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STARTUP NATION CENTRAL

The Contribution of Israel's High-Tech Sector to Economic Resilience and Macroeconomic Performance

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The Contribution of Israel's High-Tech Sector to Economic Resilience and Macroeconomic Performance: Achievements and Challenges

Israel's high-tech sector has the greatest relative economic impact on its national economy than in any other country, contributing 10% of national employment and 20% of GDP in 2023, twice the share in the U.S. and more than 2.5 times that of leading European economies (Austria, Denmark, Finland, the Netherlands, and Sweden). It is a global tech hub, second only to California, with an economic contribution comparable to Texas.

The high-tech sector provides a macroeconomic platform for Israel's stability, driving 40% of overall growth, generating 25% of total tax revenues, and contributing 52% of exports in 2023 – making it a key engine of economic resilience and a major force behind Israel's positive current account balance.

Israel's high-tech sector remains a pillar of resilience in times of crisis, achieving 1.8% GDP growth in the first half of 2024 despite a 1.3% national contraction, with over $12 billion in investment exceeding pre-2020 levels, even as reserve duty rates in the sector were twice as high as in other sectors.

A key driver of the sector's resilience is its diverse composition – encompassing multinational corporations (33% of employment), fast-scaling startups (8% of employment), and a globally leading defense industry (12% of employment) – which has been expanding rapidly since 2022, reaching a record $13.1 billion in exports in 2023.

Israel's highly skilled workforce is the backbone of its high-tech sector, with 16.4% of the workforce employed in ICT roles – over twice the EU average – driven by a strong R&D focus and productivity levels 2.2 times higher than other sectors. This expertise attracts foreign VC investment and multinational companies seeking to establish R&D centers.

Between 2023 and 2024, Israel's high-tech sector faced two major risks: judicial reform proposals that raised the risk of property rights, and the war, which disrupted economic activity, triggered prolonged military reserve duty, and heightened concerns of brain drain. These disruptions have slowed GDP growth, reduced employment and startup formation, and placed significant operational strain on high-tech firms.

Artificial intelligence presents both a risk and an opportunity for Israel's high-tech sector – boosting productivity, fueling demand for deep-tech talent, and attracting companies like NVIDIA, which is expanding its investment in the local AI ecosystem. However, as global competition intensifies – with the U.S., China, and the EU investing heavily in innovation to secure technological leadership – Israel must act decisively to remain competitive.

Policy Recommendations:

1. Expand Human Capital for Israel's High-Tech Future

Israel should enhance the quality and diversity of its high-tech workforce. This includes fully implementing the Perlmutter Committee's recommendations to achieve a 3.5% annual growth in tech-related employment across all sectors of the economy. Special emphasis should be placed on integrating women, underrepresented populations (including Arabs and Haredim), and residents of peripheral regions.

2. Strengthen Industry-Academia Knowledge Transfer

It is essential to strengthen knowledge transfer between academia and industry. Establishing reliable metrics to track progress and identify the most effective policy tools will help guide these efforts. Aligning academic programs with industry needs in AI will better prepare graduates for the evolving job market. Additionally, enhancing collaboration mechanisms and removing barriers to the commercialization will ensure that cutting-edge ideas translate into economic growth.

3. Ensure Internationally Aligned and Credible Tax Policy

Israel should align tax policies with international standards to maintain global competitiveness. Ensuring tax credibility and predictability will enhance the business environment, attract more multinational corporations and investors, and support the sustainable growth of startups and innovation-driven companies.

4. Enhance Workforce Productivity Across All Economic Sectors

Israel should target an annual 2% increase in productivity across non-tech sectors. This requires integrating more tech-skilled employees across all industries, accelerating digitalization, and fostering innovation. Expanding R&D efforts, particularly in the defense sector, and improving productivity in government-owned defense companies will be key to meeting this goal. Additionally, fostering collaboration between academia and industry and supporting startups will drive technological advancements. In parallel, improving public sector efficiency through digital transformation is crucial.

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1. Summary and Conclusions

Israel's high-tech sector stands as the most impactful relative to the national economy of any country in the world, contributing 10% of total employment and 20% of GDP in 2023. This is twice the share of the U.S. and more than 2.5 times that of leading European economies such as Austria, Denmark, Finland, the Netherlands, and Sweden, where high-tech sectors average just 4% of employment and 8% of GDP. Israel ranks second only to California in high-tech performance, with an economic contribution comparable to that of Texas.

The high-tech sector provides a macroeconomic platform for Israel's stability and serves as a pillar of resilience in times of crisis. In addition to its significant share in employment and GDP, it plays a vital role in public finances and foreign trade, generating 25% of income tax revenues and accounting for 52% of total exports. Between 2017 and 2022, the sector grew at an average annual rate of 9.5%, contributing approximately 40% of overall economic growth. During the war, while the broader economy contracted by 1.3% and reserve duty in high-tech was twice as high as in other sectors, the sector still achieved 1.8% growth in the first half of 2024. Without high-tech exports, Israel's 3% current account surplus would have turned into a 10% deficit.

A key driver of Israel's high-tech resilience is its diverse workforce composition – spanning multinational corporations, fast-scaling startups, and a globally leading defense industry. Multinational firms employ 33% of the high-tech workforce, with over half of their operations focused on foreign R&D centers. Startups, which account for 8% of high-tech sector employment, are a major source of innovation. The defense sector employs 12% of the high-tech workforce and has expanded rapidly since 2022, reaching record export levels in 2023. The remaining 47% of the high-tech workforce is employed by Israeli-owned growth companies, with a strong emphasis on services.

Israel's highly skilled workforce is the foundation of its high-tech sector's success, positioning the country as a global leader in ICT expertise and research. With 16.4% of the workforce employed in ICT roles – more than twice the EU average – Israel has one of the world's highest concentrations of tech talent. Nearly half of high-tech employees are engaged in R&D, a level comparable to the U.S., reinforcing the sector's capacity for innovation. This expertise attracts foreign venture capital investment and multinational companies seeking to establish R&D centers.

The high-tech sector in Israel exhibits a high level of labor productivity, with GDP per worker twice as high as in other sectors of the economy. This productivity gap – known as the Dual Economy – is a global phenomenon. Addressing this disparity will require boosting productivity in non-tech sectors through greater digitalization, innovation, and adoption of advanced technologies.

The high-tech sector plays a pivotal role in helping Israel to narrow the GDP per capita gap with benchmark economies. Between 2017 and 2023, this gap declined from 25% to 19%, driven by increased employment of highly skilled labor across both high-tech and non-high-tech sectors, the increase of scalable high-tech companies, and strong productivity gains within the high-tech sector.[1] While Israel's high-tech productivity is aligned with leading EU economies, it remains 38% lower than in the U.S.,[2] underscoring the need to transition from a "Startup Nation" to a "Scale-Up Nation."

Despite global challenges and wartime disruptions, Israel's high-tech sector has continued to attract substantial foreign investment and sustain a strong multinational presence. In 2024, it secured over $12 billion – surpassing pre-2020 levels – demonstrating enduring global confidence in Israel's innovation ecosystem. Foreign companies have maintained operations, and despite widespread military reserve duty, there has been no significant talent outflow. This stability has helped preserve Israel's competitive edge and reinforce investor trust in the resilience of its high-tech sector.

There are several risks and opportunities in the High-Tech sector.

Between 2023 and 2024, Israel experienced a significant decline in economic and financial stability due to a range of challenges. These include the absence of a growth-supportive economic policy, the advancement of judicial reforms without broad consensus, and the "October 7 War." The resulting increase in defense spending has raised the debt-to-GDP ratio to 69% in 2024, leading to a downgrade in the country's sovereign credit rating. Israel's high-tech sector has been directly impacted by these developments.

[1] Israel's annual high-tech productivity growth reached 3.1%, exceeding the 1.6% average of benchmark countries, though still trailing the 5.2% rate seen in the United States.

[2] The U.S. has a large number of high-tech companies with significant market power in international markets.

The startup formation rate has declined significantly,[3] raising concerns about the future of early-stage innovation and its role in driving economic growth and employment. Between 2012 and 2023, the rate of new company openings fell from 20% to just 7%, while closures rose from 5% to 16%.[4] This shift has led to a notable decline in startups' economic contribution: their share in total employment dropped from 10% to 8.4%, output decreased from 11.5% to 8%, and their share of national civilian R&D spending declined from 22% to 14%. This downward trend may suggest a weakening pipeline of early-stage innovation that could have long-term implications for Israel's technological leadership and economic resilience.

At the employment level, Israel's high-tech sector has shifted its focus toward technical roles, particularly in research and development (R&D). In the first three quarters of 2024 compared to the same period in 2023, R&D employment grew by 4.9%, while business & administrative roles declined by 6.8% and product roles fell by 4.8%. The decline in "growth-related" roles, raises concerns about the sector's ability to scale startups into profitable, sustainable companies. This trend suggests a strategic refocusing and reallocation of resources toward high-value activities, likely driven by cost optimization.

A significant challenge affecting high-tech employment is the extended military reserve service. Since October 7th, the average reserve service in Israel has lasted 145 days, with 2.9% of high-tech sector workers serving in the reserves – nearly twice the rate of other sectors at 1.6. Among these reservists, about 60% are employed in R&D roles. This prolonged military reserve service has placed additional strain on high-tech companies, disrupting operations and raising concerns about transferring company activities abroad. Moreover, the situation has increased the risk of a "brain drain," where skilled professionals seek opportunities outside Israel due to economic uncertainty and instability.

[3] Israeli Central Bureau of Statistics (CBS) definition of "Startup Company": A new for-profit company, whose resources are directed towards developing an idea, service or product, and is the result of technological entrepreneurship based on research and development. This company has not yet made a profit or has not yet become a mature company (a company whose sole purpose is to sell a finished product or service to the markets, even if improvement and refinement processes are underway). The company's activities are usually financed through capital raising.

[4] Source: CBS.

Artificial intelligence (AI) presents both a strategic opportunity and a growing risk for Israel's high-tech sector. On one hand, it enhances labor productivity by automating routine tasks, freeing employees to focus on high-value activities, and fueling demand for deep-tech talent such as data scientists, machine learning specialists, and software engineers. Companies like NVIDIA are expanding their investment in Israel's AI ecosystem, reflecting confidence in its innovation capacity. At the same time, global competition is accelerating. The U.S., China, and the EU are investing aggressively in innovation, digital infrastructure, and talent development to secure technological leadership. Israel must act decisively to remain competitive and avoid falling behind.

To maintain its global competitive edge, Israel must preserve and expand its high-tech sector as a key engine for economic growth while enhancing labor productivity across all industries through innovation and digital transformation.

Policy Recommendations

1. Expand Human Capital for Israel's High-Tech Future

To sustain economic growth and global competitiveness, Israel should enhance the quality and diversity of its high-tech workforce. This includes fully implementing the Perlmutter Committee's recommendations to achieve a 3.5% annual growth in tech-related employment across all sectors of the economy. Special emphasis should be placed on integrating women, underrepresented populations (including Arabs and Haredim), and residents of peripheral regions.

Key objectives include:

- Increasing the proportion of employees in tech jobs from 14.8% to 20% by 2035.
- Raising the share of graduates with high-tech degrees from 10% to 15% by 2028.
- Expanding the number of MAHAT (vocational-technical) program graduates entering tech fields.
- Increasing the proportion of high school students eligible for a high-tech matriculation certificate from 11% to 17% by 2028.
- Enhancing digital and artificial intelligence (AI) skills among students, workers, and professionals, with a target of reaching 80% national digital and AI literacy by 2030, aligning with benchmark countries.

2. Strengthen Industry–Academia Knowledge Transfer

To further drive innovation and ensure the relevance of Israel's high-tech workforce, it is essential to strengthen knowledge transfer between academia and industry. This can be achieved by:

- Establishing reliable metrics to track progress and identify the most effective policy tools.
- Aligning academic programs with industry needs, particularly in artificial intelligence (AI), to ensure graduates are equipped for the evolving job market.
- Enhancing collaboration mechanisms between universities and companies, including joint research initiatives, internships, and faculty exchanges.
- Removing barriers to commercialization, so that cutting-edge research and ideas can be effectively translated into market-ready technologies.

3. Ensure Internationally Aligned and Credible Tax Policy

To strengthen Israel's high-tech sector and maintain its global competitiveness, a modern, transparent, and reliable tax framework is essential. This should include:

- Providing certainty in granting capital gains tax exemptions to foreign investors, including legislation to ensure that capital gains tax exemptions remain valid even if the foreign investor has a permanent establishment in Israel or if the activity is not strictly defined as capital in nature.
- Simplifying merger and acquisition (M&A) procedures to make it easier for small companies to merge with larger ones, supporting continued growth and scaling.
- Allow tax deferral upon merger
- Establishing a "green tax path" for MNCs operating from abroad, ensuring they benefit from a predictable and favorable tax environment while contributing to Israel's innovation ecosystem.

4. Enhance Workforce Productivity Across All Economic Sectors

To sustain economic growth and enhance competitiveness, Israel should:

- Target an annual 2% increase in productivity across non-tech sectors.
- Focus on strengthening efficiency in the public sector through digital transformation.
- Expand digital access and enhance connectivity nationwide.
- Fully digitize public services for businesses and individuals to streamline operations and reduce bureaucratic delays.
- Integrate more tech-skilled employees across all industries.
- Accelerate digitalization and foster innovation in all sectors.
- Expand R&D efforts, particularly in the defense sector.
- Improve productivity in government-owned defense companies to drive economic growth.

To achieve these goals, Israel should formulate and implement a comprehensive action plan with an appropriate budget and a robust monitoring and evaluation framework to track progress and ensure targets are met.

The remainder of this paper is organized as follows: Section 2 discusses the impact of high-tech on the economy, Section 3 highlights the key sources of high-tech resilience, Section 4 explores the risks and opportunities in the high-tech sector, Section 5 presents recommendations for Israel's National Innovation Policy, and Section 6 outlines a research plan proposal for the upcoming year.

Policy-Relevant Contributions of This Paper

This study plays a central role in supporting national policy-making across several strategic fronts. One of its key contributions is the development and ongoing refinement of a long-term human capital model by the Aaron Institute, which directly informed the work of the Perlmutter Committee for Increasing High-Tech Human Capital.[5] The model sets quantitative targets for employment in tech occupations, high-tech degree attainment, and high school matriculation in tech-related subjects – critical benchmarks for ensuring a steady pipeline of skilled professionals to sustain Israel's high-tech sector. Importantly, the model also addresses the broader need to boost innovation and digital adoption in traditionally less advanced sectors of the economy.

[5] See "2025 High-Tech Employment Status Report", Israel Innovation Authority, https://innovationisrael.org.il/en/press_release/2025-high-tech-employment-status-report/.

In addition, the study enhances Israel's macroeconomic planning through the evaluation of the high-tech sector's contribution to GDP. These insights helped shape recommendations presented to the Nagel Committee, which is tasked with evaluating the fiscal implications of increasing the defense budget in light of the October 7 war. These insights supported international economic dialogue during a joint event co-organized by the Aaron Institute for Economic Policy and the OECD, held at Reichman University, commemorating 15 years of Israel's OECD membership and launching the 2025 Economic Survey of Israel.[6] Furthermore, the research provided a foundation for guiding the National Digital Agency's efforts to improve public sector productivity and shape effective digital transformation policies7. Together, these contributions position the study as a vital instrument in aligning Israel's innovation capacity with its long-term economic and societal goals.

[6] See https://www.linkedin.com/feed/update/urn:li:activity:7313619807965184001/; "OECD 2025 report", www.oecd.org/content/dam/oecd/en/publications/reports/2025/04/oecd-economic-surveys-israel-2025_18e45b04/d6dd02bc-en.pdf, page 61.

2. High-tech's impact on the economy

The high-tech sector[8] plays a pivotal role in shaping Israel's economy, making it essential to understand its dynamics for future growth. A joint research initiative by the Aaron Institute for Economic Policy and Startup Nation Central (SNC) aims to explore critical aspects of this sector through four central questions: What is the contribution of the high-tech sector to the economy? What are the sources of resilience in the high-tech sector? What threats does the high-tech sector face? Lastly, what economic policies are necessary to maintain the high-tech sector as a platform for economic growth and to increase productivity across other sectors of the economy?

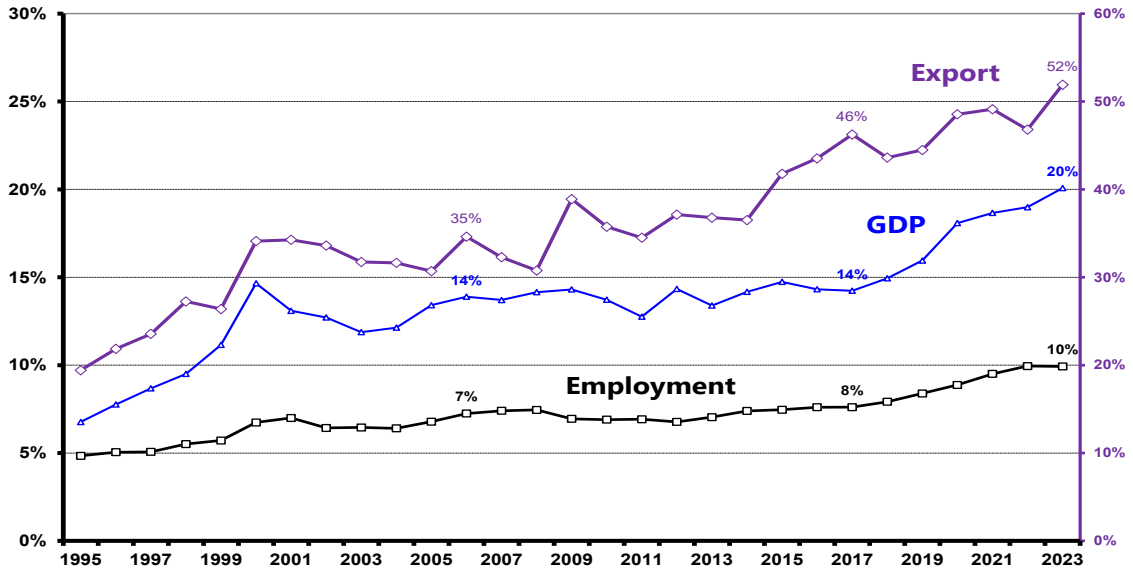
2.1 The significant contribution of the high-tech sector to the economy

Between 1995 and 2023, the high-tech sector significantly strengthened its position in the economy, particularly in terms of employment, gross domestic product (GDP), and exports, becoming a cornerstone of the national economy. Employment in the high-tech sector has grown considerably, increasing from 5% of the workforce in 1995 to 10% in 2023, effectively doubling its relative size.[9] The share of the high-tech sector in GDP has also risen sharply, climbing from 7% to 20% during the same period. Furthermore, the sector's share of exports has surged, accounting for 52% of the country's goods and services exports in 2023, compared to just 9% in 1995 (Figure 1).

[8] High-tech sector is defined as: High-tech sector - manufacture of pharmaceutical products, including homeopathic preparations (21), manufacture of computer, electronic, and optical products (26), manufacture of air and spacecraft and related machinery (303); and high-tech services - computer programming, consultancy and related activities (62), data processing, hosting and related activities, and web portals (631), scientific research and development (72).

[9] The share of the high-tech sector in employment among employees aged 25-64 is 12%.

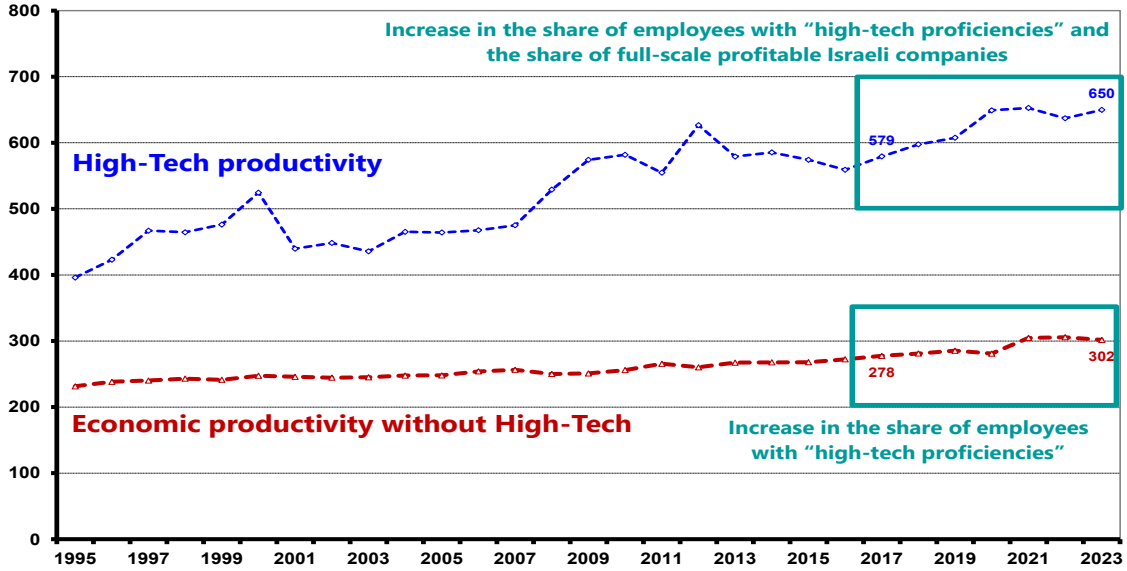
Figure 1: High Tech Share in Employment, GDP, Export of Goods and Services (% of Totals)



Source: CBS.

