
A study that quantifies the indirect impacts of the hi tech sector on the Australian economy, 2021		x1.2	-	-
A study on the impact of a Google server farm in Belgium, which is similar in size to Israel, 2015		x1.2	x0.80	x0.40
A report published by the University of Utah, which assessed the hi tech sector's total indirect and induced contributions to the GDP of the state of Utah, 2019		x1.3	-	-
An Oxford Economics report on the contribution of Google's server farm to the American economy, 2018		x2.3	x1.05	x1.25

As stated, the report takes a conservative approach to calculating the hi tech sector's economic contribution, and does not include the indirect and induced impact components. The hi tech sector's direct and indirect impacts are more substantial, so it follows that adding the induced impact would strengthen this contribution.

Figure 15: Studies in Israel and abroad have shown that the multipliers of hi tech's indirect and induced impacts on the GDP range from 1-2, compared to the direct contribution

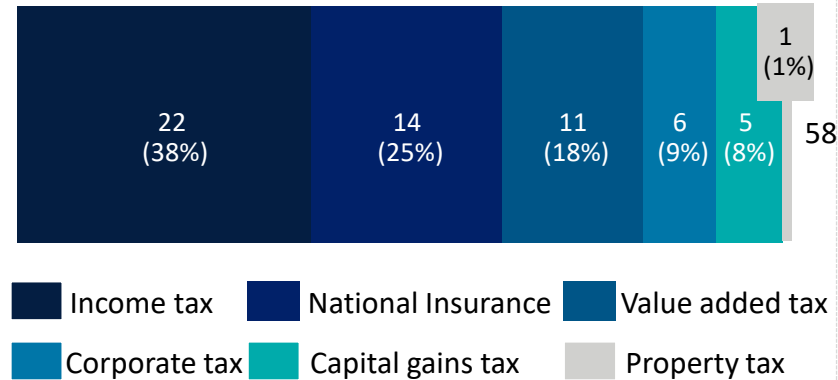
Multipliers: How Communities Can Use Them for Planning

The hi tech sector is increasing state revenues

Another dimension to assessing the industry's economic contribution is its contribution to state revenues. Contribution to revenues is very important, since it is what ultimately determines the size of the budget, the investments in development zones and infrastructure, and the country's debt and deficit.

The analysis of state revenues from hi tech assesses the direct revenues resulting from the activities performed by the workers and companies in the hi tech sector, and the indirect revenues resulting from the activities of companies that are part of their supply chain. These revenues include various taxes, mainly income tax, corporate tax, capital gains tax, value added tax, and property tax. When factoring in these types of taxes and the direct and indirect contributions, **the hi tech sector's overall contribution to state revenue is estimated at about 58 billion ILS, as at 2021.**

Figure 16: State revenue from the hi tech sector, by tax type, as at 2021 (billions of ILS):



Hi tech employees contribute nearly three times as much income tax revenue relative to their share of the country's population of employees

According to data from the Ministry of Finance's Chief Economist Division, in 2018 and 2019, hi tech employees accounted for 26% and 27%, respectively, of the total income tax received from employed workers in Israel. Considering that the total tax income deductions for employees in 2019 was about 61 billion ILS, the contribution of hi tech employees that year was about 16.4 billion ILS.²⁸

³⁰ Central Bureau of Statistics, "Table of salaried positions and average wages", 2022

Hi tech's contribution to income tax revenue has grown in recent years. This could be attributed to an increase in their relative share of the workforce, which is now 11.9%, compared to just 9.2% in 2019, and the increase in the average monthly salary of hi tech workers, which rose from 23,545 ILS in 2019 to 26,494 ILS in 2021.³⁰ This translates to an average annual growth rate of 16%, resulting in **22.1 billion shekels** in income tax revenues for 2021. In a similar calculation of income tax revenue from the entire economy in 2021, the relative share of the hi tech workers is 34%. Here, it is important to note that this estimate only relates to employees, and that it does not include the contribution of freelance hi tech workers to income tax revenue.

In 2019, the average monthly wage in the hi tech sector was 23,545 ILS, and hi tech workers were responsible for about 27% of all income tax revenue. In 2021, the average monthly wage of a hi tech employee was 26,494 ILS, and presumably, today, the relative contribution of hi tech workers to Israel's overall employee income tax revenues is nearing 34%.

Hi tech workers contribute about 14 billion ILS every year in national insurance payments.

According to data from the Ministry of Finance, hi tech's contribution to national insurance revenue collected in 2019 was 10.6 billion ILS. Similarly to how income tax is calculated, assuming growth in both average wages and the number of employees, one can presume that in 2021, state revenue from national insurance payments were **14.4 billion ILS.**

²⁸ Data from the Chief Economist Division at the Ministry of Finance
²⁹ "Report on Human Resources in the Hi Tech Sector", the Innovation Authority, 2020

A constantly increasing number of hi tech exits increases state revenues from capital gains tax

Other than income tax, hi tech employees pay capital gains tax. The substantial number of exits, which has surged in recent years, has led to higher state revenues from taxes directly tied to hi tech's human capital.

According to the Ministry of Finance's Chief Economist Division, in 2019, state revenues from individual hi tech employee option deductions amounted to 1.2 billion ILS. A substantial increase to state revenues from capital gains tax and income tax from individuals and corporations, and from deductions through trustees, occurred between 2019 and 2021. In 2019, the total taxes collected was estimated at 5.9 billion ILS, versus about 12 billion ILS in 2021.

To reach an estimate of option deductions from individual hi tech employees in 2021, we likewise assume that the tax that was levied is double the 2019 amount, reaching approximately 2.4 billion ILS. Despite the substantial fluctuation between the relative weights of individual capital gains tax revenue and corporate capital gains tax revenue in the overall capital gains tax revenue over the years, the total taxes levied in the past five years has remained rather constant for both. Therefore, to reach a total estimate, we'll assume that the capital gains tax levied from companies was about 2.4 billion ILS – like that of individuals. According to this data, one may presume that total state revenue from capital gains tax in the hi tech sector, levied from individuals and companies, was approximately 5 billion ILS in 2021.³¹

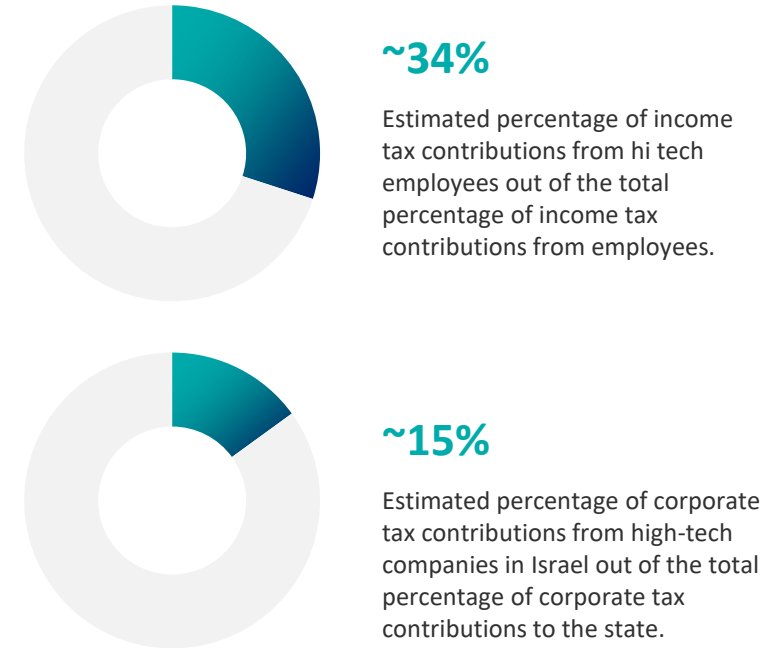
The hi tech sector accounts for 10-15% of state revenues from corporate tax

Corporate tax is calculated based on companies' net earnings. In the hi tech sector, there are a number of classifications, based on various tax tracks and other properties of companies. According to the various tax tracks³², companies whose total revenue during the relevant fiscal year exceeded 10 billion ILS pay 6% corporate tax, while small hi tech companies and startups pay a corporate tax rate of 12% (or 7.5% for productive, exporting technology companies whose manufacturing centers are located in Jerusalem or in the periphery).

According to data from the Ministry of Finance, the total contribution of the hi tech sector to the country's corporate tax revenues was 5 billion ILS in 2019, or 12.5% of the total corporate taxes collected that year. Assuming that the increase in corporate tax is similar to the growth rate of the GDP (an annual growth rate of 9% between 2019 and 2021), one could estimate hi tech's contribution to be about **5-6 billion ILS** in 2021.

This assessment is consistent with the Innovation Authority's assessment, which stated that the sector's share of state revenue from corporate tax is comparable with its share of the GDP.³⁶

Figure 17



~34%

Estimated percentage of income tax contributions from hi tech employees out of the total percentage of income tax contributions from employees.

~15%

Estimated percentage of corporate tax contributions from high-tech companies in Israel out of the total percentage of corporate tax contributions to the state.

³¹ Calcalist, Aug. 8, 2022: Data from the Chief Economist Division at the Ministry of Finance

³² Encouragement of Capital Investment Law of 1959

[32 Corporate tax, the Knesset Research and Information Center \(5\)](#)

[36 2021 Innovation Authority Report \(33\)](#)

The more the local hi tech sector matures, and the more that large and integral companies are founded, the more the State of Israel benefits from the increase in corporate tax revenues, and most importantly, from the increase in the number of hi tech workers. This increase is important, since most of the tax revenue stems from individual taxes, and not necessarily from corporate tax. For example, in 2019 and in 2020, state revenue from individual income tax was twice as much as state revenue from corporate tax: in 2019 and 2020, income tax accounted for 6.3% and 6.6%, respectively, of total state revenue, as compared to corporate tax, which accounted for only 2.8% and 3.1%, respectively, of state revenue during that time.³⁷

Hi tech's contribution to property tax

As of 2019, corporate property tax was about 14.8 billion ILS, or 21% of the total sources of income of all municipalities in Israel.³⁸

Certain municipalities in which substantial hi tech activity is performed have a separate category for hi tech companies in the property tax ordinances that they enact. In these municipalities, hi tech companies, including service companies, are categorized as industry, which is, relatively speaking, in the lowest bracket for business property tax payment. This policy stems from the desire of the municipalities to attract Israeli hi tech firms to their jurisdictions.

³⁷ ["Report of the State Revenue Administration for 2019-2020", the Ministry of Finance, Chief Economist Division \(8\)](#)

³⁸ ["Municipalities, central government, and everything in between: Where is the money?", Kohelet Policy Forum, February 2022](#)

In late 2021, the average monthly salary for hi tech employees was 26,494 ILS.⁴⁴

For example, in Tel Aviv, hi tech companies are categorized as "software companies", and pay 167 ILS per square meter per year.^{39 40} In other cities in the center of the country with a high concentration of local hi tech companies, the annual property tax per square meter for hi tech companies is also in the lowest bracket, even lower than Tel Aviv. For example, the maximum tax rate in Raanana is about 158 ILS per square meter per year, while in Herzliya, the tax rate is about 143 ILS per square meter per year.⁴¹

Other cities in the periphery, like Haifa, or Kiryat Gat, a city that hosts Intel Israel, which employs thousands of workers, tend to have lower property tax rates for businesses classified as "industry", when compared to cities in the center of the country.^{42 43}

The sector's contribution to municipalities' business property tax revenue, as at 2021, is estimated at about 760 billion ILS per year, as illustrated in Figure 20.

³⁹ [Tel Aviv Municipality, 2021 Property Tax Ordinance](#)

⁴⁰ [Haaretz, June 4, 2022](#) ⁴¹ ["Finance Ministry officials want to double property tax for hi tech companies", Globes](#)

Figure 18: Key information for calculating property tax payments in the hi tech sector:

Company type	No. of employees	Square meter per employee	Property tax per year per square meter	Total (millions of ILS)
Services	280,000	12.5	165 ILS	577.5
Industry	109,000	15.5	110 ILS	185.8
				763

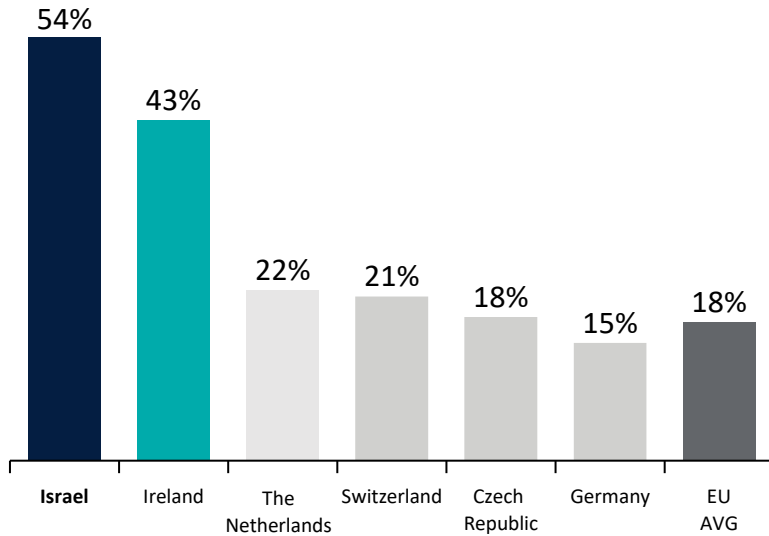
The contribution of hi tech workers to value added tax (V.A.T.)

The hi tech sector also has induced impacts stemming from the increased income of Israeli households resulting from rising employment rates, a thriving hi tech sector. This affects household purchases and increases private consumption.

An assessment of the hi tech sector's contribution to value added tax would also address the increase in consumption solely from hi tech workers, without factoring in the V.A.T. from the increased consumption of other third parties that benefit from hi tech activity in Israel. Still, one can make the general assessment that hi tech makes a substantial indirect contribution to state revenue from V.A.T.