Ten percent of employees produce twenty percent of GDP, a phenomenon attributed to the high labor productivity in the high-tech sector. Specifically, labor productivity in this sector is 2 times greater than in other areas of the economy (Figure 2). This efficiency stems from factors such as advanced technologies, a highly skilled workforce, and substantial investments in research and development (R&D). As a result, the high-tech sector contributes disproportionately to GDP relative to its workforce size. Chapter 13 will address the question: Is the dual structure of the economy unique to Israel, or is it a characteristic of other developed economies?

Figure 2: Productivity in the High-tech Sector and in the Economy Without the High-tech Sector



Source: CBS.

2.2 The high-tech sector as a platform of growth and resilience for the economy

The high-tech sector is a cornerstone of Israel's economic resilience, driving growth and providing stability during both times of peace and crisis. Its impact extends beyond GDP growth, influencing employment, tax revenues, productivity, and global competitiveness. As Israel navigates evolving economic challenges, maintaining and enhancing the growth of the high-tech sector will be essential for long-term stability and development.

High-tech sector is a driver of growth. Tables 1 and 2 illustrate that between 2017 and 2022, the high-tech sector's GDP grew at an average annual rate of 9.5%, contributing approximately 40% of the overall economic growth. This growth rate was more than twice that of other sectors, which grew at an average annual rate of 4.4%. The substantial growth in the high-tech sector was driven by a 7.4% annual increase in employment and a 1.9% annual increase in productivity.

Since the onset of the "October 7 War," the high-tech sector has shown remarkable resilience, continuing to support economic growth during challenging times. In 2023, the sector grew by 5.1%, and in the first three quarters of 2024, it expanded by an additional 1.5%, helping to offset the broader slowdown in economic growth.

Table 1: Total Economy - Growth Rate in Employed Persons (15+), GDP per Employee, and GDP

Growth Component	2008-2017	2017-2022	2008-2022	2023	Q1-Q3 2024
Employment	2.5%	1.8%	2.3%	3.3%	0.9%
GDP per worker	1.2%	2.5%	1.7%	-1.2%	-2.4%
GDP	3.8%	4.4%	4.0%	2.0%	-1.5%

Source: CBS.

Table 2: High-tech sector - Growth Rate in Employed Persons (15+), GDP per Employee, and GDP

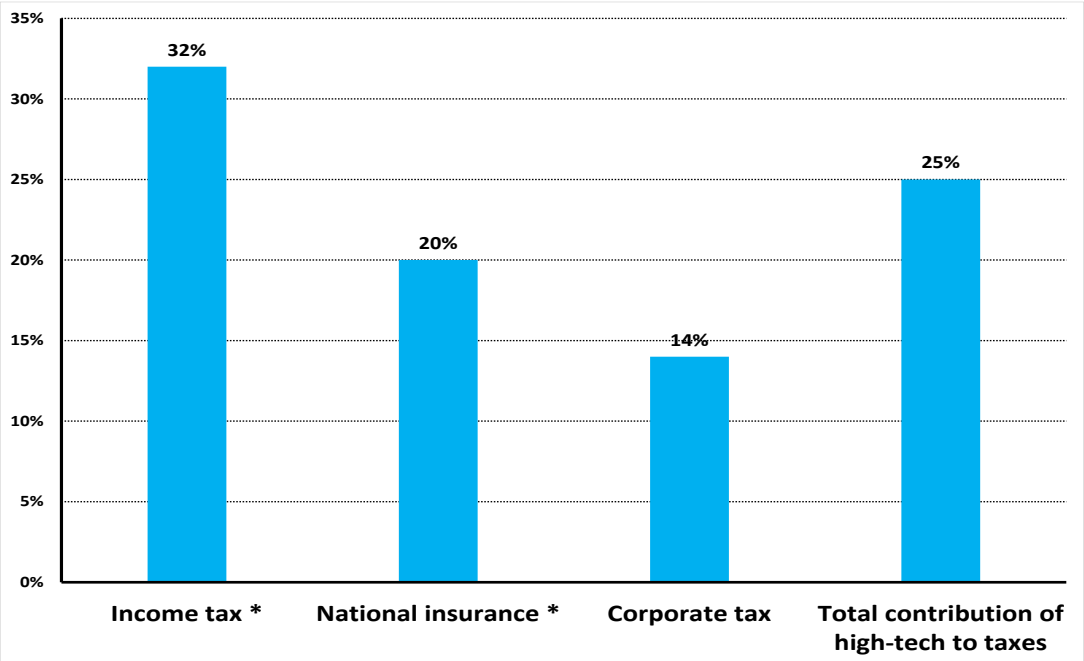
Growth Component	2008-2017	2017-2022	2008-2022	2023	Q1-Q3 2024
Employment	2.7%	7.4%	4.4%	3.1%	-0.7%
GDP per worker	1.0%	1.9%	1.3%	2.0%	2.2%
GDP	3.8%	9.5%	5.8%	5.1%	1.5%

Source: CBS.

A key factor behind the sector's success is its exceptional productivity growth. The 1.9% annual rise in GDP per worker in high-tech, coupled with an even greater 2.5% increase in the overall economy, explains why GDP growth has outpaced employment growth. We will later demonstrate that this increase in productivity can be partly attributed to the growing share of employees with "high-tech proficiencies" both within and outside the high-tech sector. This spillover effect – where advancements in high-tech skills enhance productivity across other industries – requires further research. Another significant driver of high-tech sector expansion since 2017 has been the emergence of "growth companies" – fast-growing startups that successfully transition into revenue-generating large high-tech companies.

The high-tech sector contributes substantially to tax revenues. The high-tech sector makes a substantial contribution to tax revenues, as shown in Figure 3. It generated 32% of income tax revenues, reflecting the high wages earned by its skilled workforce. Furthermore, the sector contributed 20% of national insurance payments and 14% of corporate tax revenues. Overall, the high-tech sector accounted for 25% of total tax revenues across these key categories, despite employing just 10% of the workforce.

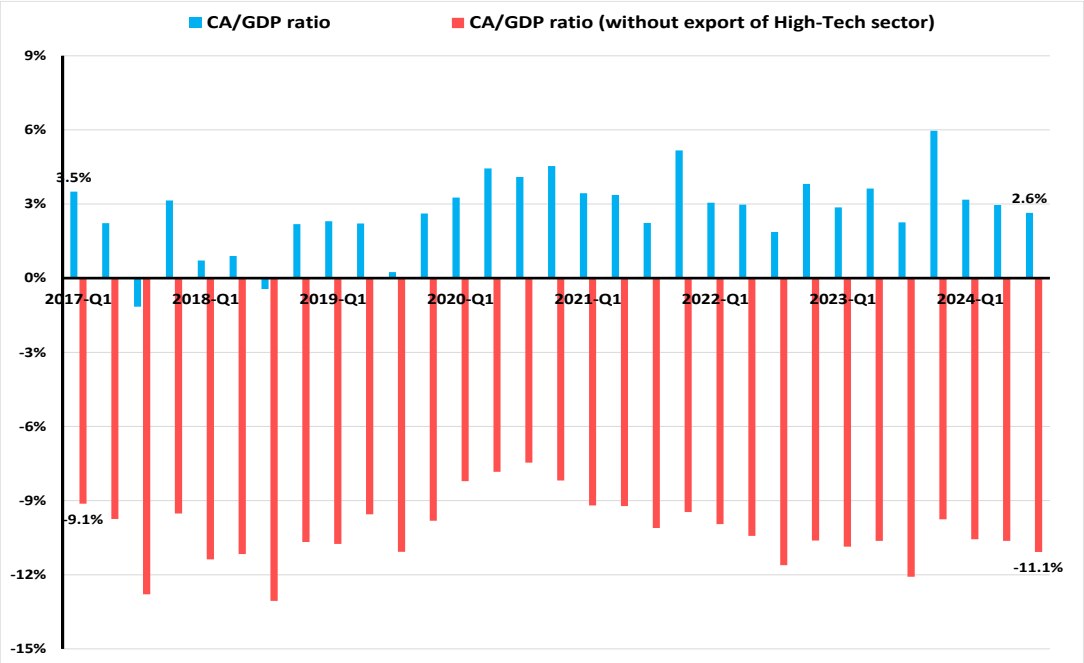
Figure 3: The Total Contribution of the High-tech Sector to Income Tax, National Security, and Corporate Taxes, 2020



Source: The Ministry of Finance.

The high-tech sector plays a crucial role in Israel's current account surplus. High-tech exports play a vital role in maintaining a positive current account balance and supporting Israel's overall balance of payments. Ninety percent of the high-tech sector's output is directed to foreign markets.[10] Without high-tech exports, the 3% GDP surplus in the current account would have turned into a 10% GDP deficit, highlighting the sector's crucial role in stabilizing the economy (Figure 4).

Figure 4: Current Account (Goods & Services) to GDP Ratio, with and Without High-tech Exports



Source: Aaron Institute's analysis of CBS data.

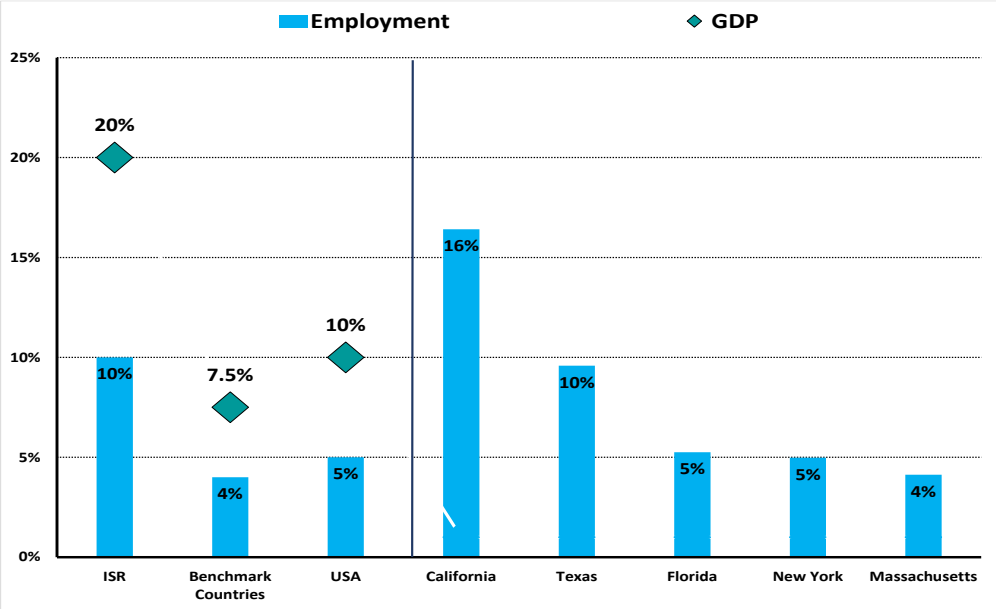
[10] 110% in high-tech sector and 70% in high-tech services. Source: CBS.

2.3 High-tech as the main engine driving Israel into the ranks of top countries

Israel's high-tech sector is a key driver of economic growth, significantly outperforming global benchmarks in its contributions to GDP and employment. While it has been instrumental in narrowing the GDP per capita gap with advanced economies, its productivity still lags behind that of the U.S. Similar to other benchmark economies, Israel exhibits a dual economic structure characterized by a significant productivity gap between high-tech and non-high-tech sectors.

Israel's High-tech Sector is a global leader in employment and GDP contribution. Israel is a global leader in the relative share of its high-tech sector within the total workforce and GDP. The high-tech sector employs 10% of Israel's workforce[11] and generates 20% of its GDP, significantly exceeding the contribution of the U.S. high-tech sector, which accounts for 5% of employment and 10% of GDP (Figure 5). Moreover, Israel's high-tech sector outperforms benchmark countries such as Austria, Denmark, Finland, the Netherlands, and Sweden, where the average contributions are 4% of employment and 8% of GDP. Notably, the economic impact of Israel's high-tech sector is comparable to that of Texas, the second-leading U.S. state in high-tech performance after California.

Figure 5: Share of High-tech Sector in Employment and GDP, 2022



Source: CS, BLS, OECD.

[11] Ages 15 and older. Among those aged 25-64, 12% are employed in the high-tech sector.

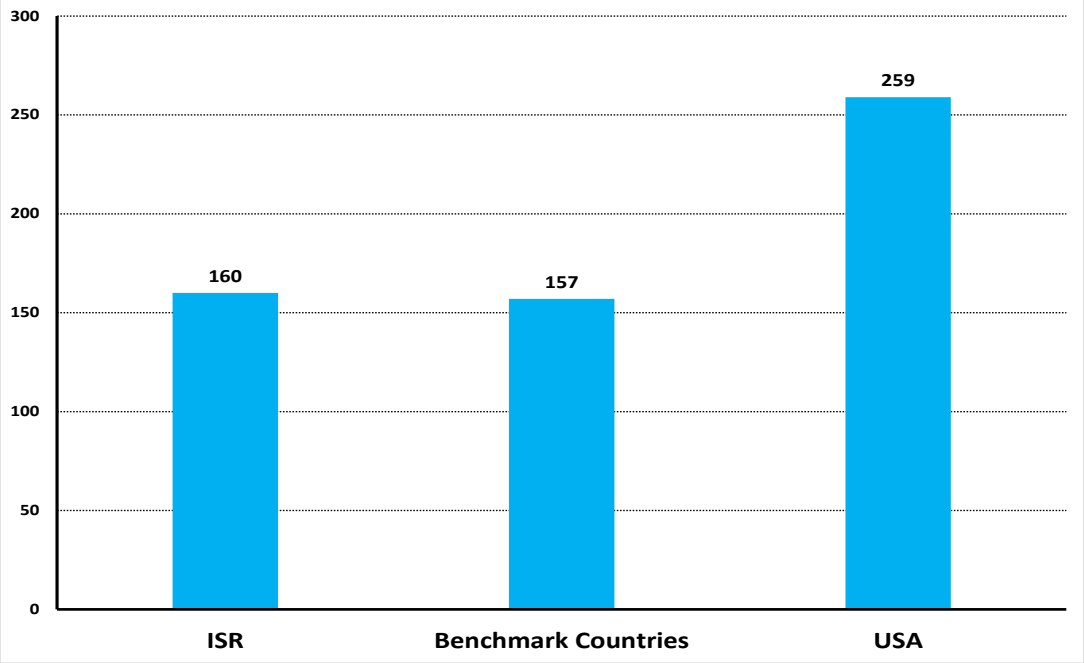
Labor Productivity in Israel's High-tech Sector is high. Israel's high-tech labor productivity, $160K PPP (2015 prices), is closely aligned with the averages of benchmark countries. It remains 38% lower than that of the U.S., where productivity reaches $259K PPP (Figure 6). This gap is primarily due to the presence of globally dominant high-tech corporations in the U.S., which benefit from monopolistic market power and exceptional profitability.

Among benchmark countries, Denmark and Sweden lead in high-tech productivity**,** while others lag behind. Nevertheless, Israel exceeds the benchmark average in key high-tech segments**:**

- High-tech services: $160K PPP vs. $129K PPP (benchmark average).
- Manufacturing of computer, electronic, and optical products: $220K PPP vs. $197K PPP (benchmark average)**.**

While Israel demonstrates strong performance in these areas, it significantly trails behind the United States.[12] Meanwhile, Sweden is closing the gap, with a notable 6.8% growth in IT and information services (see Appendix 4).

Figure 6: Value Added per Worker, High-tech Sector, 2021, Thousand $ PPP 2015 Prices[13]



Benchmark countries: Austria, Denmark, Finland, The Netherlands, Sweden.

Source: Aaron Institute analysis of OECD data.

[12] U.S. high-tech firms have global market power, and their high labor productivity reflects the markups they can charge as a result of this dominance.

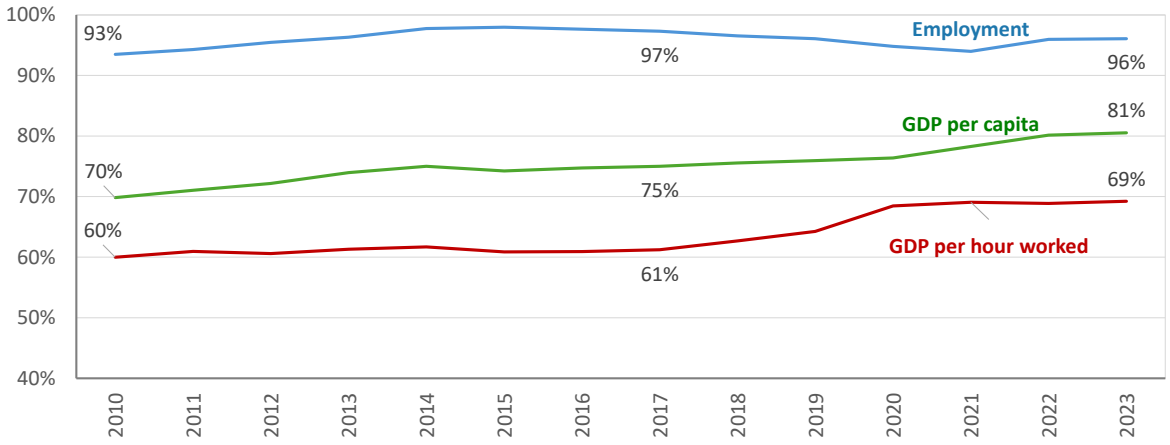
[13] The specific calculation referenced here was also conducted using 2015 constant prices.

High-Tech sector plays a significant role in closing Israel's GDP Per Capita Gap. The high-tech sector plays a pivotal role in enhancing Israel's global economic competitiveness, reducing the GDP per capita gap with benchmark nations, and positioning Israel among the leading countries in GDP per capita.[14]

Between 2017 and 2023, the gap in GDP per capita between Israel and the benchmark countries decreased from 25% to 19%. Much of this progress can be attributed to improvements in productivity, as measured by GDP per hour worked (Figure 7). As shown in Appendix 4, this achievement was driven by:

- A rise in the employment of highly skilled labor in both high-tech and non-high-tech sectors.
- A growing number of profitable, scalable high-tech companies.
- Strong productivity gains in the high-tech sector, where Israel's annual productivity growth (3.1%) surpassed the benchmark average (1.6%) but still lagged behind the U.S. (5.2%).