In 2021, hi tech exports exceeded 50% of total exports for the first time, reaching 54% of total exports,⁴⁷ whereas they had only accounted for 34% of total exports as recently as a decade ago.⁴⁸ This data positions Israel as one of the world's leading countries, surpassing all EU countries, in terms of hi tech's share of total exports. The EU average was only approximately 18% – a third of Israel's figure (54%).⁴⁹

Figure 19: Hi tech exports as a percentage of total exports: a comparison of Israel and EU countries, 2021:



⁴⁵ Processed 2018 data from the Central Bureau of Statistics, Deloitte

⁴⁶ Deloitte research

The hi tech sector is robust and thriving. It will continue to generate substantial revenue for the country in the coming years, allowing the State of Israel to continue increasing its public investments in vital areas of life.

This tax revenue assessment relates to the hi tech sector's direct activities. The sector's indirect activities have already been discussed – they are what generates tax payments by employees and other companies. The conservative approach used in the calculations in this report do not take this revenue into account. It follows, therefore, that this would be reflected if a broader perspective were to be used.

Hi tech exports and foreign investment are creating a surplus in the current balance of payments and are strengthening Israel's currency.

Exports are important because they create growth opportunities for the local economy, which in turn leads to more employees, a greater influx of foreign currency into the local market, and a greater ability to purchase foreign products and services. They are also important for creating a reputation and for branding the country within the international community; we expand on both those points later in this report.⁴⁶

⁴² 2022 Property Tax, Kiryat Gat

⁴³ 2022 Property Tax Ordinance, Haifa

⁴⁴ Central Bureau of Statistics, "Table of salaried positions and average wages", 2022

After deducting compulsory payments, taxes, and consumption that does not incur V.A.T. (such as postal services), the portion of consumption subject to V.A.T. out of a hi tech employee's gross salary is 50%.⁴⁵ An annual calculation, taking into account all hi tech employees and typical spending data for Israel and broken down into various fields and deciles of the population, would lead to the conclusion that as at 2021, the consumption of hi tech employees in Israel contributes about 10.5 billion ILS per year to state revenue (~10% of all V.A.T. revenue).

State revenue from the hi tech sector creates a budget surplus and broad investment opportunities.

The significant revenue generated by the local hi tech industry is important because it allows the State of Israel to increase public investment in all critical areas of life. When the state has higher revenues from a greater number of diverse sources, it can make more substantial investments in education, medicine, infrastructure, security, and more. This is how the hi tech sector's continued success, which manifests through significant tax revenue that increases over the years, affects all Israeli citizens in major areas of life.

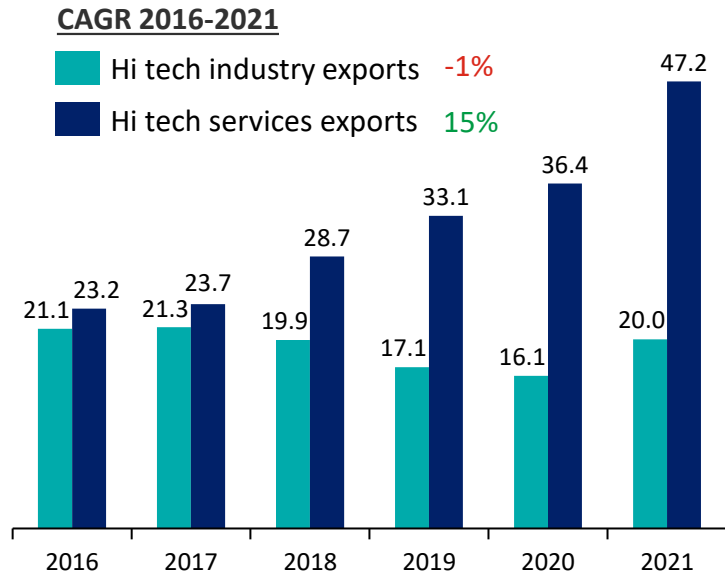
³⁹ Tel Aviv Municipality, 2021 Property Tax Ordinance

⁴⁰ Haaretz, June 4, 2022

⁴¹ "Finance Ministry officials want to double property tax for hi tech companies", Globes

Between 2016 and 2021, the total hi tech exports grew at an average annual rate of 9%, with large gaps between hi tech services and hi tech industry sectors. On average, exports of hi tech services grew at an annual rate of 15% during that time, compared to an average yearly drop of 1% during the same period for hi tech industry sectors.

Figure 20: Exports of hi tech industries and hi tech services, 2016-2021 (in billions of USD)

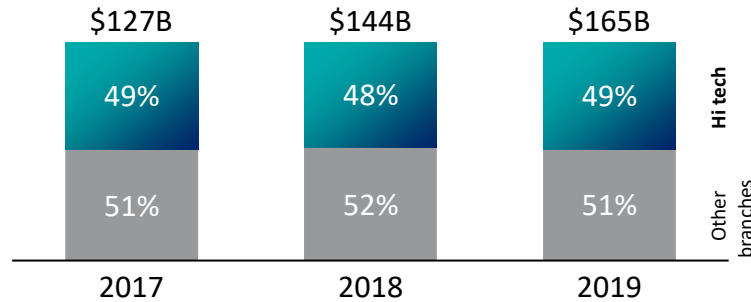


47 2022 Innovation Report (8)
 48 2020 Bank of Israel Report (1)
 49 Deloitte's analysis of Eurostat data

A significant part of hi tech service exports is exports made by multinationals to their parent company. Multinationals benefit from a high-caliber and highly-skilled workforce in Israel, at a time when such a workforce is in limited supply elsewhere in the world, and the State of Israel benefits from the presence of these foreign companies in Israel. These advantages include increased engagement between the Israeli market and the rest of the world, shortened distances and more access to information, increased permeation of knowledge and entrepreneurship in Israel, leading to more startups and unicorns, and, of course, a boost for the market in terms of technological developments, GDP per employee, growth, and more.

Aside from being clearly export-oriented, Israeli hi tech tends to attract significant foreign investments. According to the Central Bureau of Statistics, in recent years, hi tech has accounted for about one half of the balance of direct investments in Israel made by foreign residents.⁵⁰

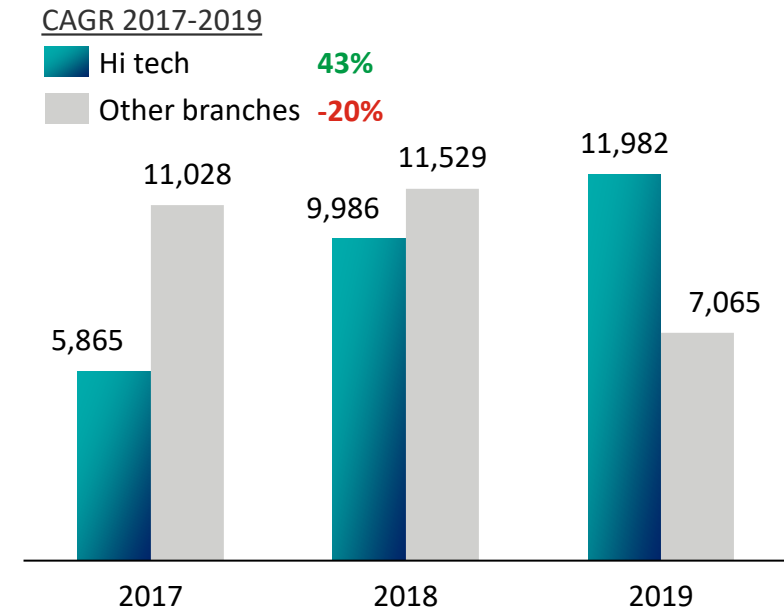
Figure 21: Foreign investment balances in Israel, and hi tech's share of those balances, 2017-2019:



50 Table 3: Balances of Direct Investments in Israel by Foreign Residents, by Technological Intensity
 51 Table 7: Balances of Direct Investments in Israel by Foreign Residents, by Technological Intensity

This data is consistent with another notable trend in the direct investments of foreign residents in Israel: increasing positive investment transactions, as incoming funds from foreign investors exceed the outgoing funds of Israeli investments abroad. These figures are growing from year to year. While the foreign investment balances have grown every year between 2017 and 2019, the growth rate of foreign investment transactions has actually dropped.⁵¹

Figure 22: The growth rate of the inflow of foreign direct investment (incoming investments minus outgoing investments), 2017-2019 (in millions of USD):



The scale of foreign investments in the hi tech sector as well as the sector's orientation towards exports affect the sharp increase in the Bank of Israel's foreign currency reserves in the past several years. Since 2016, the Bank of Israel's foreign currency reserves have increased at an average annual rate of over 11%.

Increased exports also affect the State of Israel's balance of payments: a major increase in Israeli exports originating in the hi tech sector gradually increases the surplus in the balance of payments.⁵²

This surplus in the balance of payments has affected how the shekel has strengthened against foreign currencies in recent years. A stronger shekel makes it increasingly costly to employ Israelis in the hi tech sector. This cost increase adversely affects Israel's ability to compete against other R&D centers elsewhere in the world that employ increasingly competent engineers at a much lower cost. In the long run, Israel's hi tech sector may find it harder to compete with alternative R&D centers located abroad. Notably, a strong currency also has a positive effect on the economy. Many products and services, from consumer products to airline tickets, are imported. The price of these goods and services decreases as the shekel strengthens against the dollar. This also contributes to how the country contends with the cost of living and the stability of the local economy.



Israeli hi-tech as a driver for improving productivity in Israel

Productivity plays a significant role in the growth of modern economies. The key to increasing productivity is less about the production inputs themselves, and more about the technology and innovation outputs that allow the economy to generate greater value.

Over the years, Israel has been contending with the need to reduce productivity gaps vis-à-vis other OECD countries, and since productivity in the hi tech sector is twice as high as the national average, the sector makes a major contribution to the country's economic growth.

Correspondingly, the average hi tech salary is also 2.25 times higher than the national average.

Israel has one of the highest ratios between high tech employees and the total number of employees. The transition from startup nation to growth nation expands the pool of hi tech employees, so that it now encompasses

non-technological roles, improves productivity in Israel, and increases the average salary. It also means more economic wellbeing for Israelis.

The hi tech sector is twice as productive as the national average.

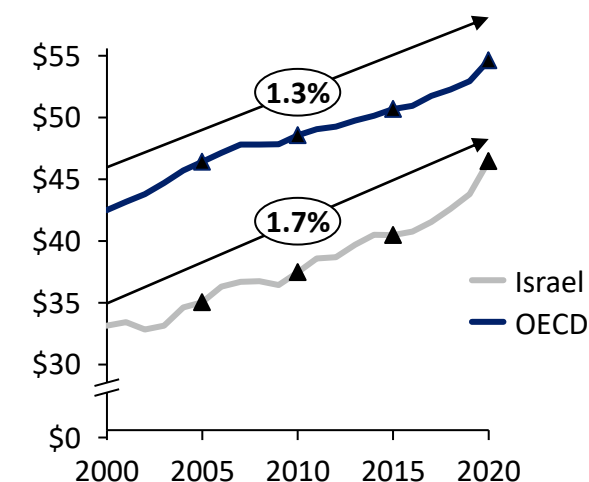
Productivity is the total value of the goods and services produced in one hour of labor, or, in short, the output per hour of labor. Many economic studies conducted since the early 1950s have demonstrated that production inputs, per se, do not explain economic growth. However, the economy's main growth engine is the increase in the value generated from existing resources. In other words, increased output occurs due to improvements in technology and improvements to manufacturing processes.

High work productivity is important for increasing the output over a given quantity of hours of labor. It's a significant part of a country's economic growth, and the main reason for the disparities between Israel's economic results and those of other developed countries.

Compared to other OECD countries, Israel typically has a low work productivity level – productivity per hour of labor in Israel is 18% lower than the OECD average. In the past two decades, the average annual growth rate of Israel's output per work hour was 1.7%, compared to the OECD average of 1.3%. Consequently, Israel managed to slightly reduce the work productivity gap vis-a-vis the OECD countries.

The hi tech sector plays a major role in reducing productivity gaps, but those gaps are still large. Strengthening hi tech, while integrating the technologies and abilities it develops into other industries, is the key to significantly reducing gaps in the future.

Figure 23: The increase in the output per work hour between 2000 and 2020:



Over the years, Israeli governments have viewed productivity as an important economic measure, and have been working intensely to assess and implement measures designed to improve productivity in Israel.

The disparity between the work productivity levels in different sectors is tied, among other things, to adopting advanced technologies, hiring employees with a high level of human capital, investing in physical capital, maintaining a high level of competitiveness, and maintaining import exposure.

The gap between the average productivity in the OECD and Israel's productivity level is attributed to, among other things, the fact that sectors of the economy that adversely affect the productivity gap are much larger employers than sectors that positively affect productivity.

Figure 24: The IT and information services sector makes the greatest positive contribution to the productivity gap vis-a-vis the OECD, but it constitutes a small part of the job market:

Sector	Contribution to the productivity gap (in percentage points)	Relative weight in employment
IT and information services	+3.21	3.19%
Wholesale trade	-1.08	3.79%
Construction	-1.08	7.92%
Administrative services	-0.70	5.43%
Insurance and pension	-0.68	1.89%
Food and hospitality services	0.56	4.90%

The OECD also mentioned the significant gaps between work productivity in the hi tech sector and the low work productivity in traditional industries, which account for most of the labor force in Israel, as an inhibiting factor in improving the country's productivity.⁵⁴

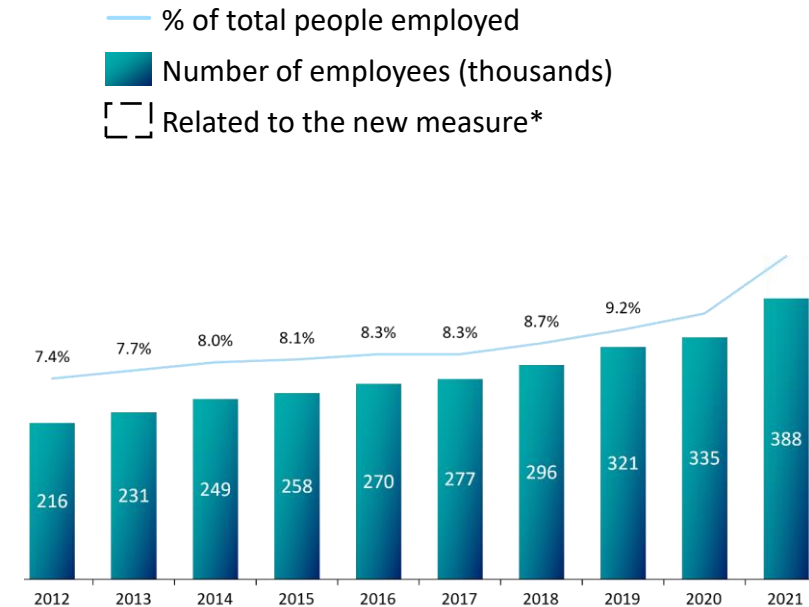
Consequently, local high tech starkly contrasts with the rest of the market with respect to work productivity. Statistics indicate that work productivity in the hi tech sector is double that of the national average.⁵⁵ These figures position the hi tech sector as having the greatest positive contribution to work productivity in Israel⁵⁶, which has contributed and still contributes to reducing the gaps between Israel and OECD countries.

With this in mind, it's clear that the hi tech sector is important to improving Israel's position with regard to work productivity. Integrating populations outside of the hi tech sector's labor pool into the hi tech sector, and integrating employees in non-technological vocations in hi tech, will help significantly increase long-term work productivity in Israel, and lead to a quicker reduction of the productivity gaps between Israel and OECD countries.

Hi tech's contribution to work productivity in Israel is also consistent with policy measures proposed in a report drafted by the Knesset Research and Information Center, which include promoting technological instruction and developing technological and digital skills among Israeli workers.⁵⁷ Integrating technologies and those with hi tech occupations into other sectors of the economy also engenders higher productivity levels in those sectors, thus improving overall productivity in the economy. This will be explained further in this report.

The hi-tech sector as a major employer

11.9% of the workforce aged 25-64, which accounts for 10% of those aged 15 and older that make up the workforce in Israel, are employed in the hi tech sector. This is a record figure, not just for Israel, but also for Israel's global standing, as reflected in comparative data from leading countries for 2020.⁵⁸

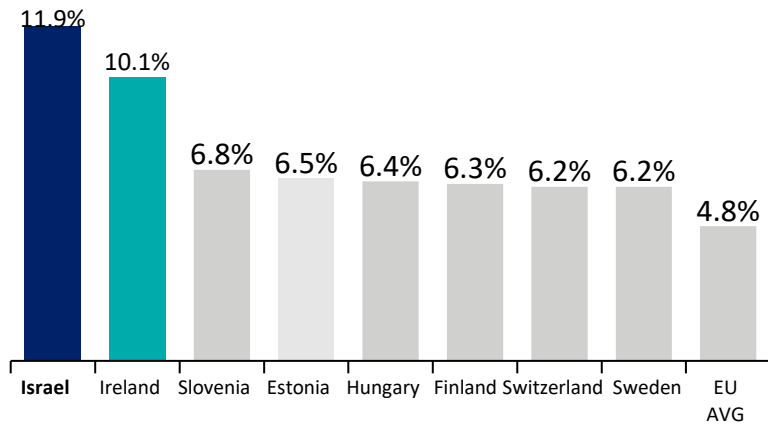


⁵⁶ "Pathways to Israel's prosperity: Improving productivity and accelerating growth", January, 2023, McKinsey
⁵⁷ "Work Productivity in Israel and in Developed Countries, and the Factors that Affect it", The Knesset Research and Information Center (15)
⁵⁸ 2022 Innovation Report, the Innovation Authority (17)
⁵⁹ What are the professional skills required of hi-tech workers, The Aaron Institute of Economic Policy, March 2022 roundtable (6)

The substantial increase in the number of hi tech workers occurred as the Israeli hi tech sector matured, which caused certain changes. Whereas in the past, a startup company's main goal was to find the right exit as technological development drew to a close, in recent years, we've seen the growth of companies, unicorns, and IPOs alongside the establishment of companies with large headquarters and hundreds of employees.

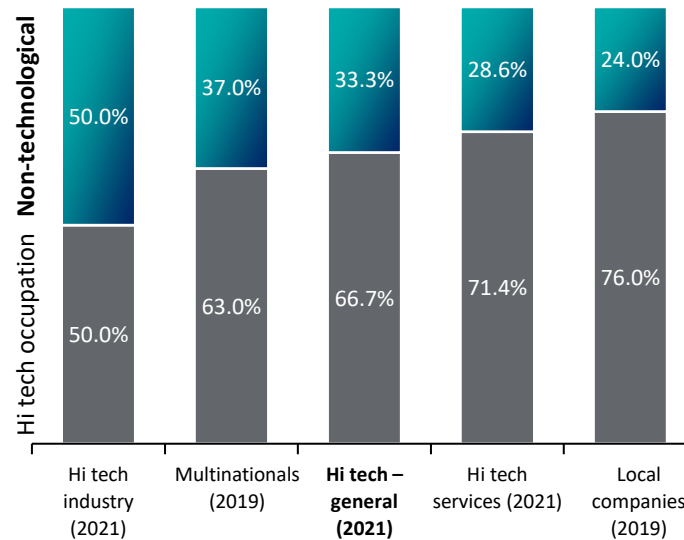
The creation of these integral companies increased the number of jobs in technological roles, but no less importantly, it also increased the number of non-technological positions in fields like marketing, finances, human resources, sales, and others, and that allowed for the integration of a broader range of skills and experience.

Figure 26: Percentage of total employees in hi tech, a comparison of Israel and EU countries, 2021:



On average, one third of the employees of hi tech companies are non-technological, and this varies among the different types of companies. The ratio between technological and non-technological employees in hi tech industry companies is almost one to one. Since Israeli hi tech companies tend to be younger startups, the ratio in Israel between technology employees and non-technology employees is 3 to 1.^{60 61}

Figure 27: Breakdown of workers, technological vs. non-technological roles:



⁶⁰ What are the professional skills required of hi-tech workers. The Aaron Institute of Economic Policy, March 2022 roundtable (8)
⁶¹ High-Tech Human Capital Report", The Israel Innovation Authority, December 2019, (9)

The sector’s contribution has added significance in consideration of the major salary gaps between the hi tech sector and other industries. This significant gap is part of a multi-year trend of significant salary gaps between hi tech workers and those working in other sectors. As at the end of 2021, the average salary in Israel was only about 44% of the average hi tech salary. Figure 28 demonstrates that these gaps have only been increasing over recent years. Between 2015 and 2021, the average salary in Israel grew at an annual rate of 3.5%, compared to 4.7% in the hi tech sector, and during the three years since 2019, hi tech salaries have risen by a total of about 19%.⁶

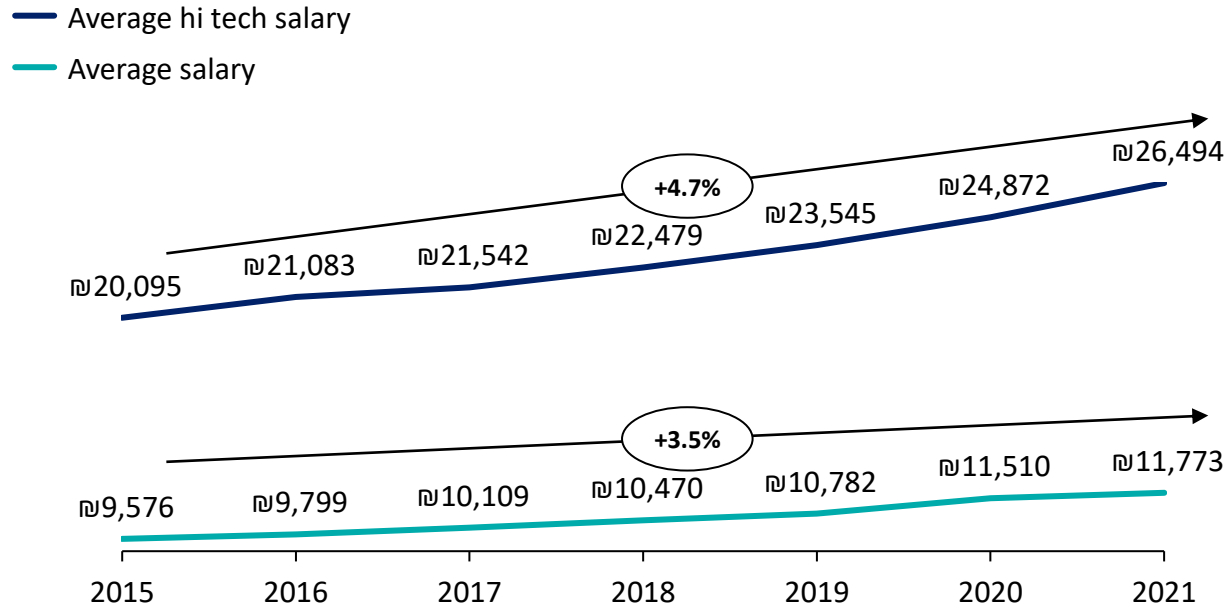
In summary, hi tech's contribution is not limited to creating non-technological jobs. It also creates jobs with a high economic value for the Israeli economy, which boost the wellbeing of workers, state revenue, and work productivity.

One main reason for the salary growth is the high demand for talent, which greatly surpasses the supply of human resources. Besides increasing salaries, the "war over talent" has also led to workers shifting rapidly between roles. This affects the companies' ability to generate value from their workers.

The salary trend also has negative repercussions on the economy. Higher salaries make it harder for other industries to compete over the best talent, producing a shortage of high-quality workers outside of the hi tech sector. It also lowers the profitability of companies forced to increase their expenditures in order to stay competitive.

Although the changes to average hi tech salaries have had a somewhat positive effect on the average salaries in other sectors (a 1% increase in hi tech leads to a 0.11-0.12% increase in other sectors, about 3-4 months after the change)⁶³, higher salaries and higher productivity in the hi tech sector widen the gaps between the various populations in Israel. The hi tech sector shouldn't be blamed for social gaps. However, policymakers should stress this and take steps to reduce these gaps by strengthening the weaker populations. A discussion of the hi tech's potential contribution to reducing these gaps appears later in this report.

Figure 28: Average hi tech salary versus the average salary in Israel, 2015-2021



⁶² "State of the Nation Report", Taub Center, December 2022

⁶³ "State of the Nation Report", Taub Center, December 2022

Hi tech as a substantial part of national resilience

National resilience refers to the country's ability to withstand the occurrence of an internal or external threat.

In recent decades, hi tech has become a major part of the State of Israel's national resilience, alongside the military and the defense industry. As such, hi tech contributes to preserving the economy's stability and the country's positioning.

Hi tech's contribution to the State of Israel's national resilience can be assessed both during routine times and when it faces various threats. It is demonstrated in the development of technological capabilities like the Iron Dome system and maintaining economic stability, which is critical, both at times of crisis and during periods of relative stability. It also manifests in international branding, which translates, among other things, into foreign investments and international relations, which position Israel as an important and strategic objective for collaboration, and more.

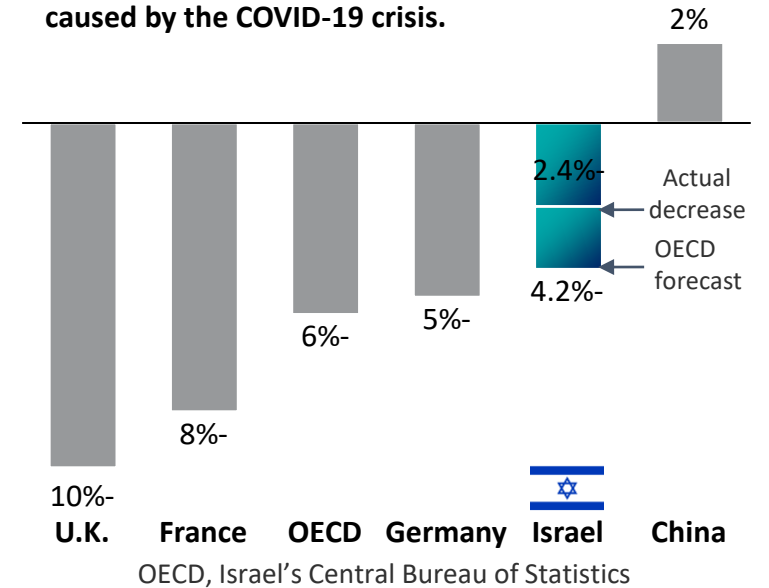
Preserving economic stability

The eruption of the Second Lebanon War in 2006 sparked fears that the war would lead to an economic crisis. However, the GDP ultimately rose by 5.2% compared to the previous year. Technology's contribution to the GDP grew at twice the speed of that of the other sectors, and it was the first time that the GDP had increased during a lengthy wartime period. Notably, this was the first war that erupted since Israel had become a major hi tech player.⁶⁴

After several decades in which foreign investments had been pouring into the country, as the hi tech sector grew and the country emerged from the COVID-19 pandemic, one thing remains clear: hi tech plays a major role in stabilizing the State of Israel's economy. During the COVID-19 crisis, the OECD predicted that Israel's GDP would fall by 4.2% in 2020, but in practice, it experienced a decrease of only 2.4%.

The hi tech sector, which grew by 3% in 2020, was one of the major factors in mitigating the decrease in the GDP.⁶⁵

Figure 29: Changes in the GDP in 2020
Hi tech contributed to the resilience of the Israeli economy and mitigated the harm to the GDP caused by the COVID-19 crisis.



Two major factors allowed the hi tech sector to preserve the country's economic resilience during the pandemic and maintain "business as usual."

(1) Technological abilities that allowed for business continuity through employees working remotely: while severe restrictions were in place, the percentage of hi tech workers that worked from home was 50%, compared to 20% of workers in other sectors.⁶⁶

⁶⁴ [The Effect of Advanced Industry on the Resilience of the Economy During War](#)

⁶⁵ [Bank of Israel, 2020 Annual report, 2021](#)

⁶⁶ ["Panel Discussion: The Labor Market in the Post-COVID Era", the Eli Hurvitz Conference on Economy and Society, 2021](#)

(2) The sector's high productivity, based on exports: the GDP per hi tech worker was 2.3 greater than the GDP per worker in the other sectors.⁶⁷

Hi tech also contributed to the State of Israel's economic resilience, thanks to its high share of the country's exports, which positioned the hi tech sector as a "pillar of defense" at times of crisis.