Figure 7: Employment Rate Ratio, GDP Per Capita Ratio, and Labor Productivity Ratio: A Comparison Between Israel and the Average of Benchmark Countries



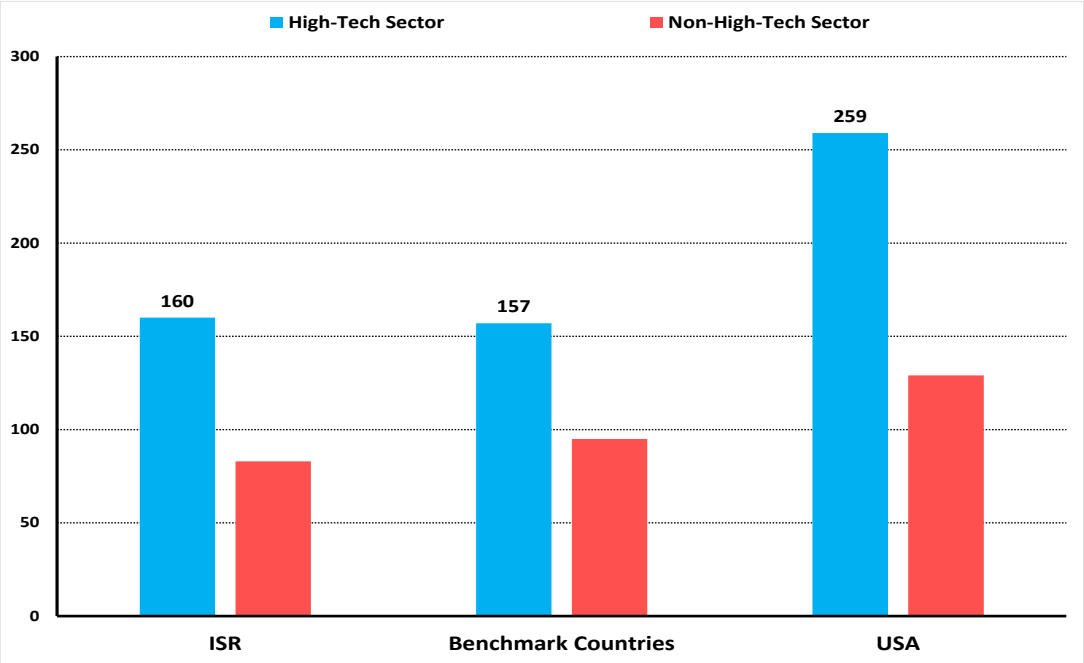
2015 prices PPP. Benchmark countries: Austria, Denmark, Finland, The Netherlands, Sweden.

Source: Aaron Institute analysis of OECD data.

[14] GDP per capita = Employment rate * Labor Productivity (GDP per Worker).

Is Israel's Dual Economy Structure Unique? A defining characteristic of Israel's economic structure is the significant productivity gap between the high-tech sector and the rest of the economy. High-tech labor productivity is $160K PPP, which is nearly 2 times higher than that of non-high-tech sectors ($83K PPP). This gap is wider than in benchmark countries (1.7) and the U.S. (2.0) (Figure 8). Consequently, the exceptionally high labor productivity in the high-tech sector is also a feature of other developed economies.

Figure 8: Value Added per Worker, High-tech and Non-high-tech Sectors, 2021, Thousand $ PPP, 2015 Prices



2015 prices PPP. Benchmark countries: Austria, Denmark, Finland, The Netherlands, Sweden.

Source: Aaron Institute analysis of OECD data.

3. The sources for high-tech resilience

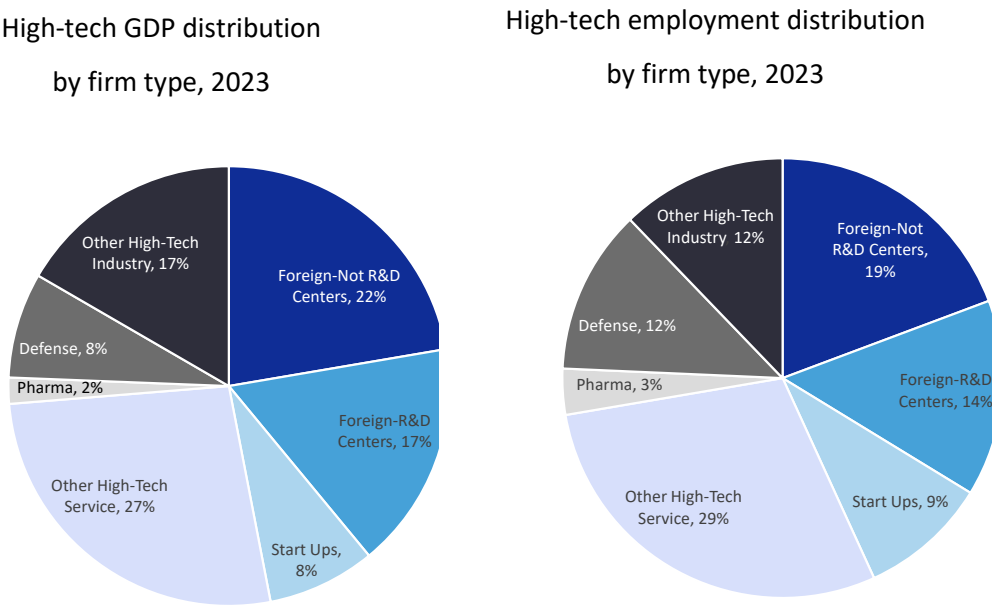
3.1 High-tech is diversified

The high-tech sector in Israel is highly diversified, encompassing a wide range of companies across various fields, as shown in Figure 9. Multinational corporations play a pivotal role in driving the sector's GDP, with foreign R&D centers contributing 22% and non-R&D foreign centers[15] adding 17%. Startups, known for their innovation and entrepreneurial spirit, account for 8% of GDP, while defense industries and pharmaceuticals contribute 8% and 2%, respectively. Notably, local high-tech services make a significant contribution compared to local high-tech sector, accounting for 27% and 17% of GDP, respectively, highlighting the central role of services in Israel's high-tech ecosystem.

In terms of employment, the distribution reveals notable differences in productivity across various segments of Israel's high-tech sector. Foreign R&D centers and non-R&D centers, employing 14% and 19% of the workforce respectively, contribute substantially to GDP, reflecting their high productivity. Similarly, local high-tech sector, which employ just 12%, demonstrate impressive efficiency by producing more with fewer employees. In contrast, local high-tech services and defense, employing 29% and 12% of the workforce respectively, are more labor-intensive.

[15] Examples of foreign-owned multinational corporations with non-R&D operations in Israel include the Intel manufacturing plant in Kiryat Gat, Applied Materials, Inc., and KLA Corporation.

Figure 9: High-tech GDP and Employment distribution by Firm Type, 2023



Source: Aaron Institute analysis of CBS data.

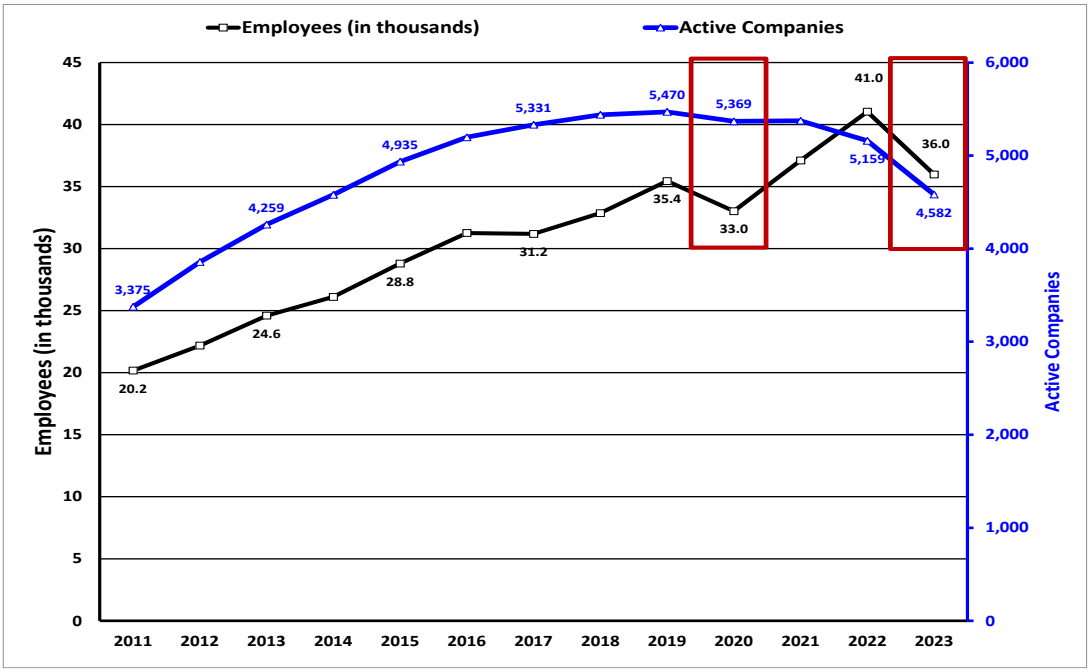
Startups[16]

Startups are a cornerstone of Israel's high-tech ecosystem, driving innovation and economic growth. As shown in Figure 10, there were **4,582 active startup companies employing 36,000 individuals in 2023**.[17] Although the total number of startups declined from a peak of 5,470 in 2019 to 5,159 in 2022, this reduction did not immediately impact employment levels, highlighting the sector's adaptability and commitment to maintaining a skilled workforce. However, employment has fluctuated during crises. In 2020, during the COVID-19 pandemic, startup employment dropped from 35,400 to 33,000, and the October 7 war resulted in a more significant decrease, from 41,000 to 36,000 employees. These trends illustrate both the long-term resilience and short-term vulnerability of the startup sector.

[16] Source of the data: Central Bureau of Statistics startups database. The database deals with startups and mature companies that were launched from 2003 onwards and provides a snapshot of their areas of activity, survival and economic data (such as wages, jobs, revenue, capital raisings). The database was built by the Central Bureau of Statistics, with funding and cooperation from the National Council for Civilian Research and Development in the Ministry of Innovation, Science and Technology. Startup identification is based on information from Startup Nation Central and IVC, which define the scope of Israel's high-tech sector.

[17] According to the Startup Nation Central dataset, the number of startups in 2023 was 7,334, compared to 7,068 in 2019.

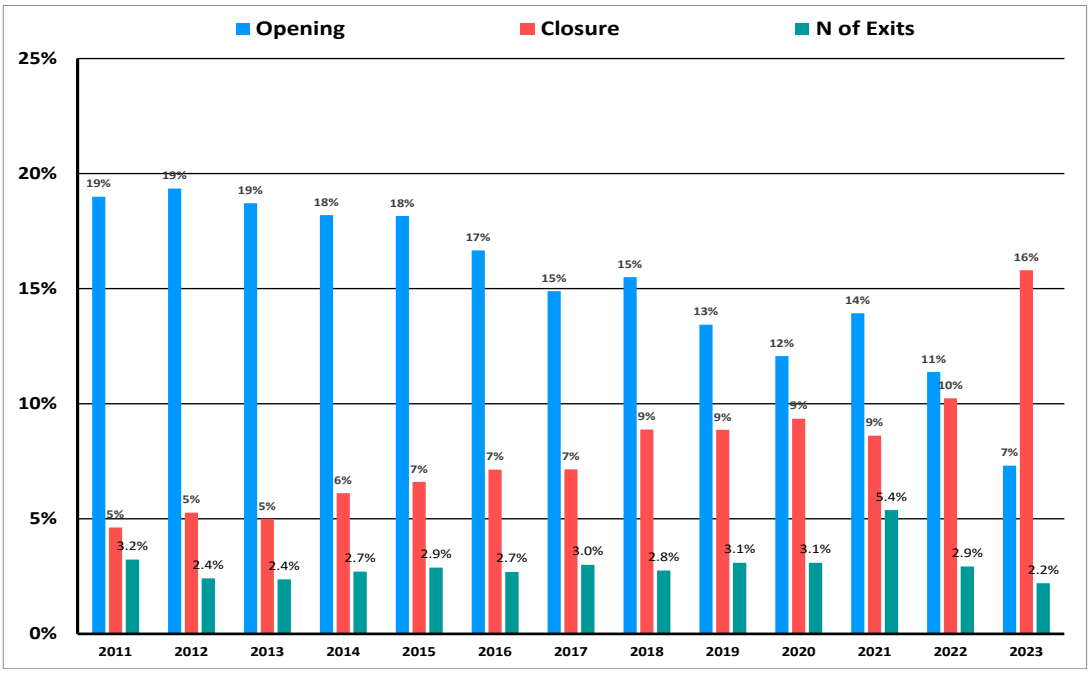
Figure 10: Number of Active Start-ups and Employees



Source: Aaron Institute analysis of CBS data.

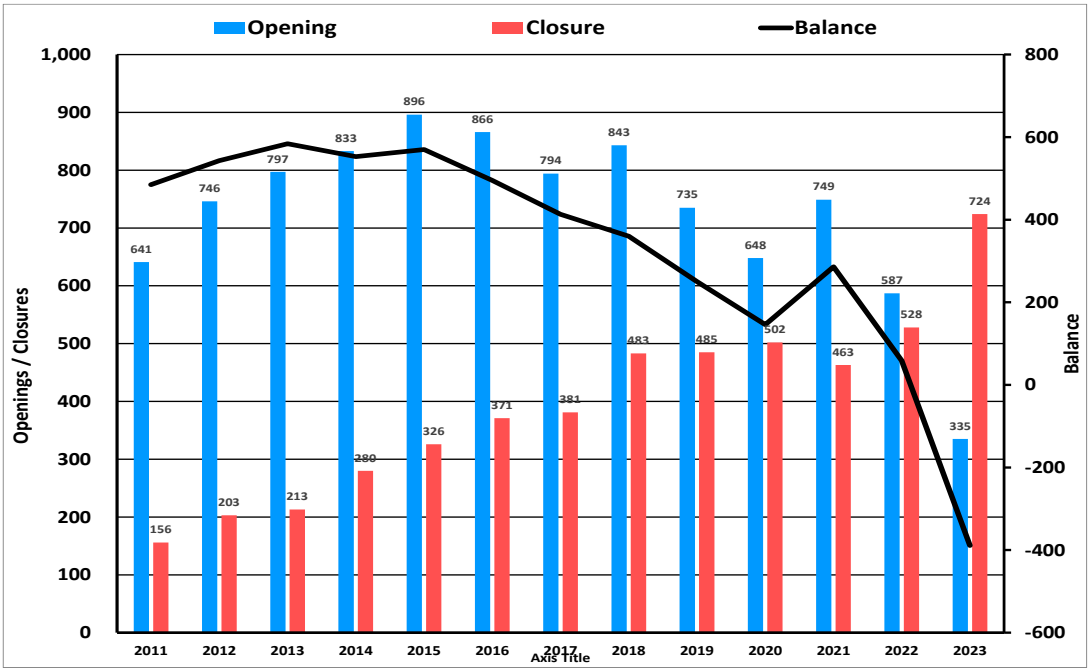
The dynamics of startup activity in Israel have shifted significantly over the past decade, with fewer new companies being formed and more facing closure, while exits remain a stable pathway for mature startups. Figure 11 illustrates that the percentage of new startup openings has sharply decreased, from 20% in 2012 to just 7% in 2023, indicating a **slowdown in the formation of new ventures**. In 2023, 335 new startups were established, while 724 were closed, resulting in a net loss of 389 startups, the first negative balance from 2011 to 2023 (Figure 12). Conversely, the percentage of startup closures has risen substantially, from 5% in 2012 to 16% in 2023, reflecting increased challenges in sustaining operations. Meanwhile, the percentage of exits has remained relatively stable at 3%, highlighting consistent opportunities for successful startups to scale.

Figure 11: Percentage of Firms Openings, Closures, Exits (Out of Active Start-ups)



Source: Aaron Institute analysis of CBS data.

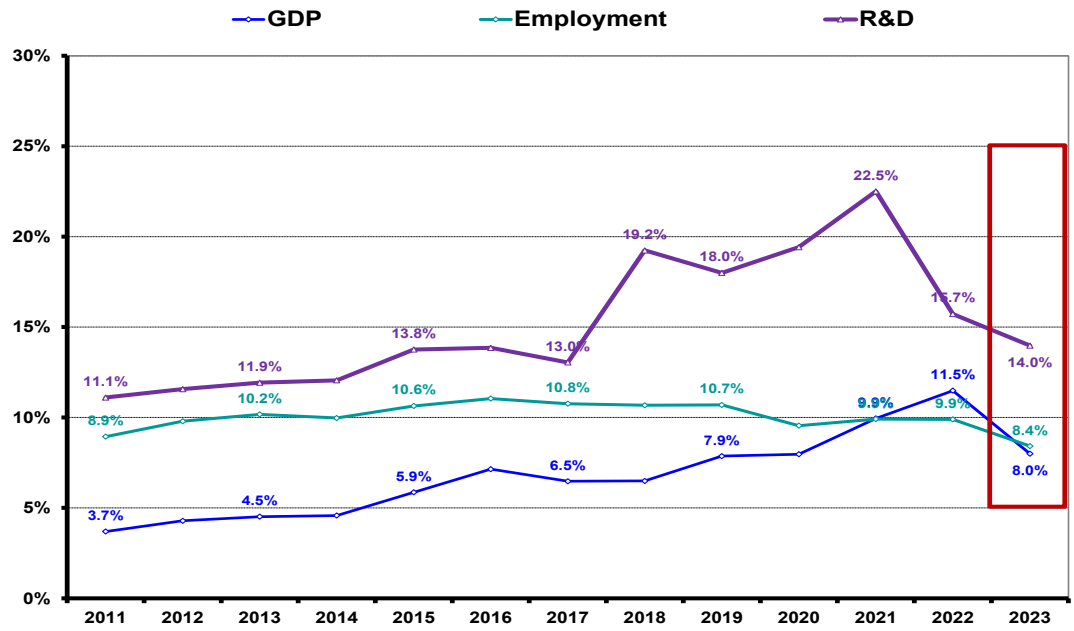
Figure 12: Number of Firms Openings, Closures, Exits



Source: Aaron Institute analysis of CBS data.

Figure 13 shows that the share of startups in employment, which remained steady at 10% between 2011 and 2022, dropped to 8.4% in 2023, indicating a contraction in workforce involvement. Similarly, their share of GDP, which peaked at 11.5% in 2022, decreased significantly to 8% in 2023. Even more striking is the decline in startups' contribution to national expenditure on civilian R&D, which fell from 22.5% in 2021 to 14% in 2023, signaling a reduced influence on innovation and research.

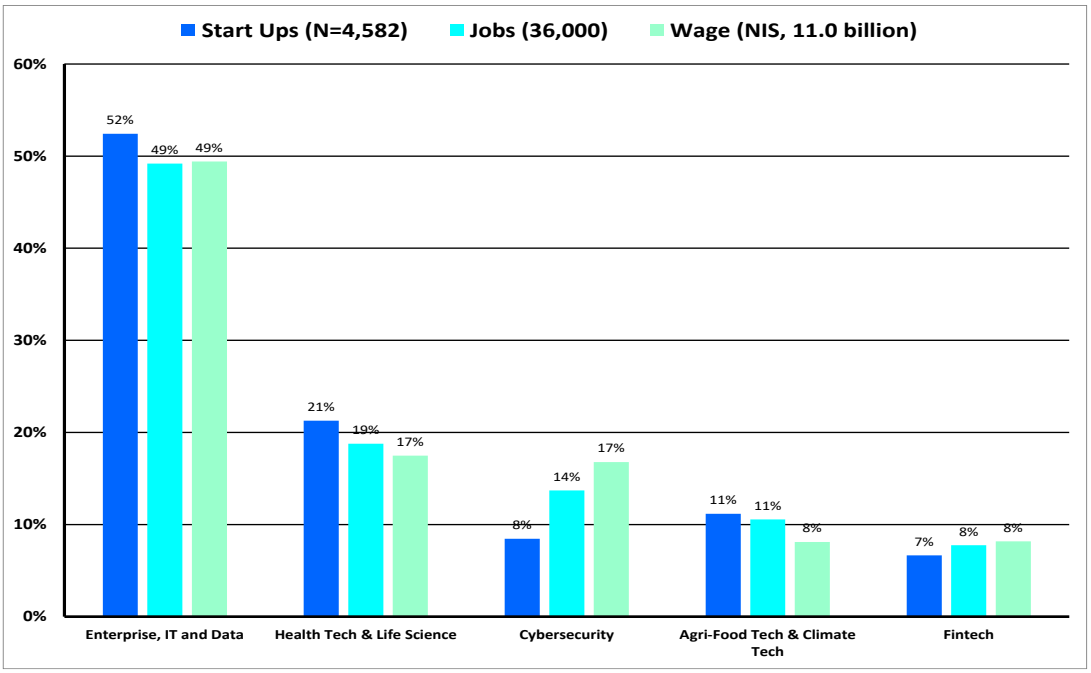
Figure 13: Share of Start-ups in GDP, Employment and R&D Expenditure



Source: Aaron Institute analysis of CBS data.

Israel's startup ecosystem is diverse, encompassing a wide range of fields. Figure 14 illustrates that Enterprise, IT, and Data startups dominate the ecosystem, comprising 52% of all startups, employing 50% of the sector's workforce, and contributing 5.5 billion NIS of the total 11 billion NIS in wage payments. The Health Tech and Life Sciences sector follows, representing 20% of startups and underscoring its growing significance. Cybersecurity startups account for 8% of the ecosystem, while Agri-Food Tech and Climate Tech contribute 11%. Fintech startups, another important sector, make up 6% of the total. In contrast, the defense sector is less prominent, with fewer than 3% of startups operating in this field.