The OECD concluded that the State of Israel's economic resilience relied heavily on the hi tech sector's high productivity levels, which successfully compensated for the decreases in the other sectors, and counterbalanced the reductions in the GDP during times of crisis.

However, relying on hi tech thanks to its prominence in the Israeli economy, when coupled with the direct correlation between fluctuations in the markets and those in the hi tech sector (both public and private companies), could pose a risk when the sector experiences crises. One such crisis occurred in the 2000s, when the dot-com bubble burst. Another crisis was more recent, when financial markets experienced sharp drops, alongside a slowdown in the hi tech sector in the form of layoffs, lower valuations, less successful fundraising, and more. Nonetheless, the broad diversity and distribution of these companies within the various sectors and subsectors, along with those companies' financial robustness, produced a hedging effect that acted to preserve the sector's robustness and financial stability, and lower the likelihood of an across-the-board slowdown in the industry.

International branding

The Israeli innovation ecosystem, acting alongside a unique and high-caliber workforce, has led to Israel being branded as a technological nation. Thanks to that branding, the State of Israel and hi tech companies are gaining recognition throughout the world, bringing in foreign investment and business tourism, and creating strategic opportunities in Israel.

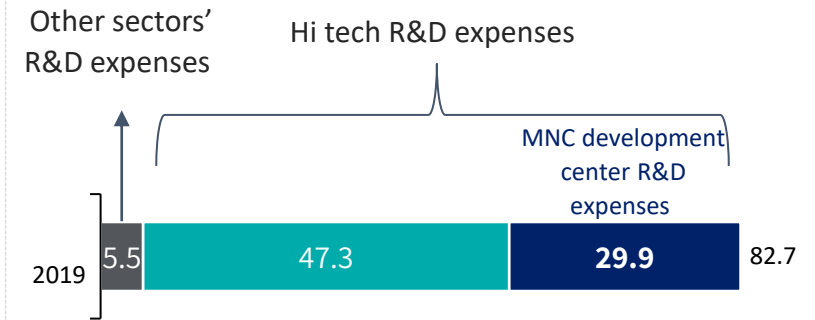
Consequently, multinationals have chosen to establish their R&D centers in Israel and increase investments in local industry.

Approximately 400 multinationals now run R&D centers in Israel, and for leading multinationals, Israel has become their first strategic hub outside of the United States. In 2019, investments in R&D made by multinationals totalled about thirty billion shekels – about 37% of all R&D and business development spending in Israel.⁶⁸

Multinationals have a major effect on the contributions described in this report. Besides employing about 65,000 hi tech workers, these companies are responsible for developing advanced technologies, investing in young companies, and raising the bar for management and quality. Their employees often end up establishing their own innovative and independent ventures. Moreover, these companies fly the banner of equality and tolerance, showing others in the hi tech industry the way to promoting social mobility and integrating populations who are currently underrepresented in the sector.

In 2021 alone, companies like Google, Microsoft and Intel announced investments they had made in Israel totalling tens of billions of shekels, in the form of either investment in local innovation or establishing and expanding R&D centers and local production facilities.

Figure 30: Distribution of commercial R&D expenses in Israel (in billions of ILS).



⁶⁷ [https://din-online.info/pdf/ah46.pdf\(9\)](https://din-online.info/pdf/ah46.pdf(9))

⁶⁸ "Spending on R&D in Startup Companies and Multinationals (including R&D centers), 2019"





















Though Israel remains a strong brand, multinationals are constantly aware of the increased competition from other innovation hubs in the world. This, along with the rising cost of Israeli talent, makes it hard for Israeli centers to maintain their parent companies' focus on Israel, and they find themselves competing constantly with other R&D centers over resources and strategic focus.

Another argument being floated is that the R&D centers of multinational corporations are making it harder for Israeli companies to hire talent and compete, given the conditions offered by those multinationals, and that they have a stalling effect on spin-outs and the establishment of startups.

The hi tech sector also contributes by strengthening the Israeli brand, in the general sense. According to senior hi tech experts, much of their time is spent representing the country and exposing the world to its narrative, which often produces a new, positive narrative about the State of Israel. They don't necessarily do this to advance business or financial goals. Furthermore, once an international corporation establishes its activities in Israel, or once an Israeli company establishes its activities abroad, new unofficial "ambassadors" are produced, which contribute to branding the country as a nation of hi tech and innovation.

The hi tech sector attracts prominent and influential business and government leaders from around the globe who visit Israel to get a feel for the hi tech sector and its achievements. They can then experience the country's abilities and environment first-hand, and that positions Israel differently than how it is often portrayed in the media.

Figure 31: MNCs operating in Israel, by country of origin and industry

Industry & Origin	Technology	Media & Entertainment	Telecom	Energy, Resources & Industrials	Consumer	Financial Services	Life Sciences & Healthcare
North America							
Europe							
Asia							

Note: Not exhaustive

International relations

Quite often, world leaders also take interest in the magic of Israeli hi tech, and this strengthens ties with the State of Israel. This is achieved through official visits to the State of Israel and the forging of diplomatic ties with countries prepared to sign agreements on establishing ties with the country in order to have a relationship with its hi tech sector. Beyond meetings between political leaders, diplomatic visits often include visits to companies and technology centers, and meetings with key figures in the hi tech industry. Sometimes, the latter constitutes the most significant part of the visit. All of these strengthen the substantial contribution made by the hi tech sector to the country's economy in the area of diplomatic ties as well. Clearly, with the hi tech sector at the forefront, other countries are much more motivated to sign agreements, like the Abraham Accords.



Hi tech as an engine for inclusive growth

The term "inclusive growth" is defined as "the long-term growth of the GDP [when] distributed fairly within society, creating good employment opportunities for large population groups, and reducing poverty." According to a report issued by the WEF (the World Economic Forum), which ranks countries based on inclusive growth, Israel is ranked 25th out of the 29 participating western countries.⁷⁰

The growth of the hi tech sector, which leads to increasing demand for well-paid employees, along with a flexible employment model and the fact that hiring and promotion within the sector depend solely on the individual and his or her abilities, make hi tech an unrivaled springboard for social mobility in Israel. The higher the proportion of non-technological workers in hi tech companies, the wider the springboard, and this creates opportunities for those with a broader range of abilities and experience.

Many hi tech companies rise to the occasion, and invest in encouraging, training, and hiring different population groups in order to reduce the gaps in the supply of talent, to promote the diversification of the workforce, and to help cope with demographic trends.

Integrating these population groups helps both the companies themselves along with the entire economy, by increasing productivity, boosting economic contribution, and reducing social gaps. A review of the demographics of hi tech employees would reveal that despite the steps being taken, the country is far from meeting the potential. Both the hi tech sector and the state, which is responsible for creating the required infrastructure, must make significant investments.

The hi-tech sector as a springboard for social mobility

The hi tech sector has several characteristics that make it an important tool for inclusive growth. The first is the entry requirements. Succeeding in hi tech depends solely on the individual and his or her abilities, and not on things like pedigree, place of residence or other environmental factors. The sector's flexible work model, which allows people to work from home and work flexible hours, makes it easier for diverse populations, particularly those from the geographic periphery, to join in. Finally, high salaries and productivity levels in the hi tech sector mean a surge in quality of life and economic growth, for both individuals and the state as a whole.

It would be fair to conclude that no other sector or industry facilitate broad social mobility for various population groups as much as the hi tech sector does.

"The hi tech sector creates a dreamy horizon for social mobility," says Dalit Stauber, the director-general of the ministry of education. "Students in the periphery have set their sights on the hi tech sector, and they believe that if they manage to acclimate in the world of hi tech, they'll have a good future and economic wellbeing. This motivates them to keep studying, and gives them the determination to persevere against all challenges and strive to make achievements."

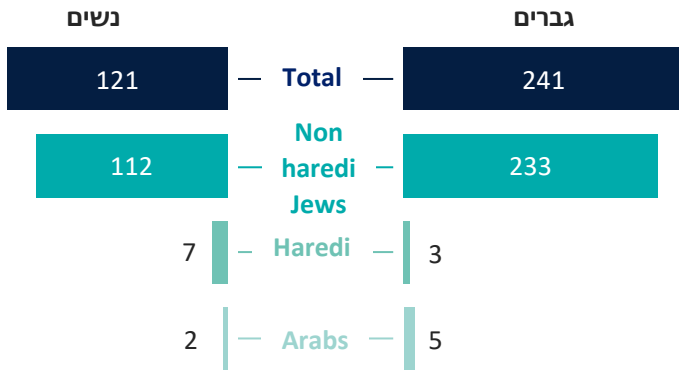
According to the Innovation Authority and data from the Central Bureau of Statistics, although another 30,000 employees were added (a 12% increase in hi tech employees), there are still 32,900 unfilled positions. **Clearly, the natural increase of human capital seeking jobs in the hi tech sector cannot meet the increasing demand, and the pool of candidates must be expanded** to include population groups that are not currently part of that pool. One major contributor to the increase in the demand for workers is the increase in non-technological positions, which has more than doubled. This means that it is more than just the technological professions that provide opportunities for social mobility – a broad range of other vocations do as well.

The demographics of the hi tech sector

Currently, the population of hi tech workers does not represent the country's population, with the Jewish male subgroup from central Israel still dominating the sector.⁷¹

⁷⁰ [The Inclusive Development Index, 2018](#)
⁷¹ ["2022 High-Tech Human 71 Report", The Israel Innovation Authority](#)

Figure 32: Breakdown of hi tech workers by gender and population, 2021, in thousands



Four population groups are typically seen as underrepresented: haredi Jews, Arabs, women, and residents of the periphery.

Haredi Jews

Although the absolute number of male and female haredi workers has increased, their relative share has remained rather constant over the years. Examining haredi society as one monolithic group is quite challenging. While the gap among men is quite considerable – with an actual participation rate of 3% against an expected rate of 14% (if it were to correspond with their share of the population), the gap is much lower for haredi women – just 2% (5% vs. 7%).

One major factor is the fact that men display more significant educational gaps than women do. In recent years, many seminars and women's study programs have added technology tracks. In 2021, there were 4,900 male and female haredi students in technology tracks in Israel, and only a third of them were men.

Consequently, the proportion of haredi women working in hi tech almost doubled between 2014 and 2020. The relative share has stagnated despite the fact that in recent years, much has been done, and much discussion has been conducted, regarding integrating this population into the sector, both by the government and the public sector, and by the hi tech sector itself.

Figure 33: Despite the increase in the number of haredi employees in the hi tech sector, their relative proportion within the total number of employees has remained the same

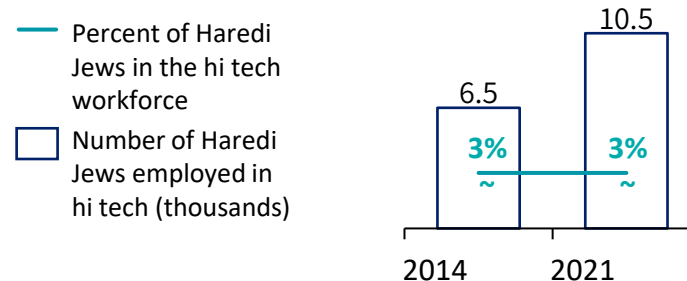
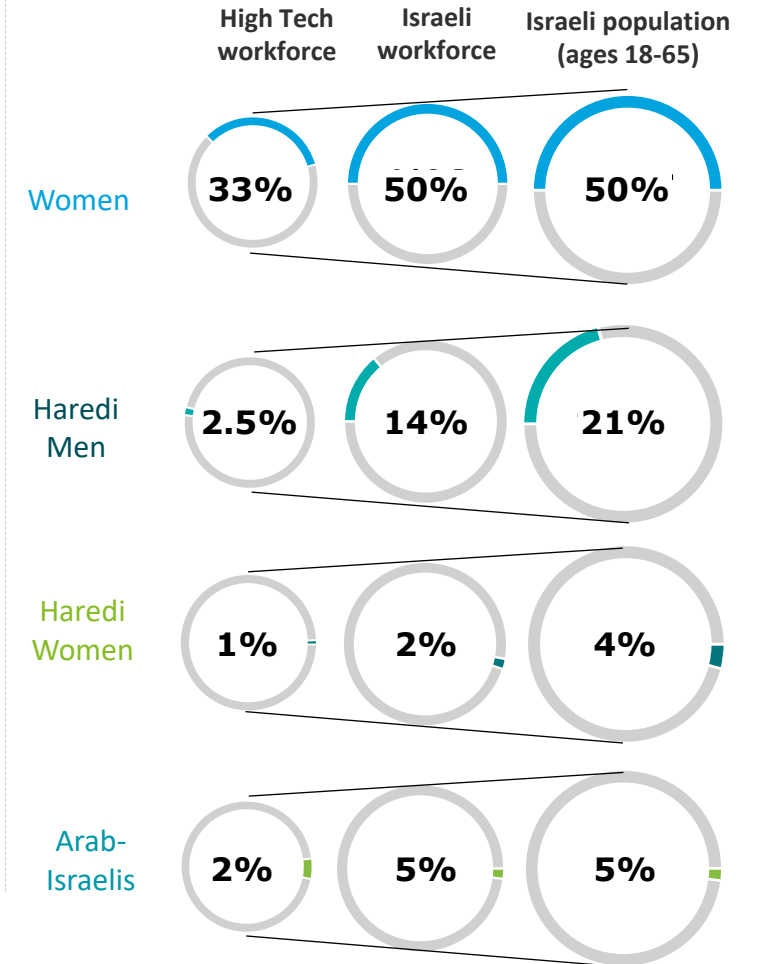


Figure 34: Proportion of hi tech employees from underrepresented population groups



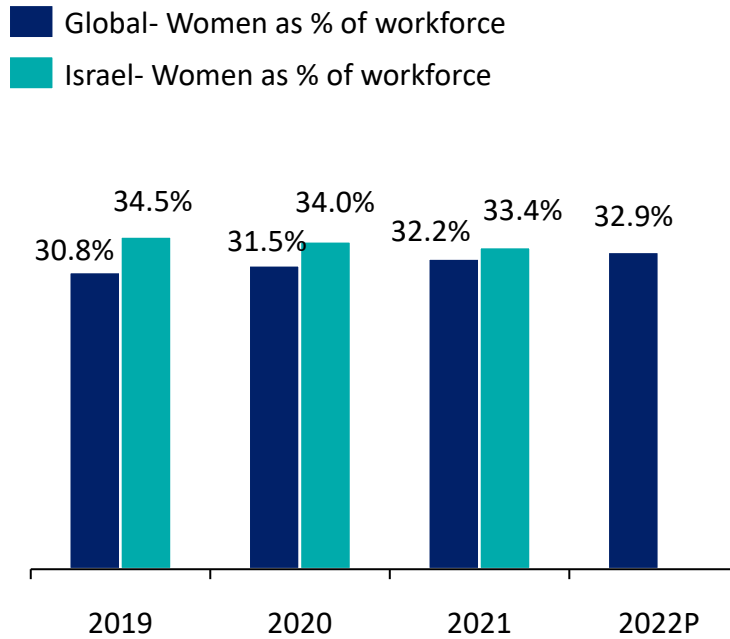
Women

The absolute number of women in the hi tech sector grew to about 120,700, compared to 72,100 in 2012, but their relative share has remained constant, at 33.4%. The inequality increases even more with respect to management roles. While one third of hi tech workers are women, only 22.6% of the senior managers are women, and over half of hi tech companies have no more than 2 women in their management teams. The most common position for these senior female hi tech employees is HR management (nearly a third of all woman managers)⁷⁴. However, the annual growth rate of the number of employed women is about 6%, more than double the the annual growth rate of the number of employed women in the other sectors, which is 2.4%.⁷⁵ This trend regarding the integration of women into the hi tech sector corresponds with the significant increase in the number of female students studying hi tech professions. Between 2015 and 2020, their numbers increased by 80% at public universities and by 60% at private colleges.⁷⁶

This is not unique to Israel. The proportion of women in hi tech is similar elsewhere in the world, and is slowly growing. Suprisingly, although women comprise 33.7% of those studying STEM professions at the universities, they only constitute 23% of those working in technological roles.