Figure 14: Fields of Activity of Start-up Companies, 2023

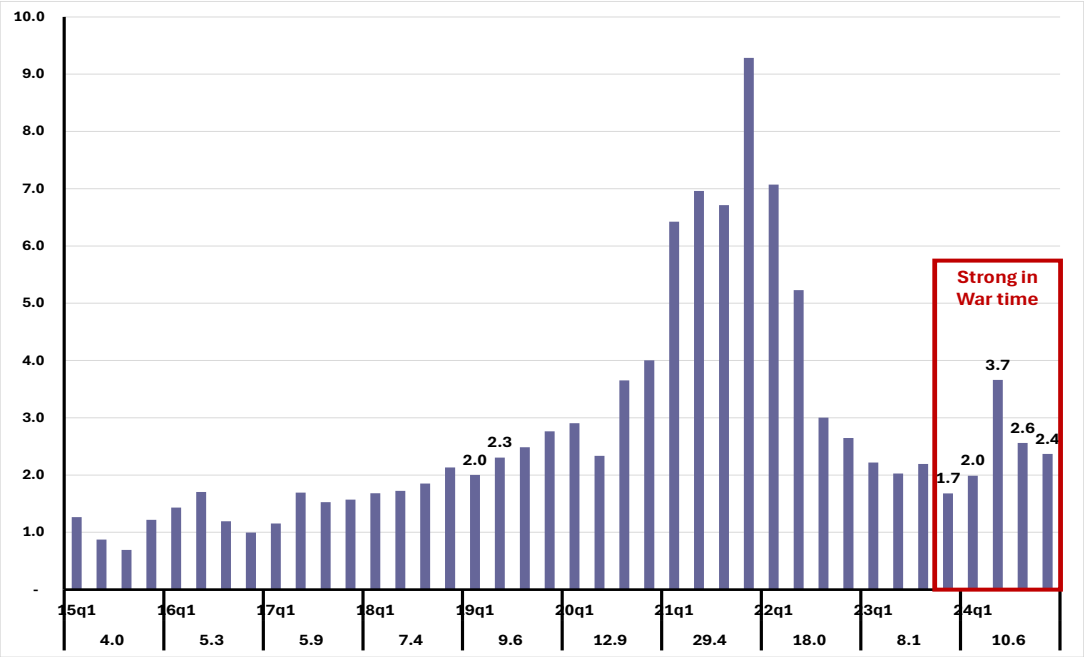


Source: Aaron Institute analysis of CBS data.

Israel demonstrates strength in attracting foreign investments despite global challenges and wartime adversity. Foreign venture capital (VC) investments in Israeli high-tech have been remarkable, positioning Israel as a global innovation hub[18] and underscoring its important role in the innovation ecosystem. Figure 15 illustrates that the investments peaked at $29.4 billion in 2021, followed by $18 billion in 2022. However, in 2023, foreign VC investments dropped significantly to $8 billion, reflecting the challenges of global economic instability and local unrest. Despite the impact of the "October 7 war," 2024 saw a recovery, with foreign VC investments rising to $10.6 billion. This rebound highlights Israel's ability to maintain investor interest and confidence even during periods of conflict.

[18] Source: The Innovation Authority.

Figure 15: Israel High-Tech VC Private Investments, $B



Source: Startup Nation Central.

Investment in high-tech is a key indicator of economic confidence and the potential for innovation-driven growth. According to Startup Nation Central (SNC) data,[19] Israel recorded $10.6 billion in investments across 766 rounds in 2024. This marks a 27% increase in invested capital, despite a 4% decline in the number of rounds compared to 2023. However, global investment trends were mixed, with the United States leading in total investment growth while Europe and Asia faced contractions:

- United States: The largest player in venture capital, recording $210 billion across 18.6K rounds, reflecting a 28% increase in total funding.
- Europe: Experienced a 4% decline in invested capital, reaching $61 billion across 12K rounds, with a 27% drop in deal count.
- Asia: Saw a 24% decline in total investment, amounting to $76 billion across 12K rounds, with a 26% reduction in the number of rounds.

This highlights Israel's strong position in the global high-tech investment landscape, demonstrating its resilience and ability to attract capital, despite ongoing conflict and broader market fluctuations.

[19] Source: Startup Nation Central (SNC), https://finder.startupnationcentral.org/reports/2024-annual-report.

Government and VC Support for Startups

Supporting innovative companies is a highly profitable strategy for governments, generating significant economic returns, attracting global investment, and fostering long-term economic growth and sustainability. Venture capital investment and government-backed initiatives, such as those by the Israel Innovation Authority (IIA), play a crucial role in nurturing startups through their critical growth phases.

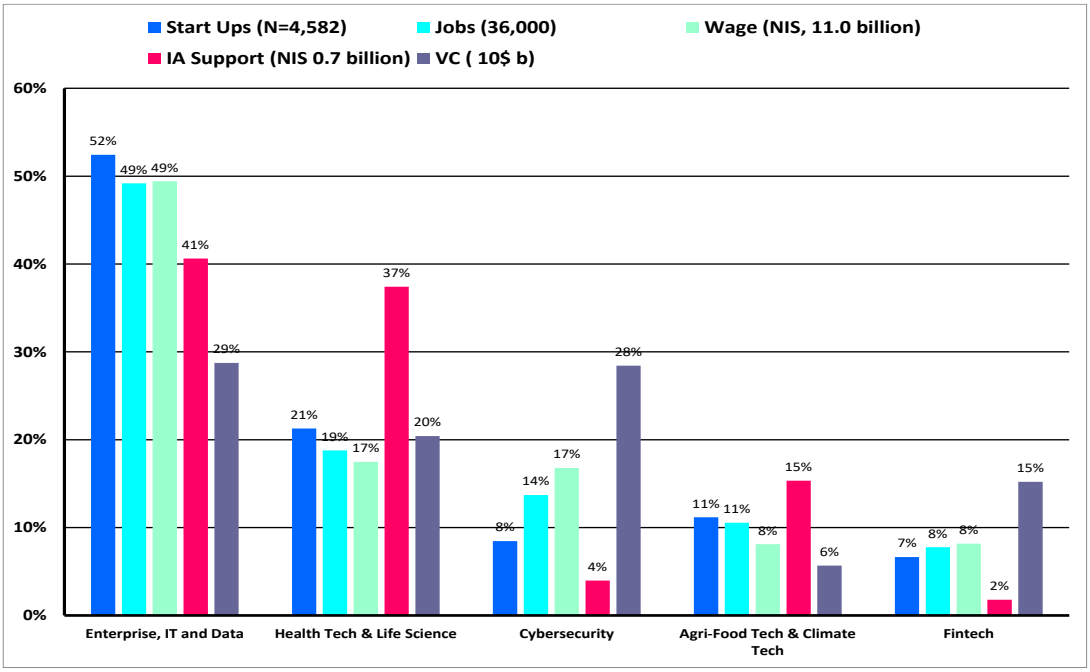
In 2023, the Israel Innovation Authority (IIA) provided $0.7 billion in support to startups, strategically allocating funds across various sectors to drive innovation and economic growth. Figure 16 offers a comprehensive overview of how the Israel Innovation Authority's funding was distributed across different fields in 2023, along with additional information on each sector's share of startups, employment, and wages.

- Enterprise, IT, and Data received the largest share at 41%, emphasizing its leadership in Israel's high-tech ecosystem. This sector accounts for 52% of startups, 49% of the workforce (16,000 jobs), and 49% of total wage payments.
- Health Tech and Life Sciences followed with 37%, highlighting the growing importance of medical innovation. This sector represents 21% of startups, employs 19% of the workforce, and contributes 17% of wage payments.
- Agri-Food Tech and Energy and Climate Tech accounted for 15%, underscoring the focus on sustainability and environmental challenges. This sector comprises 11% of startups, 11% of employment, and 8% of total wage payments.
- Cybersecurity received 4%, with its smaller share likely reflecting the strong backing the field already receives from VCs totaling $10.5 billion. This sector accounts for 10% of startups, 14% of employment, and 17% of total wage payments.
- FinTech received 2%, indicating its smaller footprint in terms of support. This sector accounts for 7% of startups, 8% of employment, and 8% of total wage payments.

When comparing venture capital (VC) investments with Israel Innovation Authority (IIA) funding in 2023, distinct priorities emerge, highlighting a complementary relationship between public and private funding (Figure 16):

- Enterprise, IT, and Data lead both categories, with 41% of IIA support and 29% of VC investments, underscoring their dominant role in Israel's high-tech sector.
- Cybersecurity presents a sharp contrast, receiving only 4% of IIA funding but 28% of VC investments, due to its maturity and strong appeal to private investors.
- FinTech, which garnered just 2% of IIA support, attracted 15% of VC funding, indicating its dependence on private capital for expansion.
- Health Tech and Life Sciences, and Agri-Food Tech and Energy and Climate Tech received higher shares of IIA funding at 37% and 15%, respectively, but lower VC investments at 20% and 6%.
- Fields such as defense, energy, and quantum technologies attracted very small shares of VC investment.

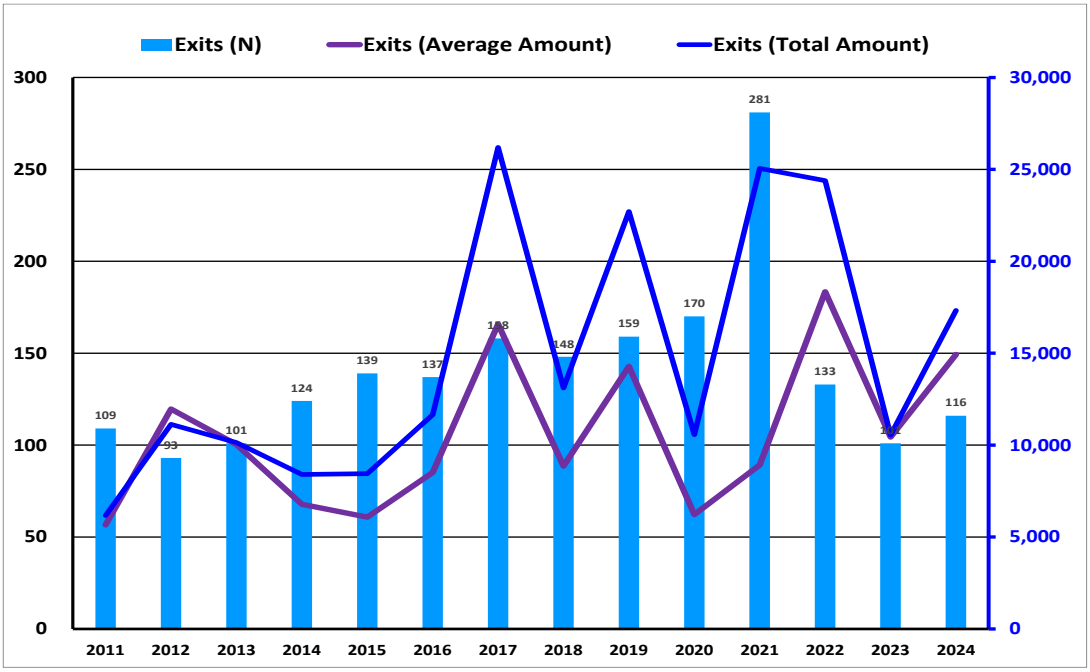
Figure 16: Israel Innovation Authority Support of Start-Ups, $B



Source: Aaron Institute analysis of CBS data.

A strong exit market is a key driver of Israel's high-tech ecosystem. An analysis of company exits from 2011 to 2024 (Figure 17) reveals an average of 140 exits per year, with an average exit value of $105 million. Notably, 90% of these exits were acquisitions or mergers, primarily by foreign multinational corporations. Additionally, 80% of the exits involved companies that had been operating for over five years, highlighting the importance of venture capital investment and Innovation Authority (IIA) support during growth stages. While 66% of the exited companies remain active, 34% have closed, with 75% closures occurring within three years of the exit.

Figure 17: Exits: Number and Amounts, $ Millions



Source: Aaron Institute analysis of CBS data.

Beyond individual company performance, the broader exit market has played a crucial role in maintaining investor confidence. The ratio of total exit amounts to venture capital (VC) investments, which ranged between 5 (in 2020–2022) and 3 (in 2023–2024), underscores the high profitability of the high-tech sector. This strong return on investment has helped sustain Israel's attractiveness as a destination for both local and international investors, even during periods of geopolitical uncertainty.

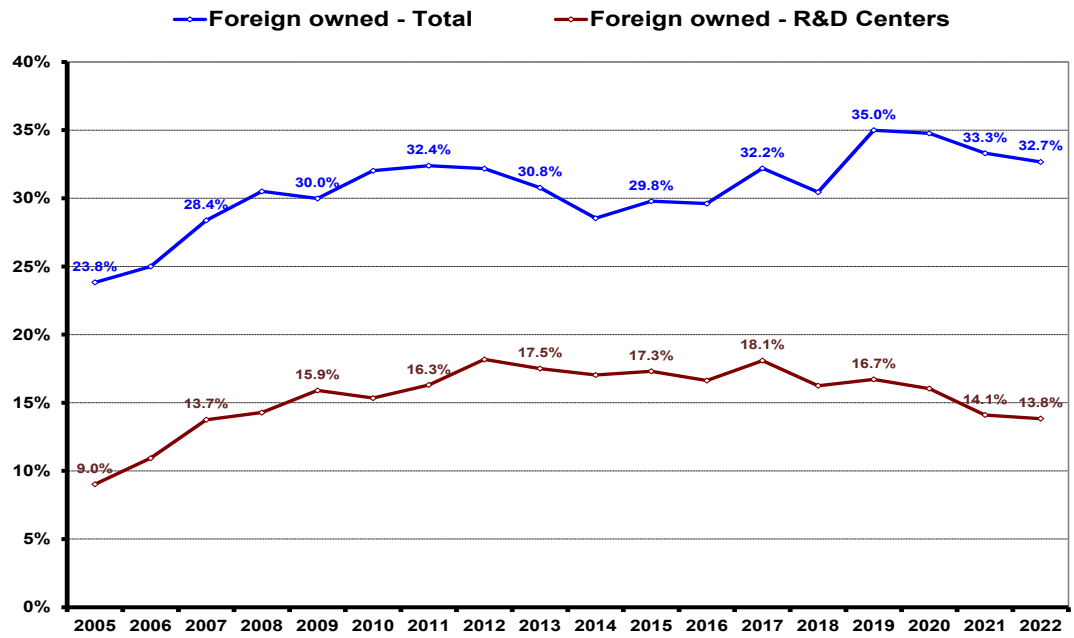
Between 2019 and 2022, while the number of startup companies and exits declined, other indicators – such as workforce size, R&D expenditure as a percentage of GDP, the share and value of exits – remained stable or even increased. This suggests that the decrease in the number of startups and exits does not necessarily reflect a decline in their quality, value, or entrepreneurial returns. However, the sharp drop-in startup activity observed in 2023, particularly in terms of their contribution to the high-tech sector, raises concerns about their future role in driving innovation, employment, and economic growth.

Foreign-owned companies

Foreign-owned companies are a testament to the strength and attractiveness of Israel's local tech ecosystem. These multinational corporations (MNCs), including foreign R&D centers and non-R&D entities, play a critical role in driving employment, fostering innovation, and sustaining economic growth. They employ one-third of Israel's high-tech workforce, with a substantial portion engaged in R&D roles. Their contributions extend beyond job creation – MNCs enhance productivity, with GDP and exports per worker surpassing those of locally owned firms, and facilitate knowledge transfer, aligning Israel's tech ecosystem with global trends. Additionally, these companies bolster economic resilience by maintaining stability during local shocks and contributing to the formation of start-ups, new ventures, and high-value exits, mergers, and acquisitions.

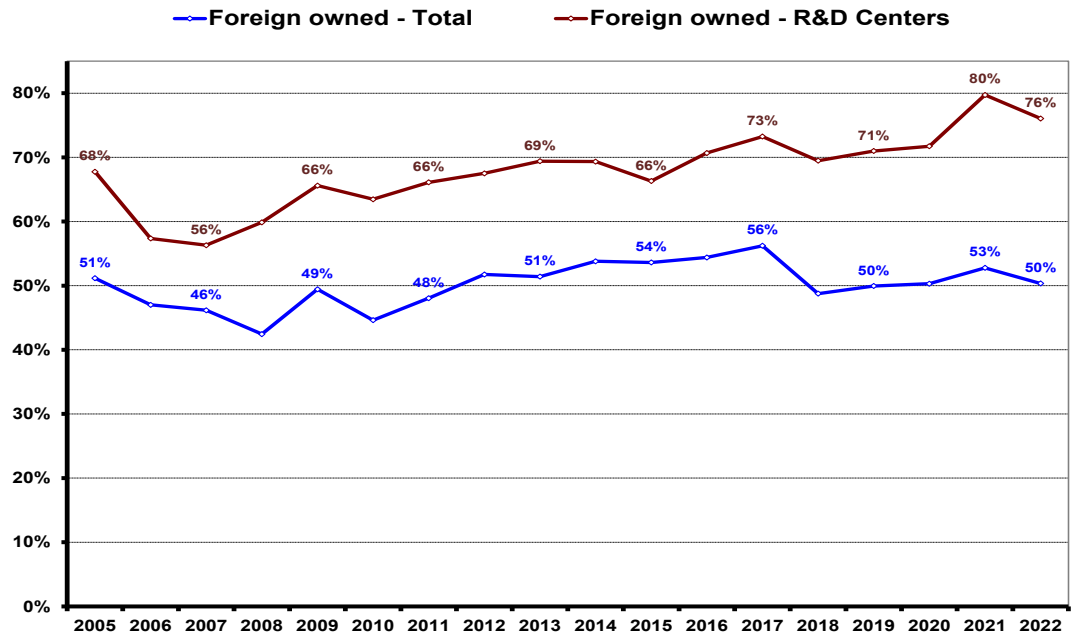
Foreign-owned companies play a pivotal role in shaping Israel's high-tech workforce, providing significant employment opportunities and driving innovation. As shown in Figure 18, one-third of Israel's high-tech workforce is employed by foreign-owned companies, with approximately 40% working in foreign R&D centers as of 2022. Figure 19 further highlights that nearly half of all employees in foreign-owned companies are engaged in R&D roles, with this share reaching close to 75% in foreign R&D centers between 2019 and 2022.

Figure 18: Share of Foreign-owned Companies in High-tech Employment



Source: Aaron Institute analysis of CBS data.

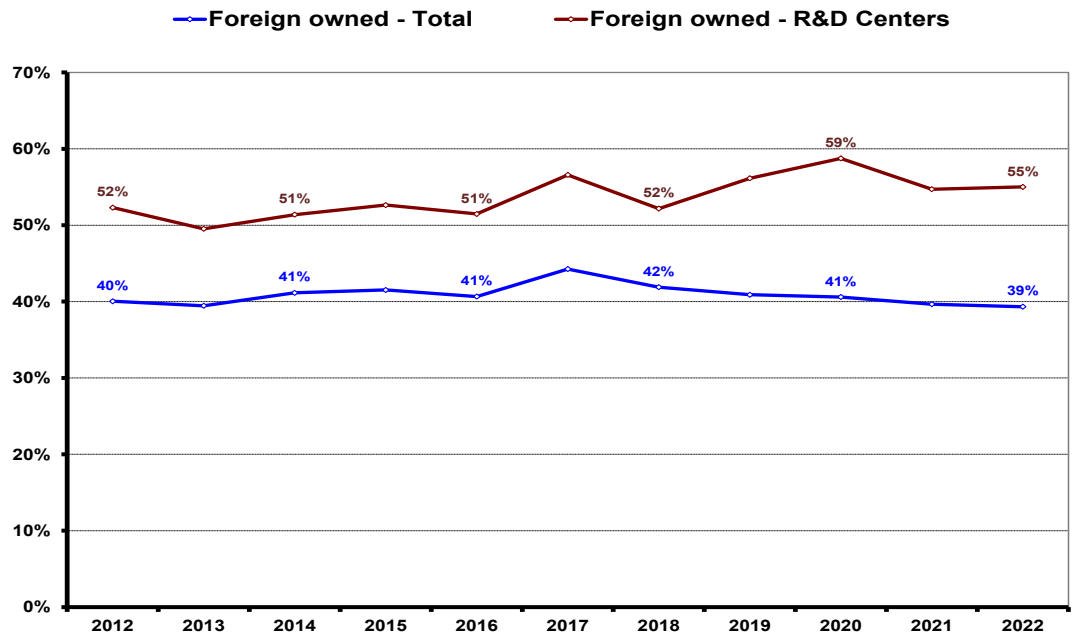
Figure 19: Share of R&D Workers in Foreign-owned companies



Source: Aaron Institute analysis of CBS data.

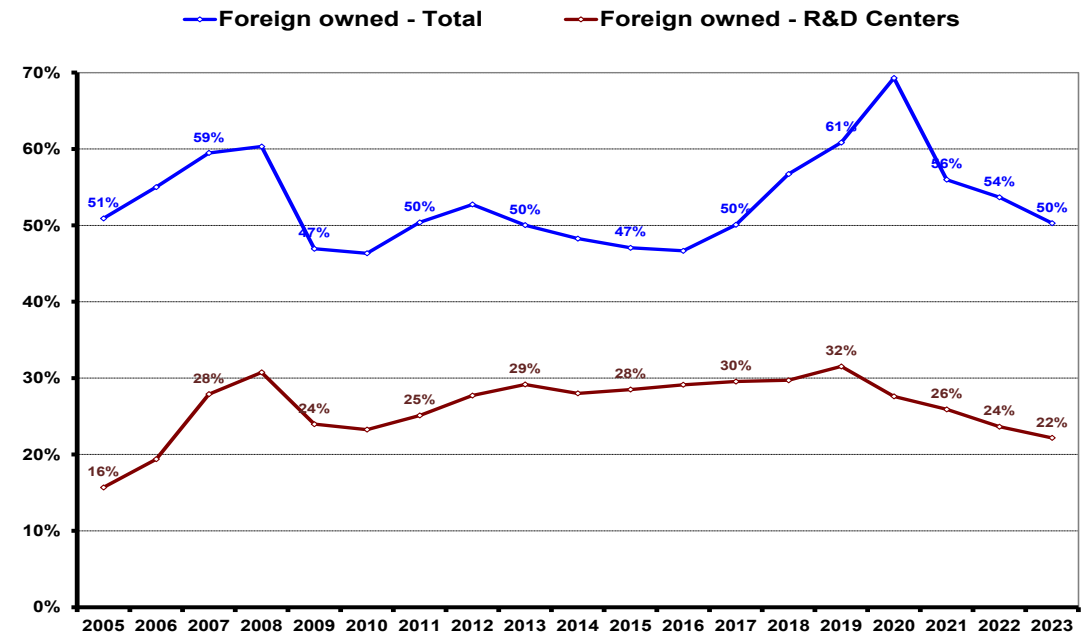
Beyond employment, foreign-owned companies are a fundamental pillar of Israel's high-tech sector, particularly in research and development (R&D) and exports. Approximately 60% of national civilian R&D expenditure is conducted by foreign-owned firms, with nearly two-thirds of this activity taking place in multinational R&D centers (Figure 20). Similarly, about 50% of Israel's high-tech exports are driven by foreign-owned companies, with approximately 45% originating from multinational R&D centers (Figure 21). Notably, 95% of R&D products are exported, primarily to parent companies, predominantly in the United States.

Figure 20: Share of Foreign-owned Companies in R&D



Source: Aaron Institute analysis of CBS data.

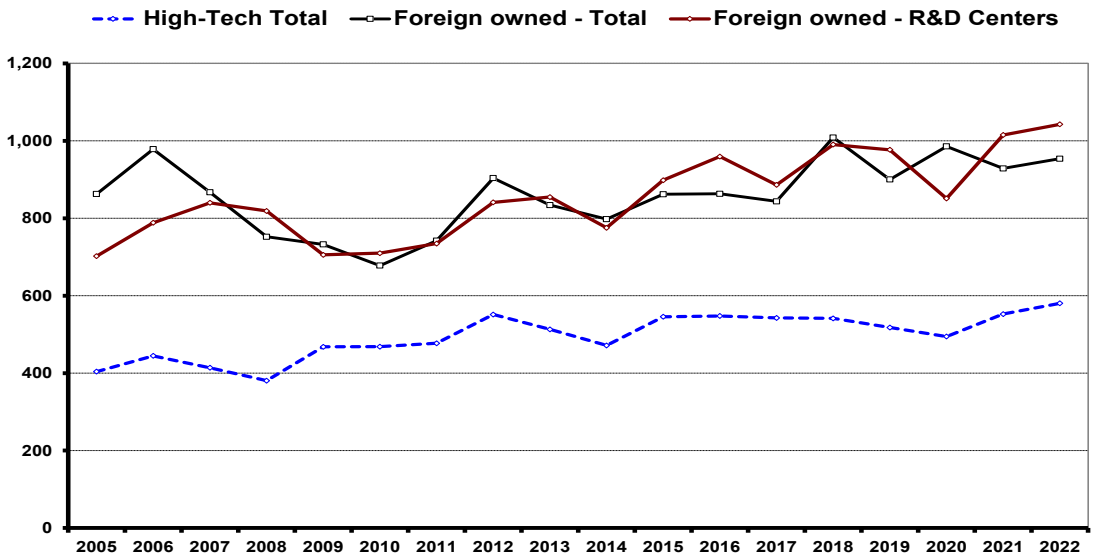
Figure 21: Share of Foreign-owned Companies in Export



Source: Aaron Institute analysis of CBS data.

Foreign-owned multinational corporations (MNCs) also drive labor productivity within Israel's high-tech sector. The GDP per worker in foreign-owned companies is 20% higher than in locally owned firms, reflecting their efficiency. Moreover, exports per worker in foreign-owned companies are 1.7 times higher than the high-tech sector average, further emphasizing their role in boosting Israel’s economic output (Figure 22).

Figure 22: Export per Worker: High-tech and Foreign-owned Companies in High-tech



Source: Aaron Institute analysis of CBS data.

Recent data from Startup Nation Central [20] indicates that foreign company activity in Israel's high-tech sector continued to grow in 2024, including several high-value deals, while their private investments showed steady performance throughout 2024.[21] The growing activity of foreign owned MNC in Israel is a positive signal of their confidence in Israel's tech environment and commitment to the local ecosystem. Aaron's survey further confirms that in 2024, there was no reduction in MNC output, R&D activity, or hiring, despite geopolitical challenges. However, these challenges have limited the expansion of MNC activities through the establishment of production plants and raised concerns about potential brain drain among employees.

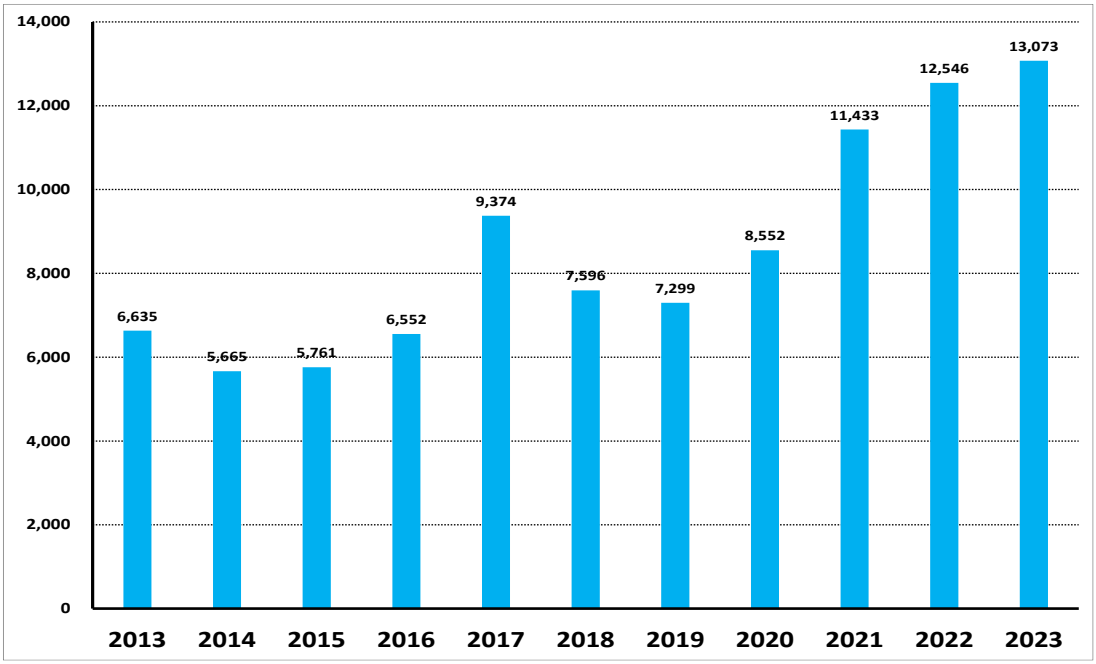
While the overall presence of foreign MNCs in Israel is stable, a slowdown in employment growth among these companies has been observed since Q4 2023.[22] This trend mirrors the decline in the high-tech sector total employment and raises concerns, as it could signal a diminished attractiveness of Israel's high-tech ecosystem to entrepreneurs, investors, and foreign MNCs.

Israeli companies - Defense industries

Israel's defense industry[23] is experiencing unprecedented growth, with export agreements reaching a record $13.1 billion in 2023 – the highest ever. This marks the third consecutive year of record-breaking defense exports, underscoring the increasing global demand for Israel's advanced military technology. As illustrated in Figure 23, defense exports have grown at an average annual rate of 15.2% since 2020, highlighting Israel's strong innovation capabilities and its ability to meet the security needs of international partners.

[20] Startup Nation Central (SNC), https://finder.startupnationcentral.org/reports/2024-annual-report.
[21] The new R&D operations minus the ceased ones.
[22] Source interviews with Google, Intel, Microsoft, Palo Alto, Cisco, Facebook.
[23] Which consists of more than 300 companies across Aerospace, Defense, and Homeland Security (HLS) technologies:
96 companies in HLS sector
56 companies in Unmanned Systems sector
43 companies in Combat Equipment & Systems sector
38 companies in Defense Electronics sector
12 companies in Aircrafts & Avionics sector
11 companies in Simulations & Training sector
39% (122) of companies in the sector are matured, 7% (22) of companies are public.
Source: Startup Nation Central. See https://finder.startupnationcentral.org/reports/aerospace-defense-hls-landscape-map.

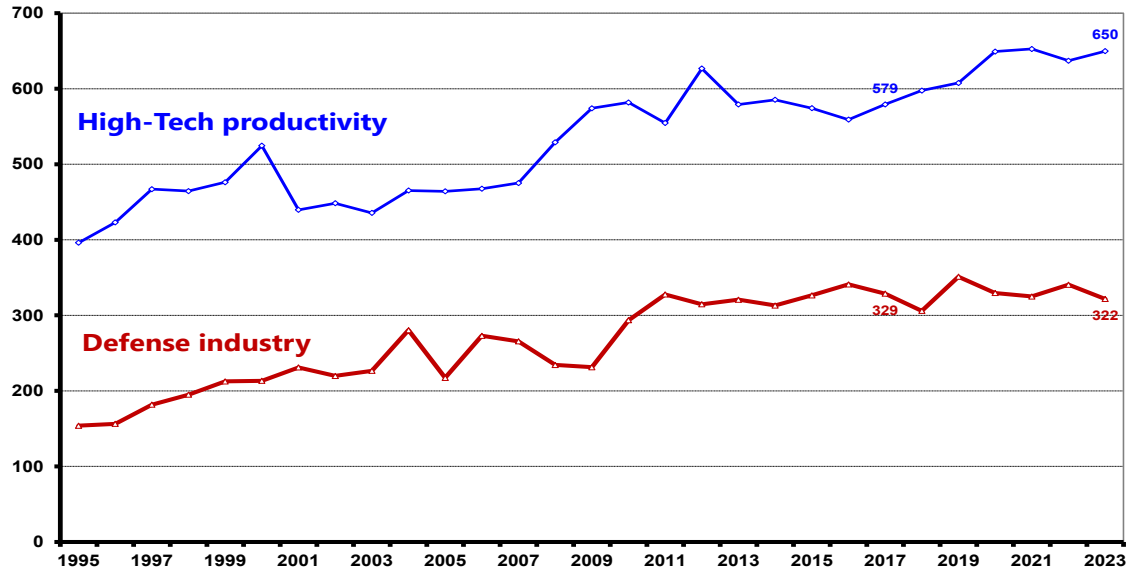
Figure 23: Value of Defense Exports Signed Agreements, $B



Source: Ministry of Defense.

However, despite this impressive export growth, labor productivity in Israel's defense industry remains significantly lower than in the high-tech sector, indicating a need for efficiency improvements. In 2023, employment in the aerospace and spacecraft manufacturing sector surged by 15%, marking a recovery after a decade of stagnation between 2011 and 2021. Nevertheless, labor productivity in the defense industry stands at 322,000 NIS per worker – only half the productivity level of the high-tech sector, which reaches 650,000 NIS per worker (Figure 24). Addressing this gap is crucial for maintaining competitiveness and maximizing the sector's economic contribution.

Figure 24: Labor Productivity in the High-tech and Defense Industries



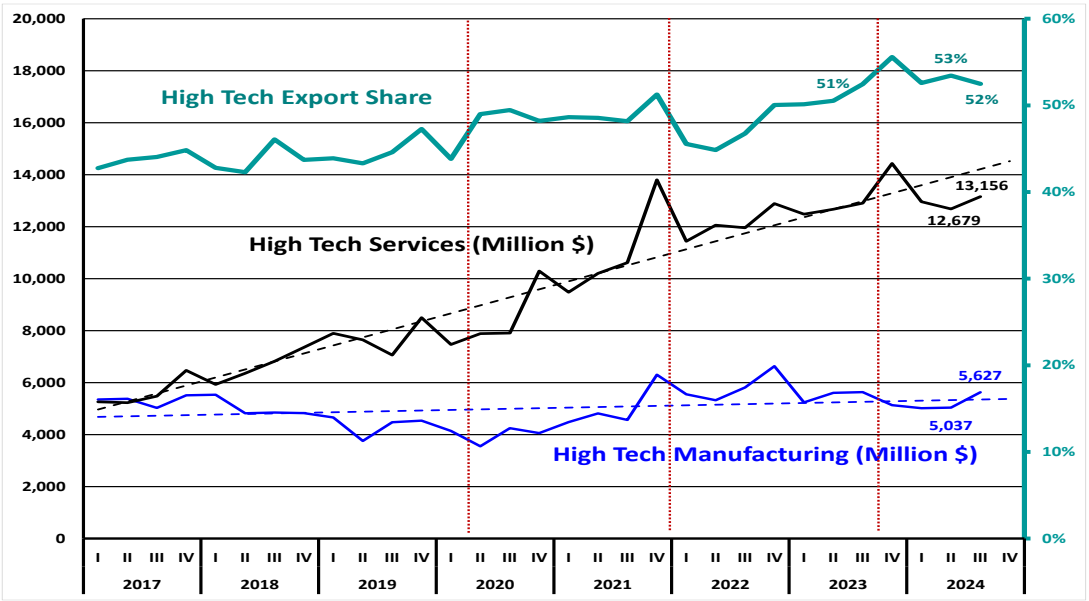
Source: Aaron Institute analysis of CBS data.

Improving efficiency and profitability, particularly in the defense industry's non-military segments, is a key challenge. The primary issue lies in the lower operational profitability of civilian divisions compared to their military counterparts. Financial statements show that Israel Aerospace Industries (IAI) has an overall operational profitability of just 3.5%, while its military sector achieves 8.5%. In contrast, Elbit Systems performs better, maintaining an operational profitability of 8.0%. Narrowing these disparities will be essential for ensuring the long-term sustainability and competitiveness of Israel's defense industry in both military and civilian markets. Addressing these challenges through improved productivity, operational efficiency, and strategic investments will be critical for sustaining the industry's global competitiveness and long-term economic impacts.

3.2 The high-tech sector is globally competitive

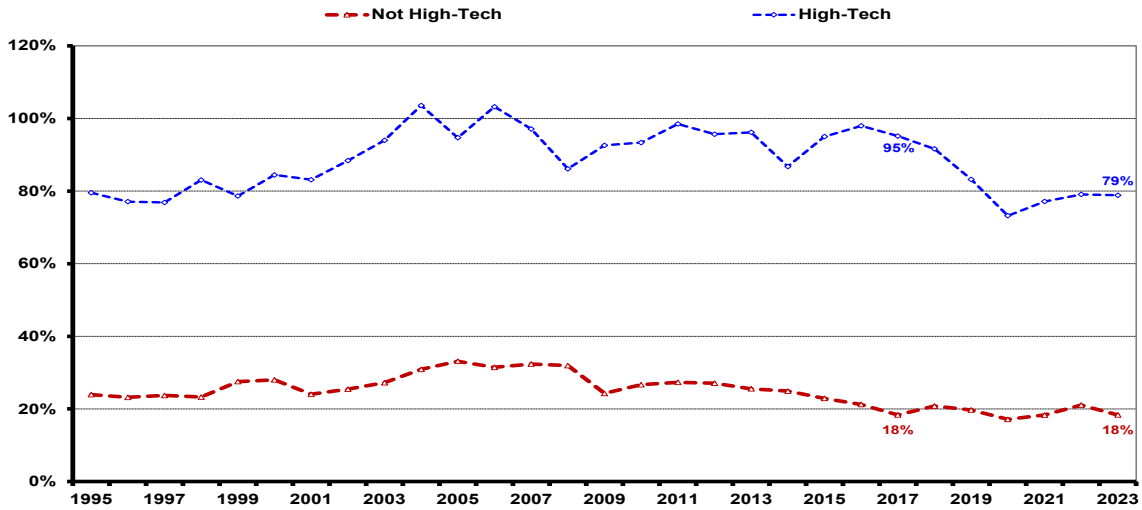
The high-tech sector is globally competitive, with 80%-100% of its output exported, with High-tech services exports significantly outpace manufacturing (Figure 25). Figure 26 illustrates the dominance of high-tech sector in exported output from 1995 to 2023, consistently outperforming non-high-tech sectors, which contribute only 20%-30%. This extensive export orientation highlights the sector's ability to innovate and meet international market demands, making it a key player in global technology supply chains.

Figure 25: High-tech Export: Total, Manufacturing and Services



Source: Aaron Institute analysis of CBS data.

Figure 26: Share of Exported Output by Sector



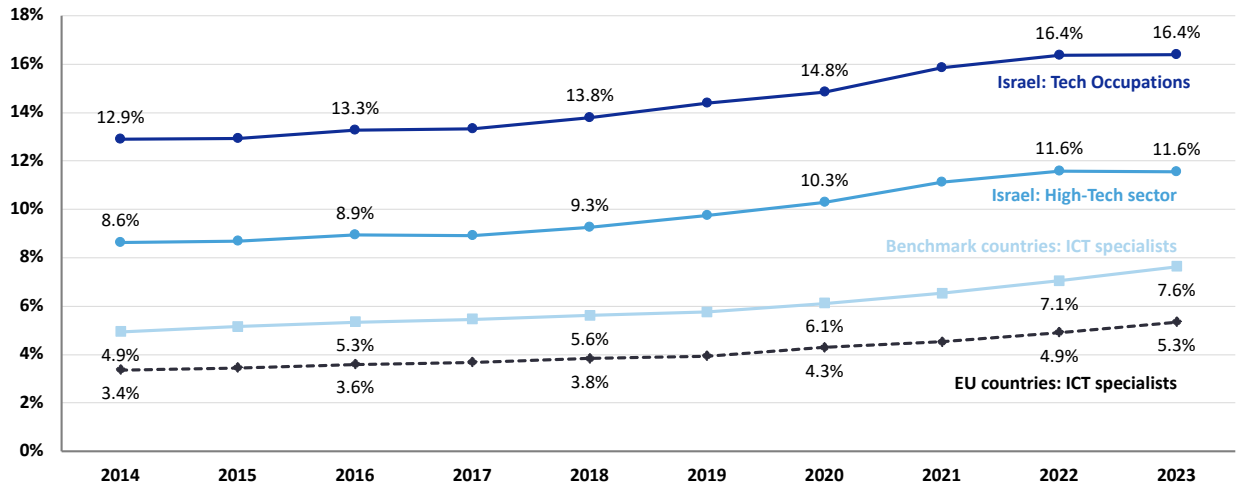
Source: Aaron Institute analysis of CBS data.