74 Taken from a sample in a study conducted by the Innovation Authority, which included 53 mature Israeli technology companies
75 "Women in Hi-Tech - 2022", The Israel Innovation Authority

Figure 35: The percentage of employed women at large global technology companies is slowly and steadily improving



* Deloitte studies based on the diversification and inclusion programs of large technology companies (with over 100,000 workers)

76 The Committee for Increasing Human Capital in High-Tech, December 2021
77 TMT Predictions 2022, Deloitte

Arabs

In 2021, only 200 Arabs began working in hi tech, and they represented only 2% of the total hi tech workforce. Unlike the Haredi population, more Arab men participate than Arab women.

The number of Arab women working in hi tech in 2021 was about 1,500, compared to about 5,000 men. This reflects a ratio of almost 1 to 3.5, while the general ratio between men and women in hi tech is 2 to 1.

The periphery

The Israeli hi tech sector is located in the center of the country, and more specifically, in Tel Aviv. This concentration manifests in every parameter, including the number of workers, the number of companies, and where the employees live.

According to the Innovation Authority's 2022 report, about 55% of all hi tech companies and about 50% of hi tech workers operate in the center of the country. More specifically, 37% of companies, and 26% of workers, operate in Tel Aviv. Furthermore, 60.3% of hi tech sector workers live in cities located in the center of the country. So, despite the flexibility and hybrid work model, the proportion of hi tech workers who reside in central Israel is 35% higher than their proportion of the general workforce, while the proportion of hi tech workers residing in the North or South of the country is 33% lower than their share of the general workforce.

Hi tech firms are taking action to diversify human resources and increase the supply of candidates

The unfulfilled potential contribution and the growing gaps in the demand for employees are causing hi tech firms and the public sector to begin integrating underrepresented populations. Many studies show that diversification benefits the company in many ways, since it creates human infrastructure with non-conformist ways of thinking, accelerated by a more diverse workforce.

According to senior experts from the hi tech sector, with regard to the integration of these groups into the sector, "talent receives the same salaries, from Eilat to Metullah, but they don't have the same opportunities". "While hi tech companies do not discriminate, there are gaps that make it harder for these groups to meet the conditions that would allow them to integrate into those companies." These gaps do not usually arise from the hi tech sector itself, but rather from gaps due to the different levels of infrastructure, including education, experience, culture, IT networks, and transportation. Take the example of a potential female worker in a disadvantaged neighborhood in the periphery with a deprivation index score of 20.⁷⁹ Only 40% of schools with this index score teach five-unit (honors level) math and computer sciences, and only 8% of students pass the exams, compared to 90% and 55%, respectively, in schools with a deprivation index score of 1.⁸⁰ The telecommunication infrastructure are not likely to allow her to work remotely continuously, and it would take her one and a half to two hours to commute to her workplace in central Israel, each way. Consequently, most of those living in the that area end up working in professions with low salaries and productivity levels, and the potential to the economy and to private citizens is not fully realized.

⁷⁸ 2022 Innovation Authority Report

⁷⁹ An index that groups schools in Israel based on socioeconomic strength. A score of "10" is given to the weakest group.

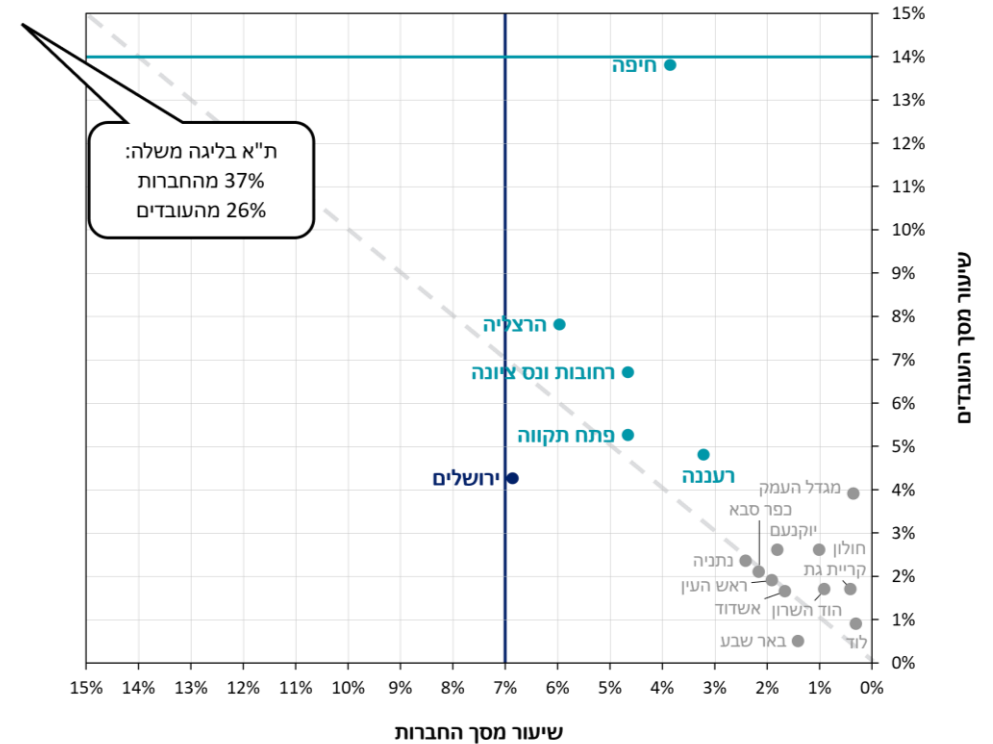
⁸⁰ "The State's Activities to Increase the Number of Workers in the High-Tech Industry", The State Comptroller's Report, 2021

⁸¹ StartUp Nation Central and Deloitte analyses

⁸² <https://www.globes.co.il/news/article.aspx?did=1001402966>

Figure 36: Distribution of employees and companies within Israeli cities:

The proportion of companies and hi tech workers in major hubs (2022 Innovation Authority Report, based on the IVC database)



From a report issued by the Innovation Authority, based on data from the IVC and the SNCF

About 100 large firms operate in Israel outside of the major cities, and multinationals account for just over half of them.⁸¹ Some firms also invest in specialized training and collaboration with non-profits, such as Kamatech, Tsofen, SheCode and others, which deal with closing knowledge and cultural gaps in order to boost integration into the sector. Senior hi tech experts attest that the advantages of the existing programs lie in their ability to locate and screen candidates, as well as create excellent specialized training so that they can fill technological positions. Many companies have made integration a key objective, and success stories are beginning to compound. The Innovation Authority's 2022 Human Capital Report reveals that 9% of employees beginning their first technological job had undergone non-academic hi-tech training.

For example, Google announced that it would invest \$25 million over five years to advance and integrate these populations. It claims that it trained over 30,000 people from these population groups in 2021.⁸² Amdocs is the largest employer in the South, and out of approximately 4,000 employees, 600-700 of them work in Sderot. Its Nazareth plant makes Amdocs the largest employer of Arab engineers in the North. The HiTech Park in Beersheba is another example of how this types of initiative can succeed. Many of the Ben Gurion University students can stay in the South after graduating, and this has a demographic and economic impact on the area.

In this area, multinationals lead the pack, since diversity is so important for the parent companies, alongside the economies of scale they benefit from. These companies are not the only ones that tend to adopt inclusive policies.

The public sector is also rising to the challenge, in order to fulfill the potential of this diversification trend and ensure that Israeli hi tech continues growing. In recent years, recommendations have been put forward and steps have been taken to motivate hi tech firms to integrate these populations and to give potential workers the tools and skills they need. The various programs and development tracks include the Perlmutter Committee for Increasing Human Capital in the Hi Tech Industry, the Innovation Authority's Human Capital Fund, and the Public Council for Promoting Hi-Tech in the Arab Society, established by Tsofen.

Holistic thinking that has the hi tech sector take substantial steps to achieve inclusion can potentially contribute a great deal to the economy. The estimated potential marginal contribution of hiring 10,000 more employees from underrepresented populations is about 3.4 billion ILS per year, compared to how much they would contribute if they are not integrated into hi tech. This figure does not include the additional contribution of welfare payments and allowances that would no longer need to be disbursed, so the potential overall contribution is even greater.

In summary, social mobility is a matter of national importance, one that contributes to both individual wellbeing as well as economic development and Israeli society. To advance this noble objective, the Israeli government must take major steps in this direction, working alongside a highly-committed hi tech sector that is fully on board. Many in the hi tech sector recognize how important this is, and we have our work cut out for us, given the existing gaps and the challenge of fulfilling the potential contribution.



⁸¹ StartUp Nation Central and Deloitte analyses
⁸² <https://www.globes.co.il/news/article.aspx?did=1001402966>

The contribution of hi tech to other industries in Israel

Hi tech is part of the innovation ecosystem, and it interacts with other industries. Sometimes, these interactions are based on commercial-business relationships, and at other times, this interaction is based on the adoption of technology and innovation.

Technology and innovation are no longer the sole domain of the hi tech sector. They permeate other industries, shaping all aspects of people's lives, and companies in every sector and of every size are now being required to adopt them.

Hi tech has the potential to contribute in other ways as well. This contribution could take the form of collaboration, integrating technology into more traditional industries and into the public sector, training talent in technological professions, and developing advanced work processes and infrastructure.

The disparities in productivity and wages between the various industries in the Israeli economy demonstrate that traditional industries lag behind while the hi tech engine continues to charge forward.

While things are getting underway and steps are being taken in certain areas, for the most part, the technological assets developed in Israel are not sufficiently leveraged.

As a case in point, of the major benchmarked countries, Israel lags behind when it comes to integrating and using ICT in the various sectors of the economy, placing it in 45th place out of a total of 84 surveyed countries in the 2021 ICT Development Index.

Figure 37: Ranking of countries by rate of science and engineering profession graduates, 2021

Benchmark countries	The ICT Development Index
South Korea	1
The United Kingdom	2
Japan	8
United States	9
Switzerland	15
Finland	17
Sweden	22
Ireland	28
Germany	32
Israel	45

Hi tech trains skilled technology workers who find technological jobs within all industries

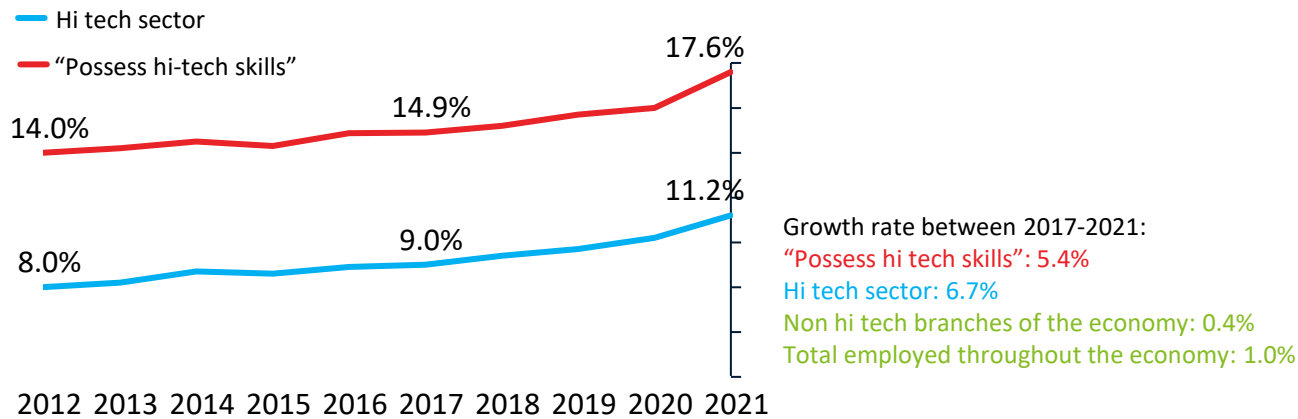
In early 2017, Lloyd Blankfein, the CEO of Goldman-Sachs, stated, "We are a technology company. We are a platform". This statement undoubtedly surprised some people, but it is consistent with the understanding that technology has long ago ceased being the sole domain of the hi tech industry. Companies in various industries need to offer digital services, digitize various work processes, handle growing quantities of data, and cope with advanced cyber threats. In light of these needs and other factors, organizations are now required to develop various technological capabilities they had not previously needed in order to continue operating sustainably.

According to a survey conducted by the Gartner Institute, which ranked the importance of various considerations to organizations' core business areas in 2022-2023, "tech-related business area" ranks second to "growth." Moreover, the investments in information systems and digital capabilities were the investments that increased the most in the past five years.

Traditional companies are expanding their technological work force to cope with the frequent changes to the competition matrix and the threats posed by those changes. Data has shown that the number of technological employees in some traditional industries that are not perceived as hi tech companies has grown at an exceptionally high rate.

According to data from Israel's Central Bureau of Statistics on scientific and technological professions known as "hi tech professions", in 2021, 452,000 employees worked in hi-tech professions in Israel, of which 246,000 worked in the hi tech sector, and 206,000 worked in other sectors of the economy.⁸⁵

Figure 38: In the past four years, the workforce in Israel has been more technological
106,000 new employees joined the workforce "possess hi tech skills," of them 80,000 were employed in the hi tech sector



The major demand for technological skills in nearly every industry and sector means that employees interested in a technological career aren't limited to the hi-tech sector, and can work in a variety of roles and industries.⁸⁷

⁸⁵ "What are the skills required of hi-tech workers", the Aaron Institute of Economic Policy

⁸⁶ "What are the professional skills required of hi-tech workers". The Aaron Institute of Economic Policy, March 2022 roundtable (8)

⁸⁷ "Tech Jobs Aren't just in Tech", www.indeed.com

The relative share of technological workers working outside of the hi tech sector has been increasing. One prominent example of growth in the relative number of hi tech workers is the banking industry, where that number doubled within a decade.⁸⁶

⁸⁸ "Tnuva and Pluristem establish a company for the development and production of cultured meat", www.globes.com

⁸⁹ Interviews with industry experts

Here, hi tech contributed in two ways: It created technological changes that increased the number of technological positions in traditional sectors and industries, and it trained skilled technological employees, some of whom would later fill vital technological functions in other industries, like banking and finance.

This trend means that the quality of human resources in Israel is growing. Since 2017, 106,000 workers with hi-tech skills have joined the work force. 75% of those new employees were employed in hi tech, while 25% were distributed among the various sectors of the economy. The number of employees with hi tech skills grew at an average annual rate of 5.4%, vs. 0.4% of employees who do not work in this profession.

Employing professionals in hi tech occupations in the other sectors of the economy is crucial for amplifying the digital transformation of the various sectors, while drawing upon various population groups to support that effort.

Israeli hi tech contributing to the technological leap and digitization of other sectors

Many senior Israeli experts have stated that another of hi tech's important contributions is tied to its impact on other segments of the economy, starting with integrating technologies into more traditional sectors and allowing them to go through digitization and innovation, and continuing by providing inspiration and serving as a role model for innovation, management techniques, and work processes.

Integrating digitization and technologies into the various industries of the economy dramatically contributes to productivity and to the GDP; digitization processes, if implemented, are likely to contribute an estimated additional \$13 trillion to the global GDP by 2030. Sectors that tend to have a high level of digitization, like media and finance, are experiencing a significant rise in productivity.

Alongside adopting technologies, digitization and innovation allow these sectors to respond to changes in the market and in the competitive landscape, adapting to the needs of customers and becoming more competitive. This occurs alongside the improved productivity of these companies, thus improving the productivity of the entire economy.

One example of how the hi tech sector affects other industries with respect to digitization and technological progress is the foodtech industry, in which Israel is a global leader. Local foodtech companies experienced significant growth in recent years, and they also have an impact on traditional companies in the Israeli food sector. Strauss, Tnuva and Osem place a greater stress on innovation in their areas of activity, and they are also actively involved in foodtech initiatives.

For example, Tnuva is active in developing and producing cultured meat, in collaboration with Pluristem, a biotech company.⁸⁸ Cultured meat can be raised in any climate, and is produced in a "closed system" that, unlike the traditional meat industry, does not depend on farmland. It contributes to the food industry environmentally (by reducing greenhouse gas emissions) and by improving certain aspects of food security.⁸⁹ This is how R&D found its way into traditional industries, enhancing their ability to compete and contend with market trends.

Another industry undergoing a major technological leap thanks to its connection with hi tech is the health care and life sciences industry. Over the years, the link between health care and hi tech has succeeded in spearheading developments in the field of medical instruments, and, in recent years, bio-convergence, which links life science disciplines with hi tech domains, has gained momentum. It has even been recognized by the government through one of the State of Israel's national programs. Applications in this area could be relevant to other fields, like agriculture, energy, security and food.

The changes in the field of health care are not occurring solely in the private sector; partnerships between private hi tech firms and public health services in Israel are being forged as well. One example is collaboration between startups and public hospitals on data analysis and the use of AI. Overall, the Israeli hi tech ecosystem contributes to the health care system through digitization.

However, in many aspects, there are major disparities between hi tech and traditional industries in terms of digitization and technology adoption. Generally speaking, despite its thriving hi tech sector, the Israeli economy is not technology-oriented. Senior experts attribute this to a number of factors, primarily a lack of competition in the business sector, and a regulatory environment that is not conducive to the integration of innovation.

First, since Israel is a small "island economy" at a considerable distance from its global supply chains, it has a low level of exposure to competition. This is particularly true for industries that focus on local activity, such as infrastructure, construction and telecommunications. Besides affecting the high cost of living in Israel, weak competition in these sectors and others affects the adoption of innovation and the tendency to make a technological leap, since there is little incentive for actors in those fields to adopt innovation that would improve their work productivity.

Moreover, the regulation of some of these areas does not encourage innovation, and, in certain cases, may even bar the entry of new competitors, particularly those based on adopting innovative technologies.⁹⁰

Notably, Israeli hi tech firms are export-oriented, since the purchasing power of the local market is limited compared to the potential of the global market, and at times, this hampers the adoption of technology in Israel.

The adoption of technology and innovation in all sectors would be enormously advantageous. It is the key to increasing productivity in these sectors and making the companies more competitive and more attractive to their customers and investors. Ultimately, this is how their contribution to the Israeli economy can be amplified. These processes also benefit the hi tech firms themselves.

⁹⁰ ["From the Hi Tech Industry to a Smart, Technological Economy", The Innovation Authority, 2018](#)

The advantage of being able to operate on their home turf allows Israeli technology companies to assess the deployment of the technology and reach the international market more experienced and with finely-honed products, having first proven their abilities at home. Ultimately, this makes them more competitive.

Strengthening the links between the hi tech sector and the various sectors of the economy requires both sides to be committed and open-minded, and the state must prepare enabling infrastructure for this to happen. There are a number of examples of supporting infrastructure that the state has recently begun providing.

The Ministry of Economy and Industry established ComNetWork, a project designed to establish a robust ecosystem in Israel in various domains, like agriculture, construction, smart transportation, energy, cyber, fintech, digital health care, and more. The innovation communities in ComNetWork are meant to promote technological innovation, and, to that end, establish connections between people in the government and business entities so that they can understand their various needs and draft enabling regulations. If this project succeeds, productivity in those sectors will be enhanced through the creation of advanced processes.

"Sandboxes" are another example of promoting innovation in various fields. A sandbox lets technology companies evaluate the technology it developed, and lets service and industry companies try their hand at those technologies, under preferable conditions.

The Innovation Authority has begun advancing several sandboxes in areas like autonomous transportation and drones, for this very purpose – promoting Israeli technology, and encouraging its adoption within the country.

A source of inspiration, and the infrastructure for "Government 2.0"

Whether it is used for inspiration, human resources, or technology, hi tech is vital for keeping the government innovative and groundbreaking. If this type of government succeeds, that would mainly benefit the country's citizens, in the form of better, more convenient, faster, and safer services.

When the government is inspired by hi tech, it boosts the government psychologically, culturally, and organizationally, and improves the way that the government provides services. **Psychologically:** Professional managers want to be seen as innovative and as part of the "start-up nation" brand. They are therefore prepared to take risks that policy leaders in other countries would not be as prepared to take. **Culturally and organizationally:** The hi tech sector causes the government to rethink the way it operates and its various work processes.

Technologically and digitally: The government is more prepared to give technological-digitalization solutions a try, even if they may fail.

Moreover, a thriving high tech sector would contribute to the government in terms of cloud and data infrastructure, as well. This includes knowledge sharing and cross-fertilization between the government and hi tech, in areas such as as cyber security. The local solutions and Israel's cyber expertise help the country contend adequately with cyber threats to the government's digital assets.



The hi-tech sector's flywheel

Developing companies from technology companies to successful for-profit companies with employees that generate added value for the economy involves several stages. It begins with basic research, usually conducted in universities and academic institutions, continues with applicative research and development within budding startups, and concludes with growth companies and contributing, productive companies.

There are various stakeholders along this value chain that support the growth of these companies. This group includes venture capital firms and investors, government ministries and authorities, and the multinationals and mature companies themselves.

Hundreds of startups are created every year in Israel, which aspire to bring the world new technology and business offerings. Some of them will eventually mature and evolve into multinational public companies. The hi tech sector and the companies that comprise it employ official and non-official mechanisms that drive and contribute to the life cycles of the technology and the startup companies, increasing the chances that those companies will evolve into companies that contribute to the economy. Were it not for this activity, Israel would have struggled to remain a global leader in innovation or to preserve the hi tech sector's status as the economy's growth engine.

The hi tech sector has a diverse, cyclical and pronounced impact on the ecosystem, which is what allows hi tech companies in various fields in Israel to grow so rapidly. The sector's cyclical nature manifests in how the output of one technology company contributes to another technology company, and so on. This could include CVC funding, a CTO at a startup who acquired his or her technological skills at a large hi tech firm, a programmer who would likely not have discerned gaps and become an entrepreneur had she not been involved in this sector, or an expert from the sector who becomes an investor, thanks to the knowledge that he or she had accumulated, and is now able to allocate the capital he or she manages to companies with a higher potential.

Let's take Efrat's case. Efrat began with a degree in economics, and was eventually hired at a large hi-tech company. Having worked at Company A for a few years, she came up with an innovative idea for the finance industry. The skills she acquired while employed in the hi tech sector gave her the abilities, the language and the understanding that the Israeli entrepreneurial ecosystem needs, and this is how she began her journey to establishing an advanced startup. Today, after having worked as an entrepreneur and manager for years and met with many investors, Efrat is beginning to invest in startups, consult to them, and contribute to their growth. While Efrat's story is fictional, it does reflect the experiences of many entrepreneurs who essentially apply hi tech's contribution to the broader ecosystem, and contribute to Israeli hi tech's growth and non-linear contribution to the State of Israel.

Another part of this connection between the entrepreneurs and the ecosystem lies in links between the academic world and industries. Those connections give rise to groundbreaking technological developments, entrepreneurs, and innovative companies.

Corindus is a company developing a robotic system for catheterization procedures. One of its founders was Professor Rafi Beyar. It began in 2002 at an incubator at the Technion, as a collaborative project with Rambam Medical center, and in 2019, it was sold for \$1.1 billion. Beyar is now managing Alive, a VFC specializing in investments in MedTech startups. There are many other similar stories of serial entrepreneurs in the hi tech sector.

Collaboration between academia and industry

Generally speaking, Israel is considered a world leader in terms of collaboration between the hi-tech sector and academia. It tops the the GII (the Global Innovation Index) for collaboration on R&D between industry and academia⁹¹.

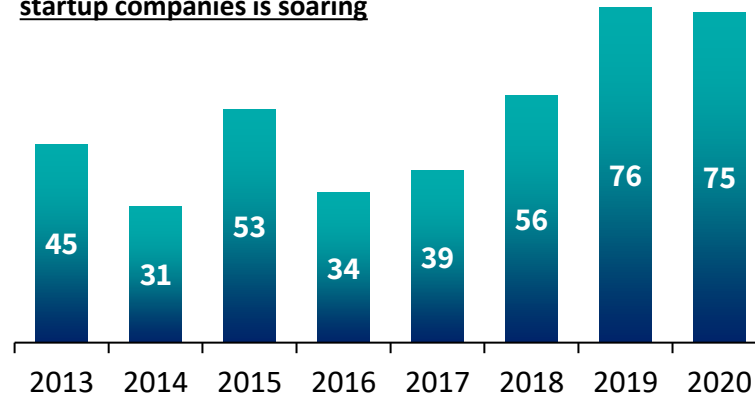
These collaborations are forged in a broad range of disciplines, including cyber, quantum computing, biotech, and more, and manifest in various ways.

91 [2022 Innovation Report \(34-35\)](#)

They take the form of startup incubators, holdings in technology companies (which may be either private or public companies, or even unicorns), and even instruction. For example, the Technion owns about 130 startups, and this year, it is expected to establish another 17. In some leading Israeli academic institutions, hi tech companies established physical R&D sites within the academic campuses. These partnerships include the academic and professional mentorship of students by researchers from those companies. The academic world has established new academic positions that accord a status to industry figures based on contributions that are not measured using classic academic criteria. However, there are vital areas in which having the ability to scale up the existing collaboration between companies and Israeli academic, regardless of business concerns, is important. This is the case, for instance, in the field of space research.

Although Israel leads the GII index, and despite the rise in the number of partnerships between the hi tech sector and academia, collaborations in Israel are very centralized and are mainly driven by multinationals, which account for about 85% of those partnerships. This means that even though the sector has matured and that Israeli megacorporations have grown, Israeli companies almost never engage in collaboration with academia. The hi tech sector is continuing to mature, and the pace at which multinationals open new R&D centers has slowed, so expanding collaboration between Israeli hi tech firms and academia is crucial.

Figure 39: Collaboration between academia and industry has expanded in recent years, and the number of academic startup companies is soaring



The managers and entrepreneurs of tomorrow

Working in hi tech familiarizes workers with the existing technologies, as a foundation for understanding the gaps in the market and creating innovative products, while providing the tools and knowledge needed to form companies.

Moreover, many entrepreneurs and managers have been receiving informal training at hi tech companies since they were junior employees. They learn how scale companies financially, administratively, organizationally, and more. With this informal training, many entrepreneurs are more likely to turn their ideas into revenue-generating companies, and then, scale those companies to make them multinationals.