Despite significant global and local disruptions, including the 2008-2009 financial crisis, the COVID-19 pandemic, and the "October 7" war crisis, high-tech exports have demonstrated remarkable resilience, maintaining stability and underscoring their importance to Israel's economy.

3.3 High and growing supply of employees with high-tech skills

Israel's global standing as a high-tech leader is further strengthened by its remarkable share of ICT specialists in the total workforce and a strong emphasis on research and development. Figure 27 highlights Israel's leadership in the proportion of ICT specialists,[24] which stands at an impressive 16.4%. This is significantly higher than the 7.6% found in benchmark countries and the EU average of 5.3%.

Figure 27: Relative Share of ICT / High-tech Specialists in the Total Workforce

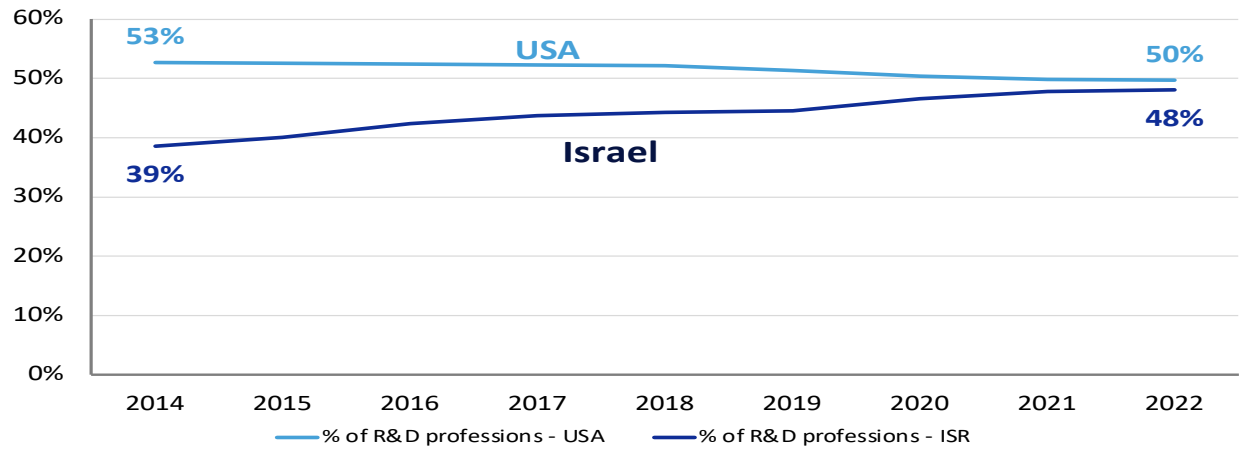


Source: CBS (Aged 25-64), Eurostat (Aged 15-75).

This innovation-driven workforce is further bolstered by Israel's strong focus on R&D. Figure 28 shows that 48% of high-tech employees in Israel were engaged in R&D in 2022, up from 39% in 2014. This level is nearly on par with the United States, where 50% of high-tech employees focus on R&D. These figures underscore Israel's strength in fostering technological advancements and maintaining its competitive edge in the global economy.

[24] The definition of tech occupations in the graph is based on a 3-digit classification due to the availability of data in the CBS research room, and is broader compared to the definition used by the Committee for Increasing High-Tech Human Capital, which was established at the 4-digit occupation level.

Figure 28: Share of R&D Employees in the High-tech Sector, ISR vs. USA



Source: CBS, BLS.

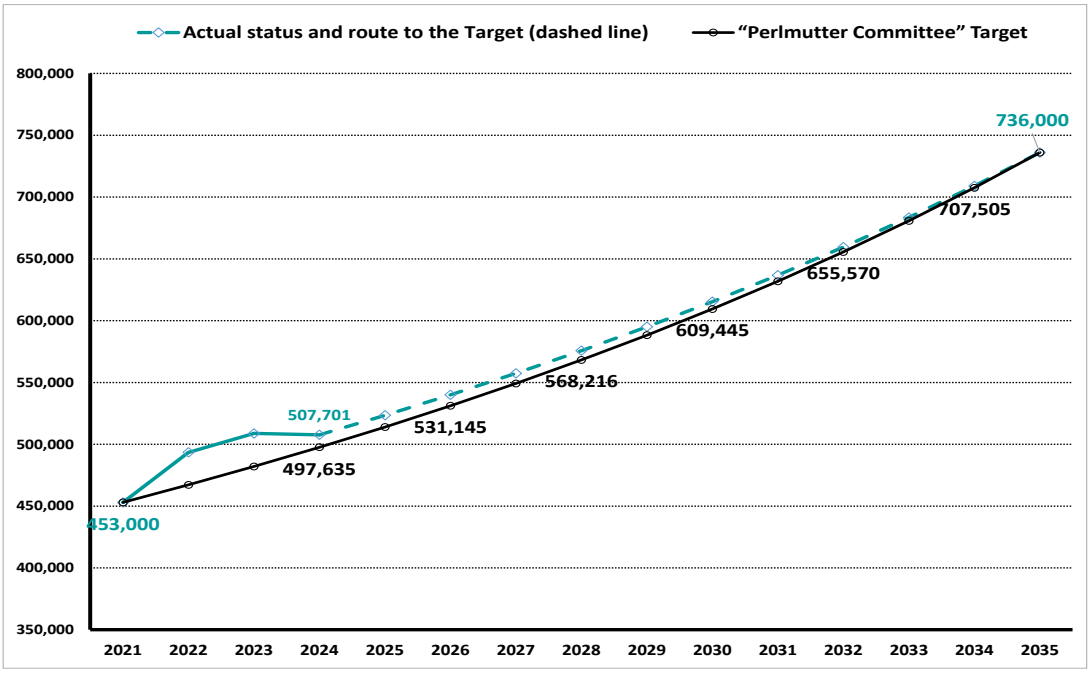
"Perlmutter Committee" Targets[25]

The Committee for Increasing High-Tech Human Capital ("Perlmutter Committee") has established both short-term and long-term targets for the share of tech occupations[26] in Israel's labor market. By 2026, the goal is to have 540,000 employees in tech occupations, representing 15% of all employed individuals aged 25-64. By 2035, this number is expected to grow to 740,000 employees. These targets, as shown in Figure 29, are based on an anticipated annual growth rate of 3.5%-4.0% in tech employment from **2021 to 2035**, ensuring steady expansion of Israel's high-tech workforce.

[25] The research team accompanied the Committee for Raising Human Capital for High-tech (Perlmutter Committee) in preparation of the first progress report.

[26] Technological positions: All workers in the high-tech sector, plus workers in other sectors and occupations - information and communications technology service managers (133), physical and earth science professionals (211), life science professionals (213), engineering professionals (214), electrotechnology engineers (215), software and applications developers and analysts (251), database and network professionals (252), physical and engineering science - practical engineers and technicians (311), information and communications technology operations and user support practical engineers and technicians (351), telecommunications and broadcasting practical engineers and technicians (352).

Figure 29: Share of Tech Employees - "Perlmutter Committee" Target



Source: Aaron Institute analysis of CBS data.

In addition to overall employment growth, the committee has also established specific targets for the growth of tech occupations within different population groups. This aims to reduce the underrepresentation of women, Arab society, and Haredi society in Israel's high-tech sector. Achieving these goals is crucial for several reasons: boosting labor productivity, narrowing the gender gap in tech employment, driving economic growth, enhancing economic resilience, and maintaining the competitiveness of Israel's high-tech sector in the global market.

To increase the supply of skilled labor for tech occupations, the committee established measurable goals in three interconnected areas that influence one another. Expanding the number of students eligible for a high-tech matriculation will naturally lead to more first-year students and graduates in technology-related degrees.[27] This, in turn, will increase the number of individuals employed in tech occupations. Investing in expanded access to high-tech matriculation will help strengthen the talent pipe-line for high-tech faculties. As these students complete their studies, they will form a skilled and readily available workforce, ensuring a sustainable supply of human capital for the tech occupations.

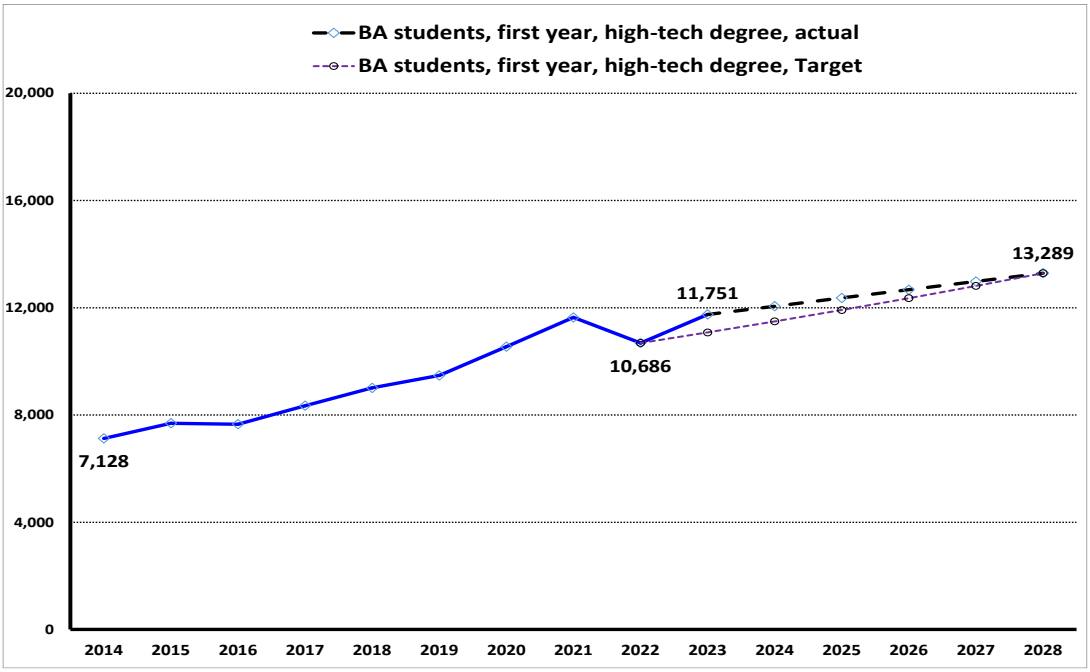
Higher Education System

Between 2010 and 2021, the number of first-year undergraduate students enrolling in high-tech degree programs grew at an impressive annual rate of 6.6% (Figure 30). However, during the 2022-2023 academic year, this growth stabilized, with only modest increases in the number of graduates – 4.8% in 2022 and 2.9% in 2023. While these figures indicate sustained interest in high-tech education, they do not meet the growth rate necessary to fulfill future workforce demands.

To ensure a sufficient pipeline of skilled professionals for the technology sector, the higher education system must increase the number of high-tech degree graduates at an annual rate of at least 3.5% (Figure 31). This is essential to achieve the national target of 15% of all graduates holding high-tech degrees by 2028. The number of graduates with high-tech degrees must grow from 7,600 in 2023 to 9,000 by 2028. Strengthening STEM education, expanding enrollment capacity in high-tech programs, and ensuring alignment between academic offerings and industry needs will be critical to meeting these goals.

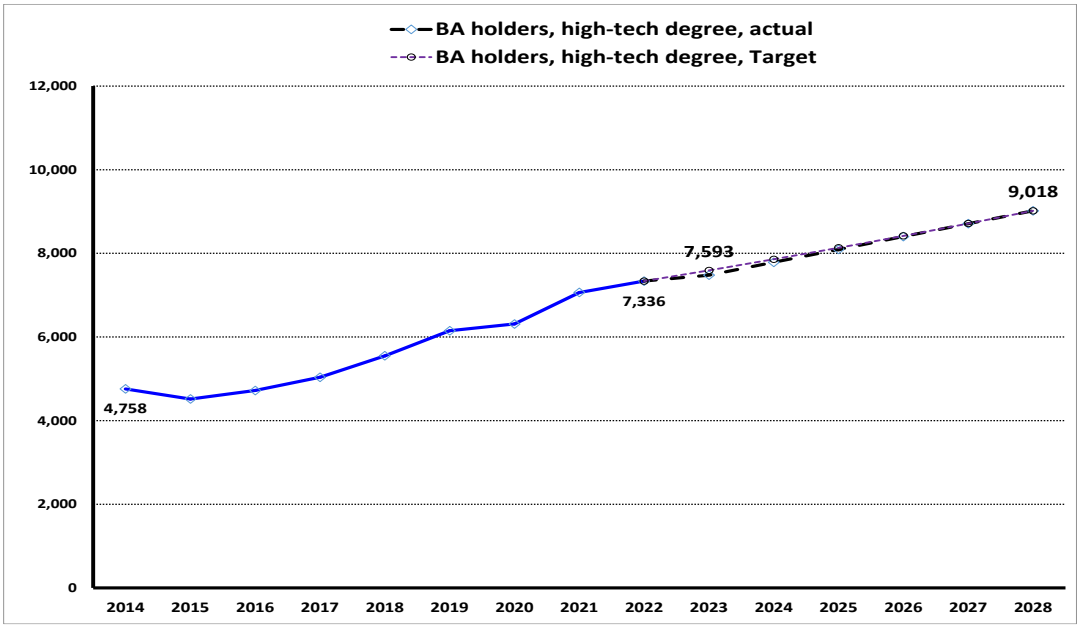
[27] High-tech degrees: Electrical Engineering, Computer Engineering, Mathematics, Computer Science, Information Systems Engineering, Bioinformatics, Systems Engineering (Technion), Electronic Engineering, Statistics, Electro-Optics.

Figure 30: BA Students and High-tech Degrees, Actual number and "Perlmutter Committee" Target



Source: Aaron Institute analysis of MALAG data.

Figure 31: BA Holders and High-tech Degrees, Actual Number and "Perlmutter Committee" Target



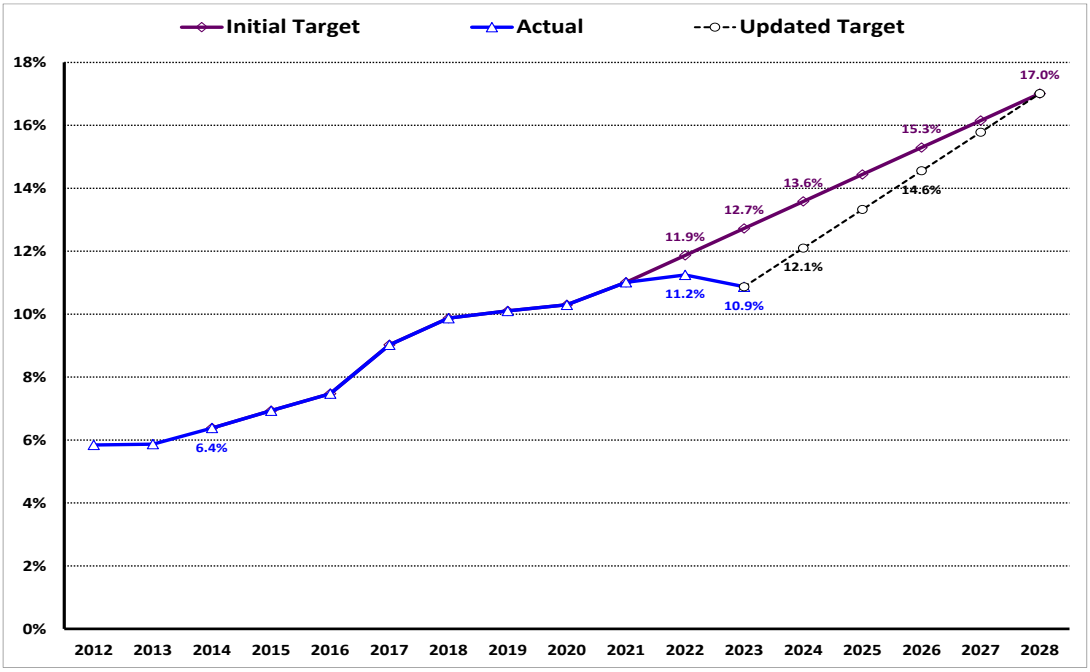
Source: Aaron Institute analysis of MALAG data.

The education system

The education system plays a crucial role in developing human capital equipped with technological skills. To increase the number of high-tech degree graduates and the proportion of those employed in tech occupations, it is essential to expand the pipeline of students pursuing STEM education. Specifically, the percentage of students earning a high-tech matriculation should reach **17% by 2028** to sustain the talent pool needed for the high-tech sector (Figure 32).

However, the lack of an active policy to boost high-tech matriculation rates in 2022–2023 has stalled previous progress. To meet future labor market demands, it is essential to increase the number of students earning a high-tech matriculation from 14,000 in 2023 to 24,000 in 2028. Proactive measures are needed to reignite growth in STEM participation, ensuring a steady supply of graduates prepared for careers in technology-driven industries.

Figure 32: High-tech Matriculation, Actual Share and "Perlmutter Committee" Target



Source: Aaron Institute analysis of Ministry of Education data.

4. High-tech: Risks and Opportunities

Between 2023 and 2024, Israel experienced a significant decline in economic and financial stability due to various challenges. These include the absence of a growth-supportive economic policy, the advancement of judicial reforms without broad consensus, and the "October 7 War." The resulting increase in defense spending has raised the debt-to-GDP ratio, leading to a downgrade of the country's sovereign credit rating. Additionally, reduced air traffic and the potential for international boycotts have further contributed to economic uncertainty and instability.

Israel's high-tech sector, a crucial driver of economic growth, has been directly affected by these developments. The share of startups in employment, GDP, and national civilian R&D expenditures declined in 2023 to 8.4%, 8.0%, and 14%, respectively, as shown in Figure 13. This downward trend may indicate a slowdown in early-stage innovation, which could have long-term consequences for economic growth.

At the employment level, the high-tech sector has shifted its focus toward technical roles, particularly in research and development (R&D), while deprioritizing administrative and support functions. Table 3 shows that total high-tech employment decreased by 0.7% in Q1–Q3 2024 compared to the same period in 2023. However, R&D roles grew by 4.9%, reflecting a strong emphasis on innovation and technical expertise. In contrast, business and administrative roles fell by 6.8%, while product, QA, and data roles declined by 4.8%. This reduction in "growth-related" roles, such as product management and business development, raises concerns about the sector's ability to scale startups into profitable, sustainable companies.

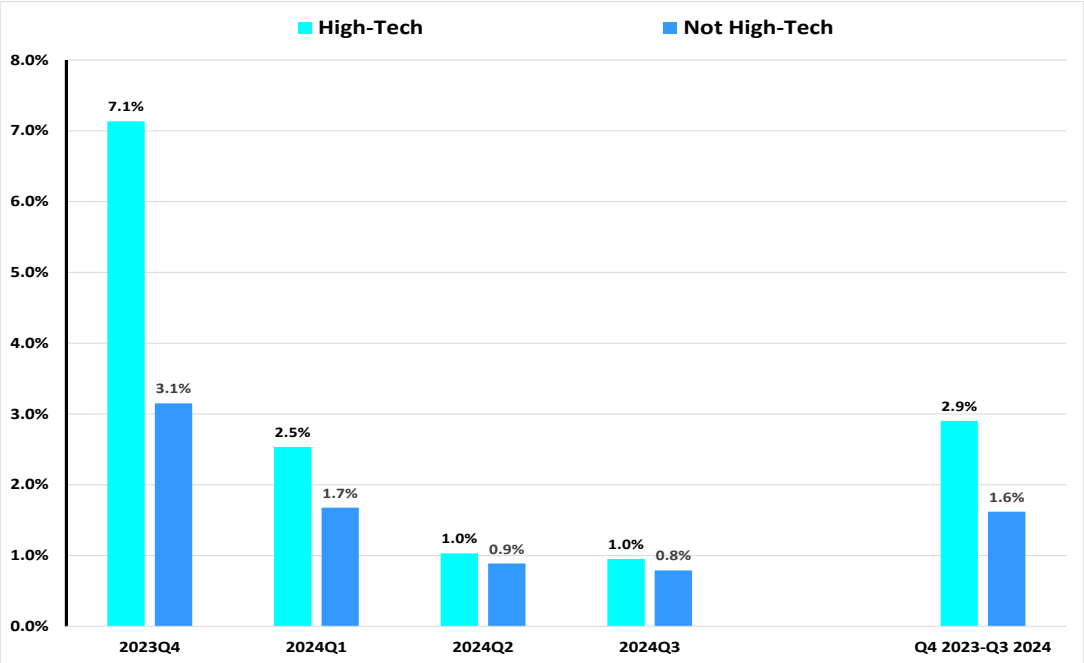
Table 3: High-tech Sector Employment by Occupation Cluster

Occupation cluster	Q1-Q3 2024	Q1-Q3 2024 vs. Q1-Q3 2023 Growth Rate	Annual Growth Rate 2022-2023	Annual Growth Rate 2017-2022
R&D	200.6K	4.9 %	3.2%	9.4%
Product, QA, Data	81.5K	-4.8 %	-2.8%	9.3%
Business, Administrative	112.2K	-6.8 %	5.9%	3.3%
All High-tech Employees	394.3K	-0.7%	2.6%	7.4%

Source: Aaron Institute analysis of CBS data.