Pushing growth companies forward

Accelerators, trainings, investments and using infrastructure are just a few examples of how the hi tech sector fuels the innovation ecosystem in the State of Israel. Intel, for instance, operates in many areas, including an accelerator called Intel Ignite, a completely free 12-month program for growth companies. The program is offered with no fees or demands for equity stake, giving companies with few resources the opportunity to benefit from the program, fulfill their potential, and grow. During this program, entrepreneurs receive professional guidance from experts and senior figures in the hi tech sector, as well as access to Intel's resources, and ultimately, ways of reaching investors. Intel is now launching this program's seventh cohort. IBM, Google, and many hi tech companies have similar programs.

Additionally, as of 2021, about 80 Israel and foreign corporate venture capital (CVC) funds operate in Israel.⁹³ These CVCs are growing fast. In 2021 alone, they made 166 seed investments. Large hi tech companies are not the only companies to benefit from CVCs – those operating in other segments, like construction, finances, and energy, to name a few, benefit as well.

[92 2022 Innovation Report \(34-35\)](#)

[93 2021 Israel funding ecosystem, Cardumen Capital](#)

[94 IVC Data and Insights](#)

A look ahead at the hi tech industry's main challenges

To keep the hi tech sector functioning as a national economic growth engine, existing companies must continue operating, growing, and expanding their activities. Concurrently, more substantial companies must be established, bringing a fresh wave of made-in-Israel innovation to the rest of the world. This involves increasing the workforce, substantially growing companies, and preserving the ability to innovate, while fulfilling the sector's potential to serve as a springboard for social mobility and an engine for the adoption of technologies across the economy.

The sector faces three main challenges. The first is to keep the Israeli hi tech sector competitive, as hi tech sectors elsewhere in the world grow stronger. The second is to continue developing companies that operate fully in Israel, and the third is the availability of high-quality human resources, representative of all population groups. The hi tech sector must overcome these threats to meet its potential as an inclusive growth engine.

This requires strengthening the infrastructure the sector relies on, including education, and academia, physical infrastructure, and regulation. If development targets are not met and if infrastructure is not strengthened, Israeli hi tech will become less competitive and stop being a tech leader, harming the sector's capacity as a national economic catalyst.

This report focuses on the hi tech sector's great contribution to the Israeli economy and society. This contribution is made possible by the strong and active ecosystem in Israel, which is rather unique to Israel.

What were to happen had this ecosystem not taken shape over the past thirty years? Senior figures in the ecosystem take an unequivocal stance: the entire country would look completely different. In a country with scarce natural resources and little substantial industry, human capital becomes the economy's driving force. If these resources remained unleveraged by the hi-tech sector, the economy would be far less robust. We would have experienced a brain drain on a larger scale, and this would harm the Israeli brand internationally.

Israel may be the hi-tech nation, but it is facing challenges that jeopardize the sector's local and international status. As a case in point, between 2020 and 2022, while Israel remained in third place in the Global Startup Ecosystem Index, other countries, like Sweden, Singapore, France, invested and boosted their rank.⁹⁵

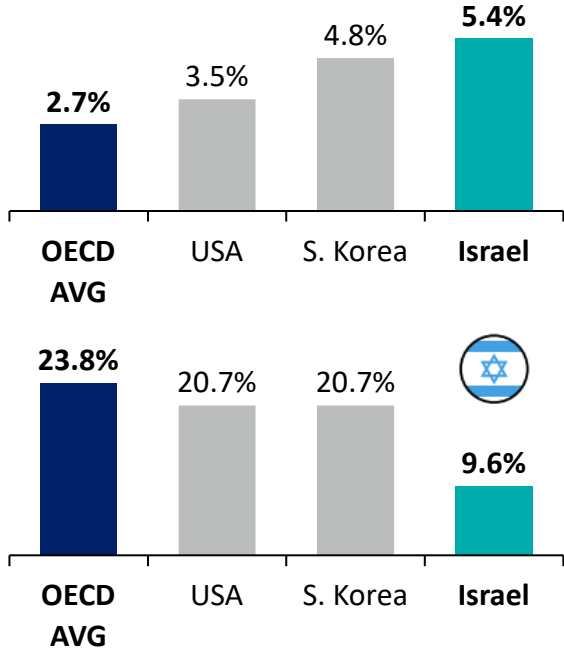
While Israel has the highest rate of investment in R&D, it is mostly from the business sector. If we examine government funding, we'll discover that Israel is trailing behind the others (see Figure 40).

This is important in several aspects. First, when countries invest in promoting technology and innovation, they demonstrate that they intend to strengthen the local hi tech and innovation sector, strengthening the competition that Israel faces. CEOs of multinationals have been sensing the stronger competition when they compete against other R&D centers over budgets, projects and resources .

Second, the business sector, as expected, focuses on business and the ability to monetize and generate value from technology. R&D is a long process, and the longer it takes to break ground, the greater the risk. The financing environment in Israel causes the hi-tech sector to center on applied R&D, which focuses more on existing technologies or advanced stages, and less on technologies of the future, like space, quantum computing, or any other development. These technologies are strategically important, and if Israeli companies enter the market too late, that might jeopardize the country's future status as a leader and cause multinationals to opt against investing in this Israeli economy.

Finally, government funding affects the ability of academic institutions to serve as a source of strength for research. Studies show that academia plays a major role in promoting technologies and creating startups and companies. Currently, Israeli academia is responsible for about 1% of the world's scientific publications, even though Israel's population is only 0.11% of the global population. In many areas, such as chemistry and computer sciences, Israeli academics are particularly influential over the international scientific community⁹⁶. The government and the industries must take action to preserve this and ensure that Israeli academia continues to thrive.

Figure 40: How much of the GDP is invested in R&D?



Percentage of R&D financed by the government (2019)

Despite the abilities and positioning that had been created for the innovation ecosystem in Israel and more broadly, for the entire country, Israel's performance has deteriorated in recent years, as reflected in 2021 Global Innovation Index, in which it was ranked only 15th in the world (dropping three ranks within two years). However, it is important to note that if we take a closer look at what comprises the index score, we can see that the areas in which Israel lags behind other countries depend less on the hi tech sector and innovation, and include political stability and national infrastructure.

Moreover, the elements of education and human capital have declined in the past two years. The combination of all of these elements, with certain countries having set their sights on developing the innovation ecosystem and adopting technologies, have led to Israel's drop in the rankings.

Senior officers in multinationals confirm that their competition against their counterparts worldwide is growing more intense with every passing day, making it hard for them to choose an Israeli site for future investments. Aside for issues tied to innovation and human resources, regulation plays a central role in keeping Israel competitive. The centrality of the multinationals, along with the global nature of the hi tech companies, make Israel a good choice as a central market to operate from. The rules of the game aren't determined by the companies in Israel. Rather, they're determined internationally, and we must be able to handle these rules, and triumph. These rules are tied to how easy it is to establish and upgrade companies, how financially worthwhile it is to work from Israel, and how difficult it is to deal with the bureaucracy.

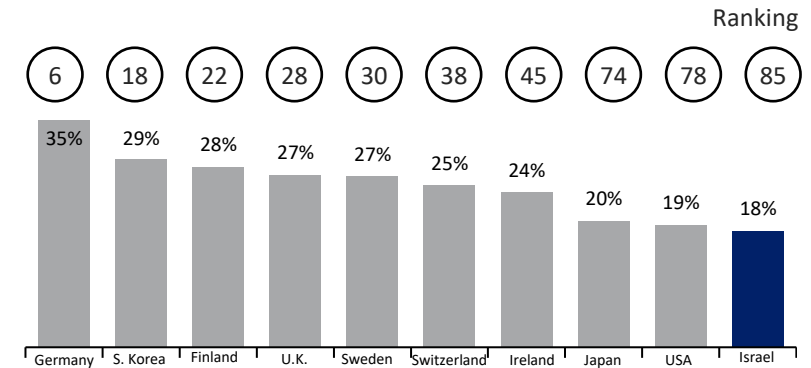
The ability to develop end-to-end companies in Israel, either as a result of the maturation of startups or the entry and expansion of multinationals, doesn't depend solely on how competitive Israeli hi tech is or how much is invested in technologies. It is also tied to Israeli regulations and the conditions on the playing field, and no less importantly, on having human capital that will facilitate the anticipated growth.

These pose a threat to the sector's ability to reach its fullest potential and to preserve its status as a growth engine with all of the qualities described in this report. With this in mind, we can define the sector's target function for the future to support the realization of its enormous potential contribution: Growing sustainable companies that benefit the world, whose main activity occurs in Israel.

In other words, to realize this target function, we must broaden the base of potential employees, while maintaining a proper representation of the different population groups, strengthening technological abilities and development, and allowing and encouraging companies to grow in Israel. There are three main areas in which these threats must be contended with: education, academia, and infrastructure (both physical and regulatory).

Investing in education to broaden the human resource base in the short and long term

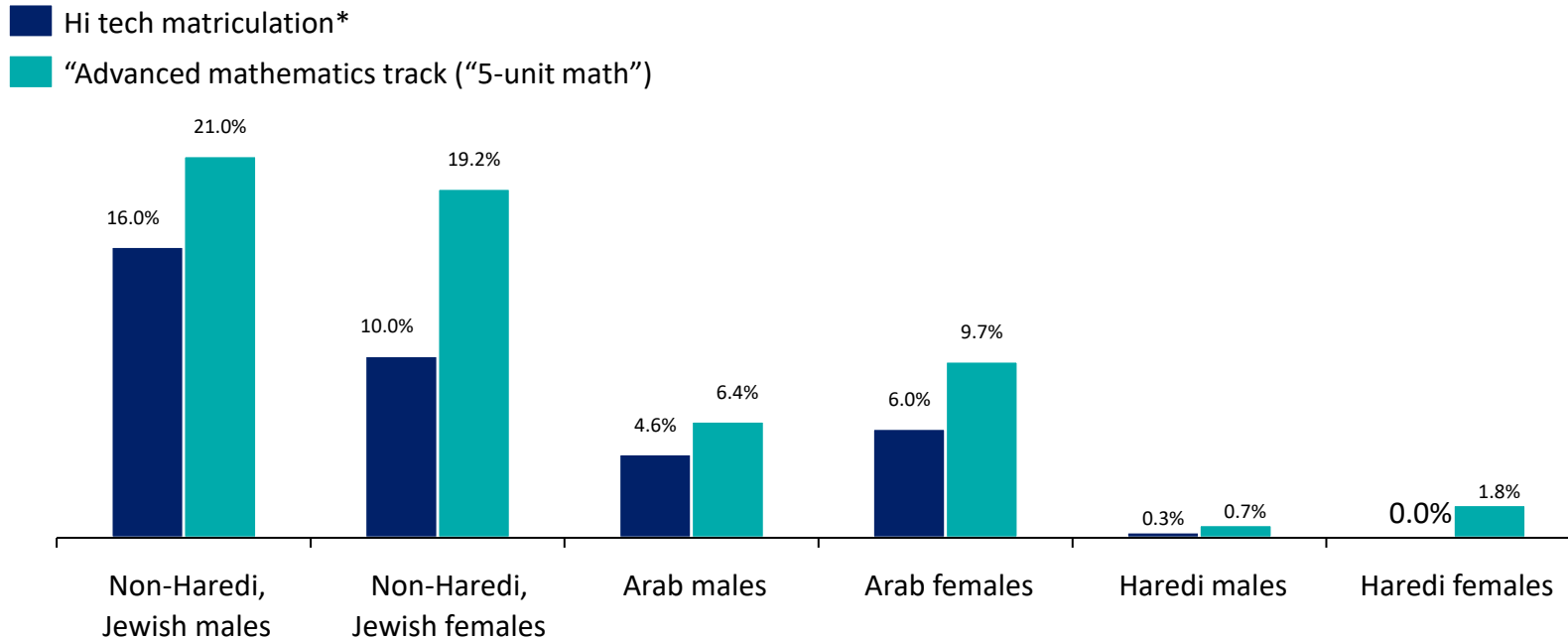
Figure 41⁹⁷: Percentage of graduates with degrees in engineering and the sciences, 2021



Investing in human resources and education does not begin with academia. It starts long before that, when those individuals are within the compulsory education system. Increasing the number of students in the top high school tracks in the relevant subjects, exposing students to the opportunities available to them, and giving them the skills they need to work in the modern job market, are the key to creating the major changes that will increase the number of candidates available to the sector, particularly those coming from underrepresented populations.

As an example, **If the number of Arab men who had completed advanced track mathematics (called "5-unit math" in Israel) were identical to the number of Jews who had completed advanced mathematics track, another 8,000 new employees would be made available to the hi tech industry within 5 years.**⁹⁸

Figure 42: The percentage of 12th-graders studying for the "hi tech matriculation exam" and studying "5-unit math", broken down by population group, in 2019



* "Hi tech matriculation": a track comprised of 5-unit math, 5-unit English, and 5-unit physics or computer sciences

⁹⁸ Ministry of Finance, December 2021

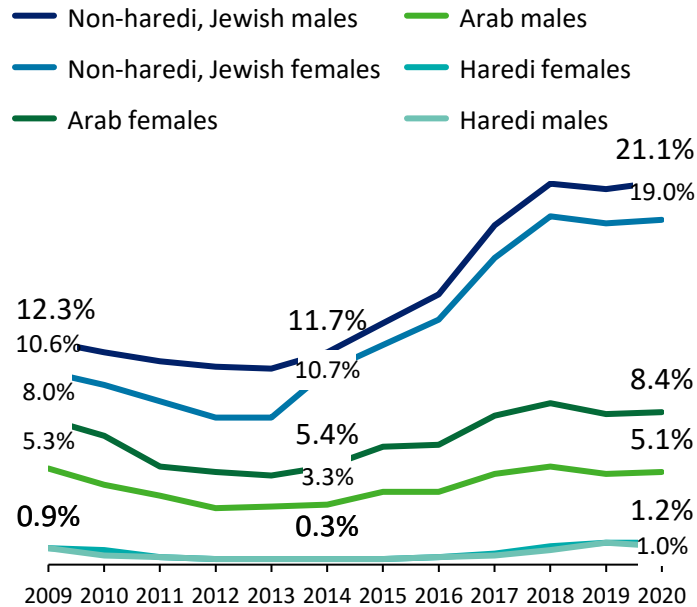
Over 30,000 currently Israeli hi tech positions (as at April 2022) are currently vacant, of which 65% are technological positions. During 2022, the demand for software engineers fell. For example, between the second and third quarters, there was a 31% reduction in the number of open positions. Despite downsizing processes over the past year, it's clear to everyone that the sector is expected to keep growing in the long term. If we peer into the future, we would realize that unless we radically change the way we operate, this gap will likely never close. It will get even wider.

The key to increasing the relevant human resource base is to increase the number of people with skills relevant to the hi tech sector, in both technological and non-technological roles. These steps must be taken, with an emphasis on integrating underrepresented populations.

Generally speaking, at present, underrepresented populations have not shared the nationwide upward trend in student performance in core subjects vital for finding a job in economic sectors with high levels of productivity, and more specifically, in the hi tech sector.

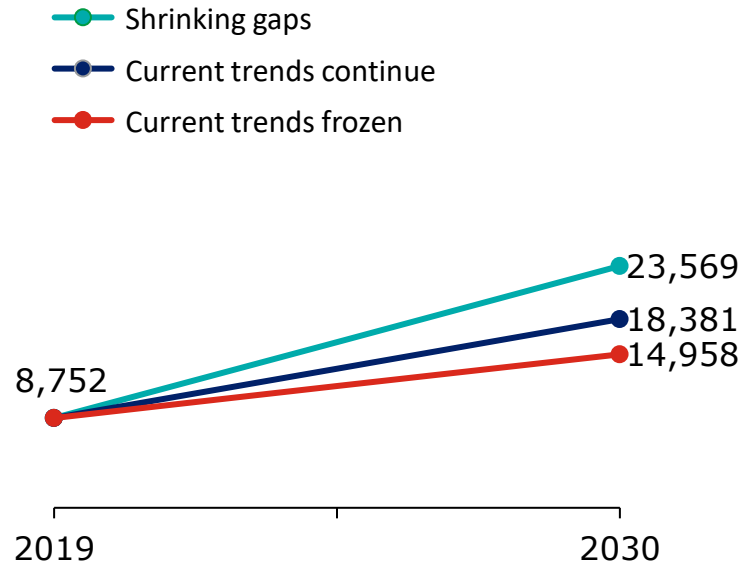
For example, the increase, over the past decade, in the number of students studying 5-unit math refers entirely to non-Haredi Jewish men and women, whereas little improvement has occurred in the Haredi and Arab sectors.

Figure 43: 100 The number of 5-unit math students in each of the groups



Inclusive growth is not the only key to reducing the gaps in Israeli society. Resolving the human resource shortage in the hi tech sector is also critical. Without change and major investment that would dramatically increase the number of 5-unit math graduates (according to certain academics, the matriculation exams in these tracks are better predictors of success than the Psychometric Exam), the human resource shortage is likely to worsen.

Figure 44: 101 Forecast of the number of students with hi tech degrees, by scenario



The required investment in education does not include just strengthening science instruction, but also adding the skills students will need to succeed in a dynamic, technologically-oriented work environment. Since all sectors have undergone a technological transformation, or will undergo such a transformation, introducing these skills would contribute to the entire economy, and not just to the hi tech sector.

Responsibility for education rests on the government, and it must draft a program to advance education and adapt it to the requirements of the hi tech sector in Israel. However, the hi tech sector also has a relevant role to play. This role includes continuing to participate in and support non-academic training so that suitable candidates from various population groups can be integrated. Philanthropic investment in education, which has no immediate ROI, is also important. The Tmura Fund and an NGO named Unistream are examples of this.

The Tmura fund was established in 2002 to boost the involvement of the Israeli hi tech sector in not-for-profit activity, particularly educational activity. The fund receives donations in the form of holdings (usually options) in hi tech companies, dependant on a sale or IPO. The funds are transferred to the selected non-profits by those companies. Generally, the non-profits that those funds are earmarked for work in the fields of education and youth. In 2022, donations to this non-profit surpassed 100 million ILS.

99 The Committee for Increasing Human Capital in High-Tech, December 2021 (data from the National Economic Council)

100 The Dadi Perlmutter Committee for Increasing Human Capital

101 The National Economic Council

For two decades, Unistream has been active in providing entrepreneurial tools to children in the periphery. Many hi tech companies support this non-profit's activities and invest time and resources to help advance its goals.

In summary, investing in education to promote the integration of human resources in the hi tech sector and technological professions is vital to preserving Israel's status as a "startup nation", and serves as the main driving force behind closing social gaps. The responsibility rests on the shoulders of both public servants and the hi tech sector.

Physical infrastructure is not a luxury

Developing physical infrastructure like transportation and telecommunications is vital if the sector is to continue developing and expanding. It will allow the entire economy to collaborate with the hi tech sector, and it will reduce the gaps between the center and the periphery.

Satisfactory public transport is critical to keeping job centers and academic institutions accessible to the entire population, particularly to those from more underprivileged backgrounds, whose motorization rate (number of vehicles per 1000 inhabitants) is lower, or populations living in remote areas with a scarcer presence of hi tech companies. Furthermore, OECD reports indicate that among other things, the slow growth rate of Israel's productivity level, when compared to other OECD countries, is tied to the inadequate transportation infrastructure that hampers the private market's ability to operate efficiently.¹⁰²

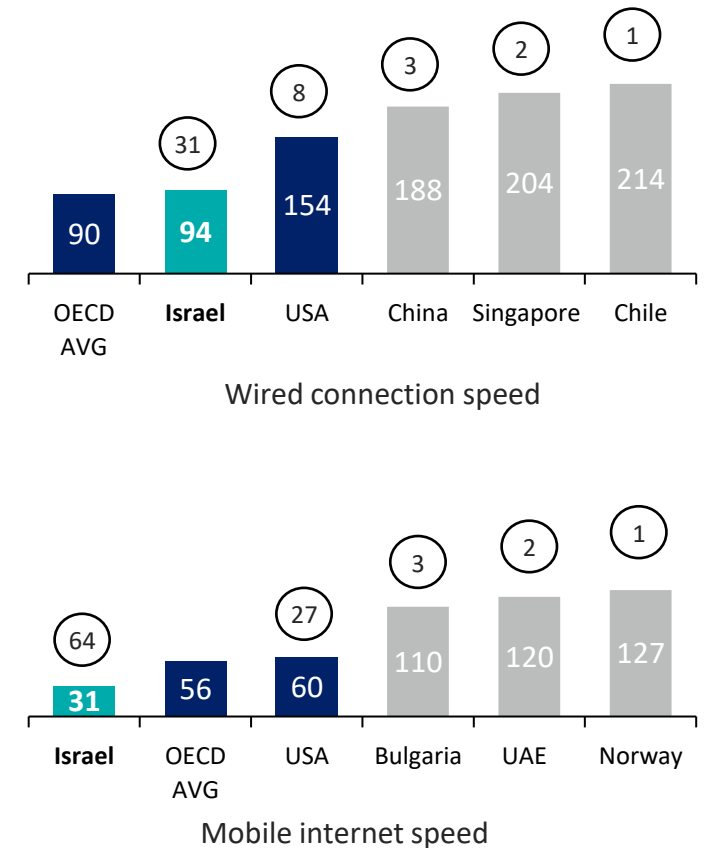
[102 OECD Economic Surveys: Israel](#)

Gaps exist in the telecommunications infrastructure, as well. Fiber optics are the most advanced telecommunications infrastructure, and in recent years, fiber optics infrastructure has been deployed throughout country. Israel is considered a global leader in terms of how fast it deploys fiber optics. However, the requirement to deploy fiber optics nationwide has been removed. According to data published in 2021, 40% of the population, including Haredi Jews, Arabs and residents of the periphery, had not been included in the major telecommunications companies' fiber optics deployment scheme.

Hi-speed internet is vital for learning and working remotely. However, internet speed in Israel is among the slowest in the world, placing it in 31st place for landline connection speed (with an average speed of 94 megabytes per second), and 64th place for mobile internet speed (with an average connection speed of 31 megabytes per second). This may inhibit Israel's potential to increase social mobility and integrate underrepresented populations.

Figure 45: Ranking telecommunications infrastructure in Israel

(Byte per second)



Transitioning to enabling regulation as infrastructure for developing Israeli companies

To continue developing successful Israeli companies, Israel must take steps to advance regulation that enables and advances, rather than set obstacles and limit the Israeli market's competitiveness.

One central fear voiced by veteran hi tech sector professionals is that entrepreneurs and companies will not choose Israel as an important place to grow in, because of regulatory changes and the need to comply with complicated and intricate regulations.

Another challenge is making Israel a place where the entire economy benefits from the hi tech sector's innovation. Creating a sandbox that allows people to try out and assess technology, in collaboration with local industry, could lead to a situation where both local industries and technology companies benefit. Technology companies would gain experience, benefit from enhancements to their products, and achieve a competitive advantage, and the local economy would absorb the technological innovation that it would otherwise benefit from at later stages. The main obstacle is making these pilot sites accessible. State and regulatory tools wielded by decision-makers can easily clear regulatory hurdles and keep participants sufficiently motivated.

Regulation tends not to respond quickly enough to the technological changes in the market, particularly the innovative areas of multidisciplinary hi tech, like fintech. Technology companies operating in those fields stand to benefit a great deal from the first trials and integration of their technologies in Israel, and the same goes for companies in the other sectors. This is why supportive and enabling regulation is needed.¹⁰⁴

Eyes on the horizon

Just as we could not imagine our world without technology, a State of Israel without a trailblazing hi tech sector is unimaginable. The hi tech sector is indisputably the State of Israel's main asset. This is because it is undeniably a major growth engine for the economy, contributes to national resilience, and allows the state to advance national objectives, like inclusive growth and improving the overall productivity.

Despite the sector's leading position, a number of factors threaten its ability to compete on the global stage and continue acting as a growth engine for the economy, while exhausting its immense long-term potential sustainably. Contending with these challenges is critical, not just for the hi tech sector, but for the country as a whole.

The challenges specified in this report are the main obstacles to future growth and to expanding the hi tech sector so that it can embrace people other than those populations currently working in the field. They hamper the substantial social mobility made possible by this sector.

These obstacles must be removed in order to keep the sector in the lead, in terms of both human resources and the ability to develop substantial companies with a distinct Israeli character. It is how Israel can go on being a global hub for technology and innovation.

The hi tech sector in Israel, and hi tech throughout the world, has been through some tough times recently. There was a 40% reduction in hiring during 2022, though it still accounted for 35% of growth since 2020, growing at an annual rate of over 20% since 2018. In other words, if we were to exclude the 2021 anomaly, hi tech is still experiencing a growth trend. We simply need to adapt the sector's business properties to the modern day. This is not the first crisis this sector has experienced, and it probably will not be the last. History has shown us that the sector has emerged stronger from every crisis, continuing to grow and play a central role in the economy. This trend is expected to continue during the current crisis as well.

We are living in a challenging time, when maintaining business certainty and the ability to stay competitive internationally is critical.



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List of interviewees

Many dozens of interviews were conducted throughout this process. The interviewees present a wide and representative sampling of senior Israeli professionals from the hi tech sector, the public sector, the media, and the relevant ecosystem

Name	Company
Natalie Kramer	AT&T
Sami Peretz	The Marker
Dr. Sergei Somkin	Aaron Institute for Policy Research
Adi Soffer Teeni	Facebook Meta
Imad Telhami	Babcom Centers
Prof. Ami Appelbaum	The Innovation Authority
Dr. Ami Moyal	Afeka
Imad Younis	Alpha Omega
Dr. Anat Cohen-Dayag	Compugen
	National Council for Civilian Research and Development
Prof. Peretz Lavi	
Tzvi Eckstein	Aaron Institute for Policy Research
Zvi Landau	SolarEdge
Karin Mayer Rubinstein	IATI
Keren Terner	Vintage Investments Partners
Prof. Rivka Carmi	TELEM
	Director-General of the Ministry of Economy and Industry
Dr. Ron Malka	
Prof. Ronni Gamzu	Tel Aviv Sourasky Medical Center
Rony Friedman	Apple
Racheli Ganot	Rachip
Shai Levy	Amdocs
Shira Greenberg	The Ministry of Finance
Shira Lev-Ami	The National Digital Agency
Shlomo Dovrat	Viola
Tomer Bar-Zeev	ironSource

Name	Company
	The Ministry of Science and Technology
Hilla Haddad-Chmelnik	
Zohar Levkovitz	Zohar Levkovitz
Dr. Ziyad Hanna	Cadence
Chaim Geron	Infinity
Yadin Kaufmann	Tmura
Yahal Zilka	10D
	The National Economic Council
Yuval Admon	
Yuval Tal	Team8
Yuval Cohen	StageOne Ventures
Yoni Assia	eToro
Jonathan Adiri	healthy.io
Jonathan Berger	The Kitchen
Dr. Yossi Vardi	Entrepreneur and investor
Yossi Carmil	Cellebrite
Prof. Yossi Matias	Google
Yoram Tietz	EY
Yifat Oron	Blackstone
Yaky Yanay	Pluristem
	The Budget Division (Ministry of Finance)
Kfir Battat	
	Ministry of Economy and Industry
Michal Fink	
Dr. Michael Gofman	The Hebrew University
Meirav Arlosoroff	The Marker
Moshe Friedman	KamaTech
Mati Gill	AION Labs

Name	Company
Adam Fisher	Bessemer
Aaron Mankovski	Pitango
	Entrepreneur and Scientist
Dr. Orna Berry	
Prof. Uri Sivan	Technion
Eyal Waldman	Nvidia
	Tel Hashomer Medical Center
Eyal Zimlichman	
Ilan Birnfeld	Deloitte
Ittai Ben-Zeev	TASE
Eli Groner	Koch Disruptive Tech
Prof. Alon Chen	Weizman Institute
Assaf Wasserzug	The Ministry of Finance
Erez Tsur	Carbyne
Ben Enosh	Antidote Health
Barak Regev	Google
Jonathan Medved	OurCrowd
Gigi Levi-Weiss	NFX
Gil Golan	General Motors
Galit Hemi	Calcalist
	High-Tech Human Capital Committee
Dadi Perlmutter	
Dr. Dorit Dor	Check Point
Didier Toubia	Aleph Farms
	The Ministry of Education
Dalit Stauber	
Prof. Dan Peer	Ramot - TAU
	The Innovation Authority
Dror Bin	

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Thank you



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