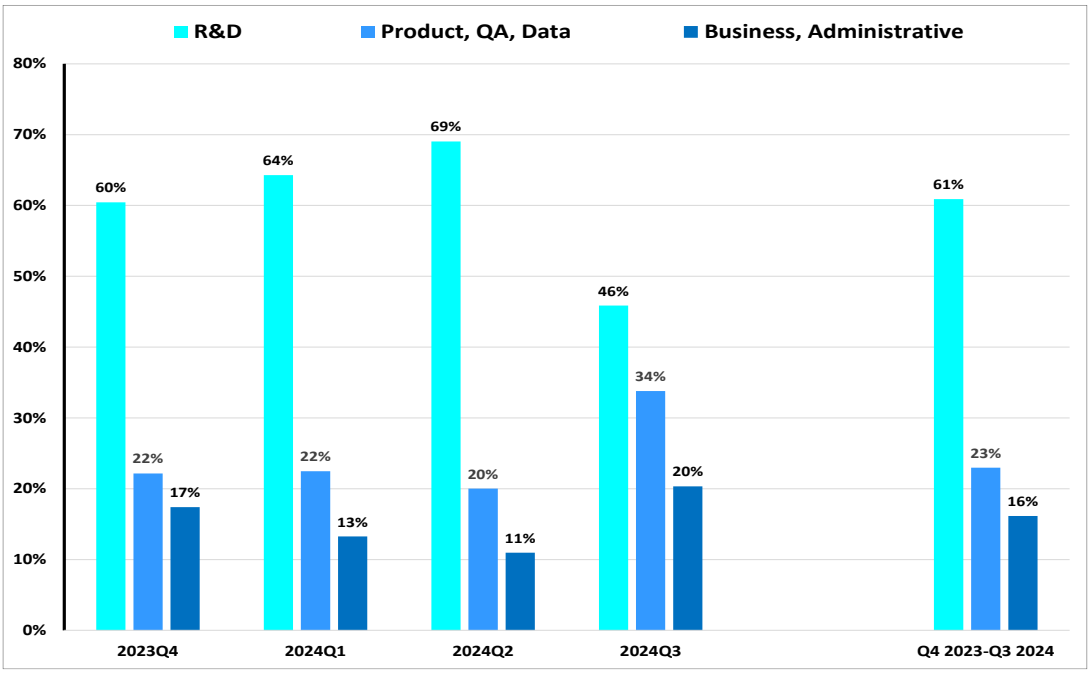
A significant challenge affecting high-tech employment is the extended military reserve service. Since October 7th, the average reserve service in Israel has lasted 145 days, with 2.9% of high-tech sector workers serving in the reserves – nearly twice the rate of other sectors, which stands at 1.6% (Figure 33). Among these reservists, approximately 60% are employed in R&D roles, 23% in Product, QA, and Data occupations, and the remaining 17% in Business and Administrative roles (Figure 34).

Figure 33: Percentage Serving in the Reserves, by Economic Sector



Source: Aaron Institute analysis of CBS data.

Figure 34: Distribution of High-tech Employees in the Reserves, by Occupation



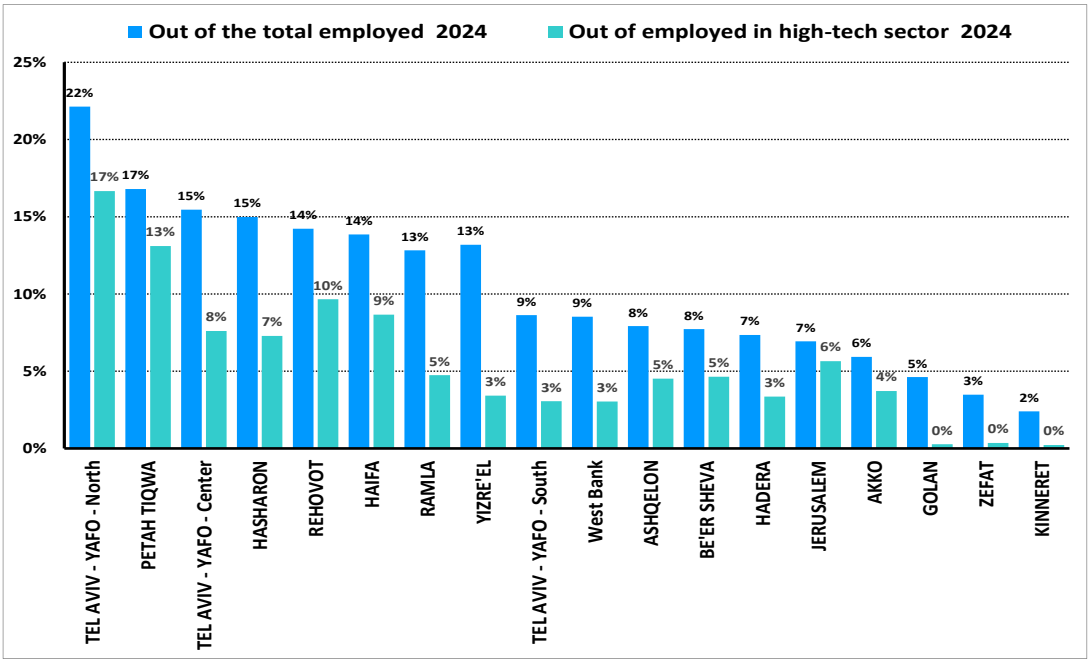
Source: Aaron Institute analysis of CBS data.

This prolonged military reserve service has placed additional strain on high-tech companies, disrupting operations and raising concerns about the potential relocation of company activities abroad. Furthermore, the situation has heightened the risk of a "brain drain," as skilled professionals seek opportunities outside Israel due to economic uncertainty and instability.

4.1 Underrepresentation of the Periphery in High-Tech Employment

Certain regions in Israel exhibit a significantly higher concentration of high-tech employment compared to others. As of 2024, Tel Aviv (particularly the northern part), Petah Tikva, and the Sharon District collectively account for 50% of the country's high-tech workforce (Figure 35). These areas have emerged as key hubs of innovation, attracting global investments, fostering startups, and housing major technology companies. Their prominence is largely driven by a combination of robust infrastructure, access to a highly skilled workforce, and proximity to leading academic and research institutions.

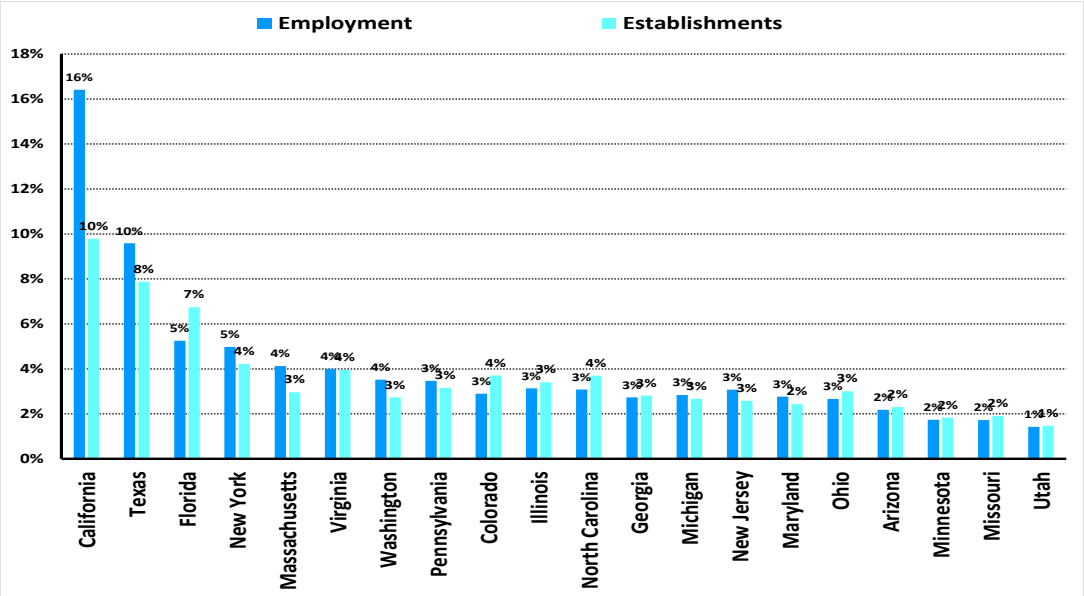
Figure 35: Distribution of Employment in Israeli High-tech Sector, 2024



Source: Aaron Institute analysis of CBS data.

This geographic clustering is not unique to Israel; it reflects broader global trends. In the United States, innovation hubs such as Silicon Valley (California) and Austin (Texas) serve a similar role, driving high-tech growth by fostering venture capital investment, attracting global talent, and promoting cutting-edge technological advancements (Figure 36). These ecosystems illustrate that the concentration of high-tech activity in specific regions enhances economic productivity, encourages collaboration, and accelerates technological innovation.

Figure 36: Distribution of Employment and Establishments in USA's High-tech Sector, 2022

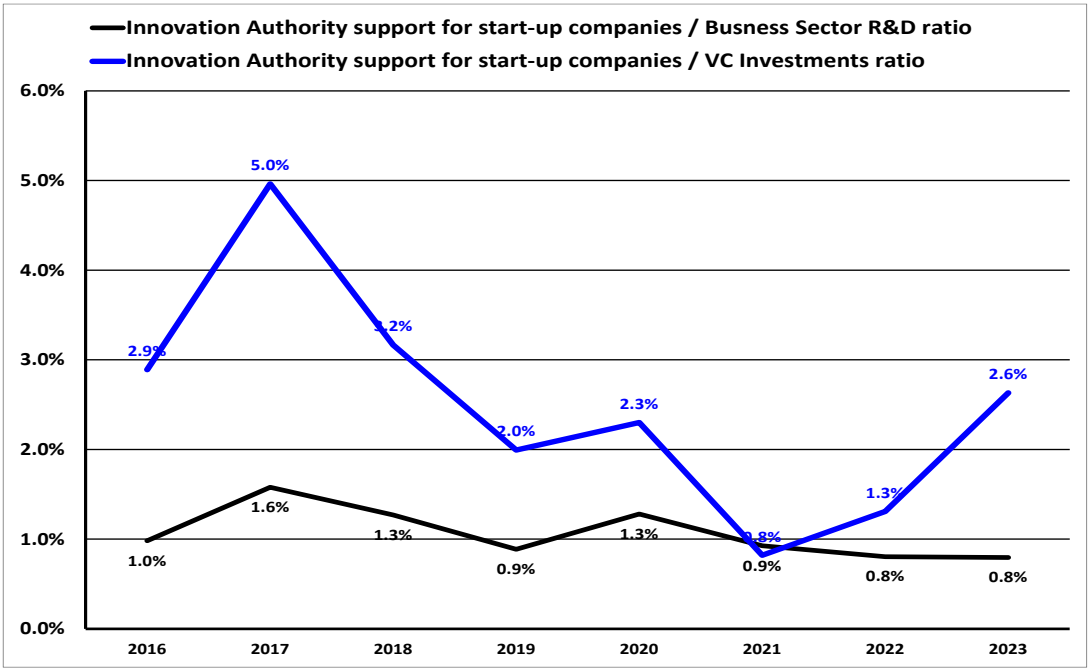


Source: Aaron Institute analysis of CBS data.

4.2 Decrease in (small) Israel Innovation Authority budget

The financial support from the Israel Innovation Authority remains relatively small compared to R&D expenditure in the business sector and venture capital (VC) investments (Figure 37). In 2023, the Innovation Authority's funding comprised only 0.8% of total business sector R&D expenditure and 2.6% of total VC investments, highlighting its limited impact within Israel's high-tech funding ecosystem.

Figure 37: Israel Innovation Authority Support, % of Business Sector R&D and VC Investments



Source: Aaron Institute analysis of CBS data.

Furthermore, this share has been steadily declining in recent years. Between 2016 and 2020, support from the Innovation Authority averaged 1.2% of total R&D expenditure, but this figure dropped to 0.8% in 2021-2023. This downward trend indicates a growing disconnect between the Innovation Authority's diminishing budget and Israel's ongoing strength in high-tech innovation. Without increased investment, the ability to sustain and expand Israel's competitive edge in global technology markets may face long-term challenges.

4.3 The Economics of AI

The field of Artificial Intelligence (AI) has generated significant interest and debate regarding its potential economic implications. While AI has the capacity to drive innovation and efficiency across various industries, its effect on productivity, labor markets, and economic inequality are subjects of ongoing research. Scholars such as Daron Acemoglu, David Autor, and Erik Brynjolfsson offer valuable insights into these dynamics.

Daron Acemoglu[28] highlights a gap between AI's transformative potential and its measurable economic gains. He estimates that AI could contribute a modest increase of 1.1% to 1.6% to U.S. GDP over the next decade, with annual productivity gains projected at only 0.05%. Acemoglu warns that if AI continues to prioritize automation that displaces human jobs, it may exacerbate income inequality and job displacement. He advocates for a transition toward AI technologies that augment human labor, ensuring that the economic benefits are widely distributed.

David Autor[29] presents AI as a potential tool for reducing inequality, particularly if implemented in ways that empower workers. He notes that Generative AI has shown promise in boosting the productivity of lower-skilled employees, which could help rebuild the middle class by expanding opportunities for workers traditionally excluded from high-paying jobs. However, Autor cautions that these benefits depend on equitable access to AI tools and supportive policies that promote workforce adaptability.

Erik Brynjolfsson[30] emphasizes the complementarity between AI and human labor, arguing that AI's true value lies in enhancing workers' capabilities rather than replacing them. He points to significant productivity gains in fields like healthcare, where AI enables professionals to improve decision-making and efficiency. Brynjolfsson stresses that shared prosperity through AI is only achievable if businesses and governments invest in reskilling programs and prioritize responsible AI deployment.

[28] Acemoglu, D. (2024), "The Simple Macroeconomics of AI", National Bureau of Economic Research.
[29] Autor, D. (2024), "Applying AI to Rebuild Middle Class jobs", National Bureau of Economic Research.
[30] Brynjolfsson, E. (2025), American Economic Association Annual Meeting.

Joseph Stiglitz[31] warns that unregulated AI could exacerbate existing inequalities. He argues that without proper oversight, AI may disproportionately benefit employers, weakening workers' bargaining power and increasing economic disparities. Stiglitz advocates for government intervention to guide AI innovation in ways that enhance productivity and create jobs, rather than simply replacing human labor.

AI's Impact on the Workforce

- **Enhancing Productivity in High-Tech**: AI is significantly boosting labor productivity by automating routine tasks and allowing employees to concentrate on higher-value work. This shift has increased the demand for AI-related professions, including software engineers, data scientists, and machine learning specialists who develop, implement, and maintain AI-driven systems. Consequently, higher education in deep-tech fields is becoming increasingly important to meet workforce demands.
- **Emerging Roles in AI Implementation:** The widespread adoption of AI across industries has led to the creation of new roles that require both technical expertise and business acumen. Positions such as AI implementation consultants, AI project managers, and AI ethics specialists are gaining traction as companies seek professionals capable of effectively integrating AI into existing business operations.
- **Decline in Routine Tech Jobs:** While AI is creating new opportunities, it is also contributing to job displacement in certain areas, particularly in routine coding, IT support, and data processing roles. Workers in these fields are increasingly required to reskill or transition to positions that emphasize creativity, strategic decision-making, and AI oversight**.**
- **The Growing Importance of Soft Skills:** Beyond technical proficiency, human skills such as problem-solving, creativity, adaptability, and emotional intelligence are becoming more valuable. While AI can manage data-driven decision-making, human intuition, ethical reasoning, and interpersonal communication remain irreplaceable in an AI-driven economy.

[31] https://www.scientificamerican.com/article/unregulated-ai-will-worsen-inequality-warns-nobel-winning-economist-joseph-stiglitz/?utm_source=chatgpt.com

- **Sector-Specific Changes:** AI is reshaping various industries by complementing human expertise, highlighting the need for workers to stay flexible and open to continuous learning.
    - Healthcare: AI-powered diagnostic tools assist doctors and radiologists, enabling them to focus on complex cases that require human judgment.
    - Education: AI-driven personalized learning platforms help teachers adapt to new technologies, improving student engagement and outcomes.
    - Finance and Law: AI automates risk assessments, fraud detection, and legal document review, requiring professionals to shift toward advisory and analytical roles.
- **Lifelong Learning:** As AI continues to evolve, continuous learning and upskilling are essential for workers to remain competitive. Training programs and certifications in AI, data science, and automation technologies are becoming more widespread, reflecting the growing need for an adaptive, tech-savvy workforce.

Beyond automation, AI fosters innovation and drives demand for AI-skilled professionals in critical high-tech fields. Eyal Waldman, co-founder of Mellanox Technologies,[32] emphasizes that AI-driven automation fuels business expansion, innovation, and economic growth rather than job destruction.

According to Startup Nation Central AI report, a key factor that sets Israel the home of world-leading AI startups, researchers and developers – both in the industry and in academia - is its focus on applied AI solutions. This includes practical applications in fields such as cybersecurity, health tech, and agriculture, positioning Israel as a leader in real-world AI innovation. There is a strong interest from the leading MNCs in Israeli AI companies: all top AI multinationals: NVIDIA, Google, Microsoft, Meta, Apple, Amazon, IBM, and Intel operate in Israel.[33]

As AI continues to evolve, it is essential for businesses, policymakers, and educators to prioritize workforce training, adaptive learning programs, and strategic AI deployment to ensure that its benefits are widely distributed across industries. A strong investment in AI education and skill development will be crucial for maintaining Israel's leadership in the global high-tech sector.

[32] The company was acquired by Nvidia for $6.9 billion in 2019.

[33] See "Israel's World-Class AI Powerhouse: Leading Through Applied Innovation", A Startup Nation Central report with commentary by NVIDIA, November 2024, https://finder.startupnationcentral.org/reports/ai-report-2024

4.4 Academia-industry Knowledge Transfer

The transfer of knowledge between academia and industry is essential for fostering innovation and driving economic growth, as it bridges the gap between theoretical research and practical application. Universities generate cutting-edge discoveries, but without collaboration with industry, many of these ideas remain in academic journals instead of transforming into real-world solutions. By working together, academia provides scientific insights, while industry contributes resources, market expertise, and pathways for practical implementation. This partnership accelerates technological advancements, reduces research and development costs, and enhances economic growth by creating new products and services.[34] Ultimately, a strong connection between academia and industry ensures that innovation moves from the lab to society, benefiting businesses, consumers, and the broader economy.

The evolution of academia-industry knowledge transfer has shifted from a linear model to a more dynamic, collaborative framework.[35] Traditionally, the linear model described a process where innovation flowed from basic university research, which industries then applied to develop marketable products. This approach resulted in limited **collaboration** between academia and industry. In contrast, the modern ecosystem model emphasizes dynamic, continuous interactions among academia, industry, and society, fostering co-creation through partnerships and joint research. Together, these models highlight the transition from a linear process to an ecosystem-driven framework, aligning innovation more closely with real-world needs and creating a more efficient innovation landscape.

[34] For small and medium-sized enterprises (SMEs), which often lack resources for in-house research, these collaborations are particularly critical. They offer access to advanced research and tools, empowering SMEs to innovate and compete on a larger scale.

[35] Arnon Bentur, Daphne Getz and Oshrat Katz Shacham (2021), "System Analysis of Technology Transfer Policies and Models in Higher Education", *Handbook of Operations Research and Management Science in Higher Education* 309, 241–262.

Academic industry knowledge transfer can be categorized into three main approaches: **knowledge dissemination, co-creation, and commercialization. Knowledge dissemination** includes traditional academic activities such as scientific publications, educating engineers and scientists, and making research widely accessible.[36] **Co-creation** emphasizes collaboration between universities and industry to translate research into practical applications through mechanisms like public-private partnerships, joint research, joint patenting, and joint publishing, thereby fostering innovation through shared expertise. The intellectual property (IP) generated through this channel is often jointly owned by the university and industry. Finally, **commercialization**[37] focuses on transforming academic inventions (IP) into marketable products or services through invention disclosure, patenting, licensing, and the creation of spin-off companies or startups.

The academia-industry knowledge transfer, with an emphasis on co-creation and commercialization, involves multiple key players. **Technology Transfer Offices (TTOs)** play a central role in this process, managing patents, intellectual property, licensing agreements, and the formation of spin-offs. **Researchers** are essential as the originators of ideas; they conduct applied research, identify practical applications, and collaborate with industry. **Universities/PRI Administrations** establish policies for intellectual property sharing, create legal entities like TTOs, and make strategic decisions regarding research and commercialization. **Industry and Ecosystem Facilitators**, including private companies, venture capitalists, and business incubators, adopt and commercialize technologies, driving innovation to market. Lastly, **Government** fosters an enabling environment through innovation policies, funding, and regulatory frameworks. Together, these players create a robust ecosystem for knowledge transfer and economic growth.

[36] This approach emphasizes the public good aspect of knowledge creation and sharing, often without direct financial return to the university.

[37] The mechanism of technology commercialization is largely linear and involves successive steps such as scientific discovery, invention disclosure, evaluation/patent application, and licensing/startup formation.

Barriers to technology commercialization and co-creation stem from challenges faced by key stakeholders. **Technology Transfer Offices (TTOs)** often struggle with underfunding, understaffing, and a lack of expertise, all compounded by bureaucratic hurdles, institutional limitations, and cultural differences. **Researchers** encounter difficulties due to limited knowledge of commercialization, a lack of business skills and industry connections, and insufficient support from their institutions and TTOs. **University/PRI Administration** may prioritize academic goals over industry needs, lack policies to promote entrepreneurship, and face constrained resources and limited engagement with industry. **Industry and Ecosystem Facilitators** face challenges such as limited funding-- particularly for SMEs--cultural misalignment between academia and industry, and difficulties in navigating collaborations between academia and business. **Governments** exacerbate these barriers through insufficient funding, weak policy frameworks, inadequate infrastructure, and systemic bureaucracy.

Effective policy is critical for fostering successful knowledge transfer between academia and industry. Such policies must establish a robust framework that addresses the unique challenges faced by each key stakeholder, including resource limitations, regulatory hurdles, weak infrastructure, and misaligned priorities. To maximize impact, policies should incorporate measurable targets aligned with key areas of focus, such as intellectual property generation and the creation of start-ups and spin-offs. These measures encompass **knowledge dissemination**, **co-creation**, and **commercialization**, providing policymakers with tangible benchmarks to monitor and refine their efforts while fostering an environment where innovation thrives.

We have identified a comprehensive set of indicators, drawn from global frameworks such as the GII index and policies implemented in other countries, to systematically track progress (Table 4).

Table 4: Measures of Knowledge Transfer

Knowledge Dissemination	Co-creation	Knowledge Exchange
❖ **Research Output Sharing:** ❑ Publications (# publications, # citations) ❑ Open Access Contributions ❖ **Skills and Training:** ❑ % ICT Graduates ❑ % Science and Engineering graduates ❖ **Placement in Business** ❑ Tracking placements	❑ Percentage of HERD Funded by Businesses ❑ Number of Co-Creation Contracts ❑ Number of Academic Industry co Publications ❑ Number of Academic Industry Patents ❑ Number of Academic Industry Licensing Agreements	❖ **Intellectual Property (IP) Metrics:** ❑ Number of Patents Filed/Issued. ❑ Number Licenses Issued ❑ Revenue from Licensing ❖ **Start-ups and Spin-offs:** ❑ Number of Companies/Growth Companies/Spin offs Emerged ❑ Number of Jobs Created ❑ Total Turnover of the Companies Emerged

Source: OECD.

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It is crucial to systematically measure and track the impact of policies to maximize the benefits of academia-industry collaboration:

- **Knowledge dissemination** is assessed through **research output metrics** such as the number of publications, citations, and open access contributions, as well as **skills and training indicators** like the percentage of ICT and science graduates entering industry roles.
- **Co-creation metrics** are evaluated based on the share of HERD funded by businesses, the number of co-creation contracts, joint academic-industry publications, joint patents, and joint licensing agreements.
- **Commercialization** impact is measured using intellectual property metrics, including the number of patents filed, licenses issued, and revenue from licensing, alongside start-up and spin-off metrics such as the number of new companies, jobs created, and total turnover.

Systematic tracking of these measures ensures that policies remain effective, facilitating continuous improvement and fostering innovation, economic growth, and societal progress. **Next year's report will explore further insights into successful policy designs and their impacts.**

5. Israeli National Innovation Policy

5.1 Lessons learned from the EU's Digital Decade

The European Union (EU) has launched an ambitious initiative known as the **Digital Decade 2030**. This program outlines a comprehensive strategy to strengthen Europe's digital capabilities and ensure its competitiveness in the global digital economy. The Digital Decade focuses on four key areas: **Infrastructure, Skills, Business** and **Government**. Its goal is to build a robust digital ecosystem that drives the digital economy, fosters innovation, empowers the workforce, and transforms governance. The program addresses the challenges and opportunities within each area and establishes concrete targets, initiatives, measures, and monitoring systems to ensure these goals are achieved by 2030. Appendix 3 provides a detailed summary of the program's main components.

The EU's framework offers a roadmap for crafting a national innovation strategy tailored to Israel's unique context. This involves defining a clear vision for its innovation policy, identifying specific challenges and opportunities in each area, and setting concrete and achievable targets. To meet these targets, Israel should develop comprehensive action plans outlining specific initiatives and policies. Furthermore, Israel must prioritize fostering collaboration among government, industry, academia, and civil society while implementing robust monitoring and evaluation frameworks to track progress and ensure that targets are met.

The challenges and opportunities within Israel's high-tech sector have been discussed in previous chapters. The next chapter will present an international benchmarking analysis based on the Global Innovation Index (GII) to evaluate Israel's position compared to leading innovation economies.

5.2 Lessons learned from Global Innovation Index

The Global Innovation Index (GII) is a widely recognized tool for measuring and ranking the innovation performance of countries worldwide. Published annually by the World Intellectual Property Organization (WIPO) in collaboration with Cornell University and INSEAD,[38] the GII evaluates 132 economies using 81 indicators derived from public and private sources. These indicators are grouped into two main pillars: Innovation Inputs and Innovation Outputs, which together determine a country's total GII score.

The GII Input Pillar assesses six key factors (32 indicators) that enable innovation: Institutions, Human Capital and Research, Infrastructure, Market Sophistication, and Business Sophistication. These factors measure a country's ability to create an environment that fosters research, entrepreneurship, and technological development. In contrast, the GII Output Pillar evaluates two main factors (49 indicators) that capture the tangible results of innovation: Knowledge and Technology Outputs and Creative Outputs.[39] Together, these indicators provide comprehensive insights into an economy's innovation capacity and achievements.

As a policy tool, the GII serves as a resource for policymakers, investors, and industry leaders to evaluate and strengthen innovation ecosystems. It identifies key areas for improvement, highlights growth opportunities, and provides a framework for shaping national strategies to drive economic growth, attract investment, and enhance global competitiveness.

Countries that score highly on the GII tend to experience higher levels of economic performance, including increased GDP, greater investment inflows, and faster technological advancements (Figure 39). In 2022, Israel ranked 13th among the 38 OECD countries, while the United States ranked 2nd. The Aaron Institute's benchmark countries – Austria, Denmark, Finland, the Netherlands, and Sweden – had an average rank of 8, highlighting their strong innovation ecosystems.[40]

[38] European Institute of Business Administration (Institut Européen d'Administration des Affaires).

[39] See Appendix 1 for the full list of innovation-specific indicators.

[40] Given that some OECD member countries are classified as developing economies, the OECD average does not serve as an appropriate benchmark for comparison. The Aaron Institute employs a methodology that benchmarks Israel against a selected group of countries that are comparable in terms of size and reliance on human capital rather than natural resources, yet outperform Israel in GDP per capita and poverty rates. These benchmark countries include Austria, Denmark, Finland, the Netherlands, and Sweden.

A detailed analysis of the Global Innovation Index (GII) indicators (Table 5) reveals that many extend beyond innovation policy, encompassing broader aspects of economic and business environments. To enhance clarity, we categorized the 81 GII indicators into two primary groups:

- **Innovation-Specific Indicators** (37 indicators) – These directly measure a country's innovation capacity and performance.[41]
- **Doing Business Indicators** (44 indicators) – These assess political stability, macroeconomic policies, infrastructure quality, and regulatory efficiency, which indirectly affect a country's innovation potential.

To refine this classification further, we divided **Innovation-Specific Indicators** into two sub-groups based on their direct relevance to innovation activity and policy:[42]

- **Core Innovation Indicators**[43] – A subset of 23 indicators directly tied to innovation policy, comprising 7 input indicators and 16 output indicators.
- **Broader Innovation Indicators** – These are the remaining indicators that contribute to innovation while also intersecting with other policy domains.

[41] For example, Full-Time Equivalent (FTE) researchers, ICT usage, knowledge-intensive employment, and high-tech trade.

[42] Based on the Aaron Institute's research on: Going Digital and EU 2030 Digital Compass methodological frameworks. For example, indicators such as high-tech imports, software spending, and creative goods exports are classified as not requiring intervention. See Appendix 2 for an explanation of the Aaron Institute's framework.

[43] See Table A-1 in Appendix 1: Inputs: Gross expenditure on R&D, ICT access, Government's online service, Venture capital investors, GERD performed by business, University-industry R&D collaboration, GERD financed by abroad; Outputs: PISA scales in reading, math and science, Graduates in science and engineering, Researchers, ICT use, Online e-participation, Venture capital recipients, Knowledge-intensive employment, Joint venture/strategic alliance deals, Patent families, Research talent, PCT patents by origin, Patents by origin, Scientific and technical articles, Production and export complexity, High-tech exports, ICT services exports.

Table 5: GII Index by Factor

Factor	All GII Indicators	Innovation-specific indicators		
		All	Core Innovation indicators	
			Inputs	Outputs
Institutions	7	1	0	0
Human capital and research	12	5	1	3
Infrastructure	10	4	2	2
Market sophistication	10	4	1	1
Business sophistication	15	10	3	3
Knowledge and technology outputs	14	9	0	7
Creative outputs	12	4	0	0
Total	80	37	7	16
Israel Rank	13	3	1	4
Benchmark Countries Rank	8	11	6	5
USA Rank	2	2	3	11

Source: The World Intellectual Property Organization (WIPO).

Israel's Innovation Performance in the Global Innovation Index (GII)

Israel's innovation ecosystem is globally competitive, yet its overall ranking in the Global Innovation Index (GII) (13th) lags behind the USA (2nd) and benchmark countries (8th on average). A deeper analysis reveals that Israel's primary weaknesses lie in **Doing Business Indicators**, which assess regulatory efficiency, market conditions, and infrastructure. However, when focusing exclusively on **Innovation-Specific Indicators**, Israel's ranking improves significantly. This shift underscores Israel's strengths in knowledge-intensive employment, ICT service exports, and scientific collaboration, which collectively fuel economic growth through innovation. Despite excelling in fostering startups, Israel faces challenges in scaling businesses due to regulatory burdens and infrastructure limitations.

Among **Core Innovation Indicators**, which are most directly tied to innovation activity and policy, Israel excels, ranking **3rd** globally, surpassing the USA (7th) and benchmark countries (11th).

Within this category, Israel leads in **Core Innovation Inputs**, ranking **1st** worldwide, ahead of the USA (3rd) and the benchmark average (6th), due to its strong business-led R&D sector, high venture capital investment, and robust international R&D partnerships. These strengths position Israel as one of the world's most dynamic ecosystems for high-tech entrepreneurship and scientific advancement. However, despite its leadership, government funding for innovation is relatively low, leaving the sector heavily dependent on private investment.

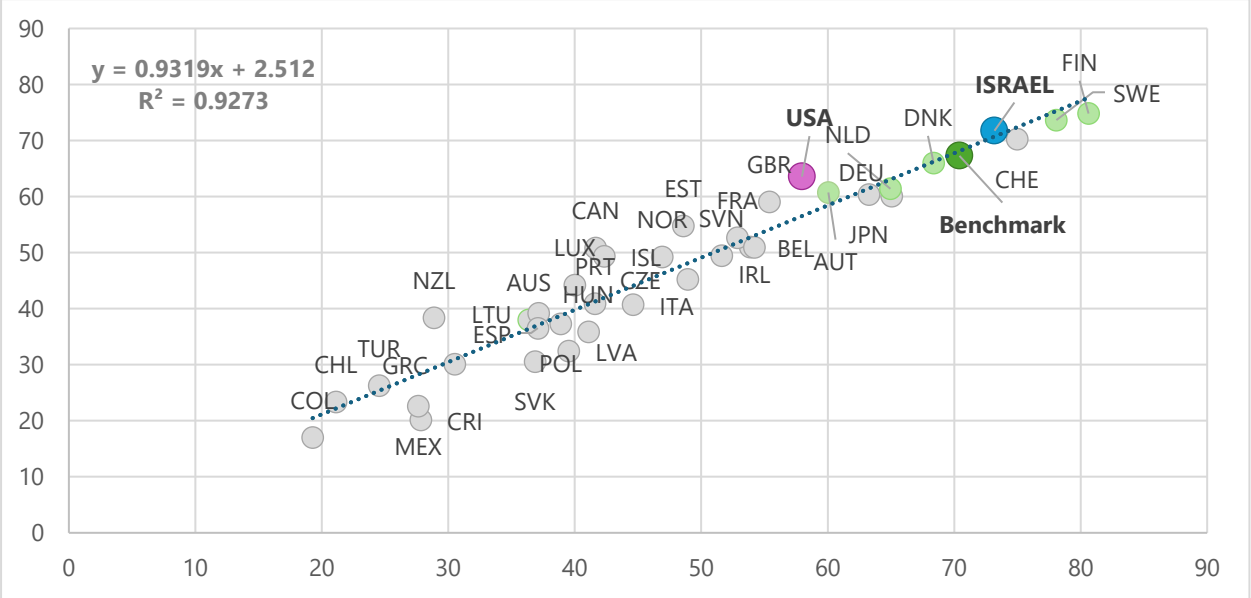
On the **Core Innovation Outputs** side, Israel maintains a **4th-place** ranking, slightly ahead of the benchmark average (5th), while the USA drops to 11th. This demonstrates Israel's strong performance in venture capital-backed startups, high-tech and ICT service exports, patent production, and strategic industry alliances. However, challenges persist in maintaining a skilled workforce capable of sustaining this innovation-driven growth. Issues such as educational attainment in science and engineering, lower PISA scores in reading, math, and science, and limited ICT adoption in traditional industries present long-term risks to workforce preparedness for emerging deep-tech industries.

Despite Israel's success in innovation-focused metrics, its broader business environment remains a critical weakness that negatively impacts its total GII ranking. Regulatory complexity, ease of doing business, and limited government digital services are among the most significant challenges that hinder further progress. These business indicators, which measure the efficiency of institutions, regulatory frameworks, and infrastructure, highlight barriers that make scaling businesses in Israel more difficult than in other leading innovation economies. Improving regulatory efficiency, streamlining government services, and enhancing ICT infrastructure will be crucial for ensuring Israel's continued growth in innovation and economic competitiveness.

Innovation Efficiency: Converting Inputs into Outputs

An analysis of the **relationship between Core Innovation Inputs and Core Innovation Outputs** reveals a **strong positive correlation (R^2 = 0.93)**, indicating that countries investing more in innovation-related inputs tend to achieve higher innovation-driven outcomes (Figure 38). Israel and its benchmark countries generally align with this trend. However, not all countries convert inputs into outputs with equal efficiency. The USA slightly outperforms the expected trend, suggesting it generates more innovation-driven results from its input investments than the average OECD country. Israel, Finland, and Sweden cluster near the upper-right corner of the trend line, indicating both high innovation inputs and strong innovation outputs.

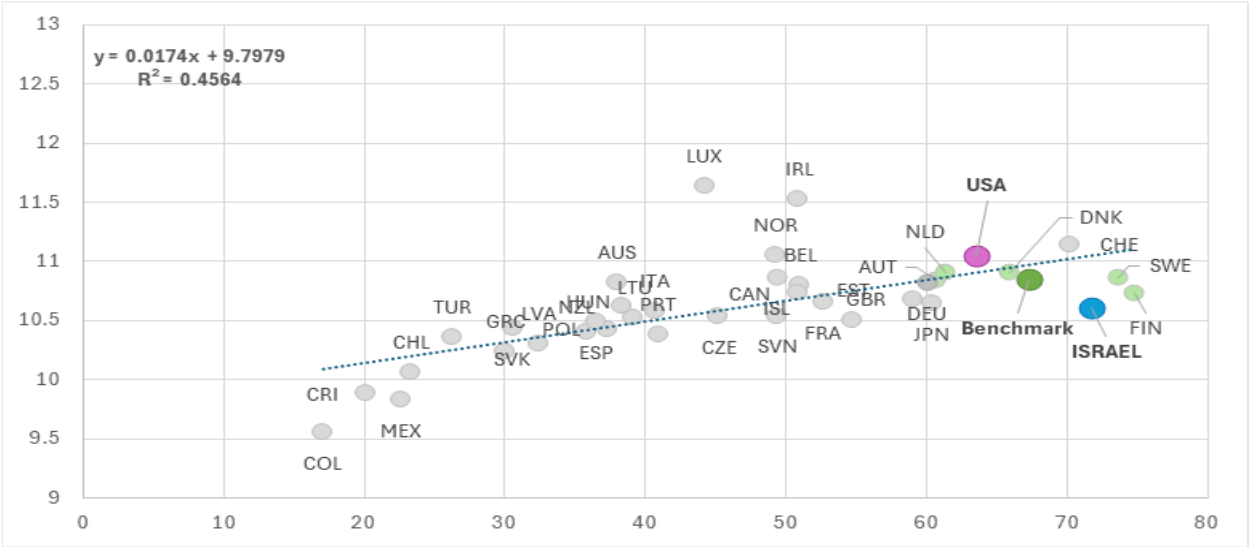
Figure 38: Innovation-Policy Output Score vs. Innovation-Policy Inputs Score, 2022



Source: Aaron Institute's processing of GII (WIPO) data.

However, when examining the relationship between the Innovation-Core Index and (log) GDP per capita, Israel falls below the trend observed among OECD countries, while the USA slightly exceeds it (Figure 39). This suggests that **although Israel demonstrates strong innovation capabilities, broader economic factors – such as market size, regulatory barriers, and infrastructure constraints – may limit its overall economic performance and its ability to fully translate innovation into sustained economic growth**.

Figure 39: GDP per Capita (log) vs. Innovation-Policy Outputs



Source: Aaron Institute's processing of GII (WIPO) data.

To maximize the impact of its innovation policies, Israel should implement a robust monitoring framework centered on **core innovation indicators** – those most directly tied to policy, such as R&D investment, patent output, venture capital activity, and knowledge-intensive exports. These indicators, as highlighted in the Global Innovation Index (GII), provide a clear lens through which to evaluate whether public and private innovation inputs are translating into meaningful economic and technological outcomes.

5.3 Policy recommendations to enhance economic innovation

The recent war has negatively impacted Israel's international standing, and the slowdown in the growth of the high-tech sector has raised concerns about its ability to sustain economic growth, finance war-related expenditures, and drive national economic recovery. Meanwhile, global competition in innovation, artificial intelligence (AI), and digital transformation is intensifying, with leading economies – including the United States, China, and the European Union – investing heavily in strategic technologies and talent development.

To maintain its global competitive edge, Israel must preserve and expand its high-tech sector as a key engine for economic growth while enhancing labor productivity across all industries through innovation and digital transformation. These efforts are essential not only for managing rising defense expenditures and maintaining high-quality government services but also for ensuring that Israel remains a leader in the global innovation economy.

To address these challenges, Israel should establish a **National Innovation Policy Vision**, focused on:

1. **Sustaining Israel's leading position on the global technological frontier.**
2. **Sustaining the high-tech sector as a driver of economic growth.**
3. **Transitioning from a dual economy to an inclusive one by improving labor productivity across all sectors through innovation and digitization.**

Based on the analysis of risks, challenges, opportunities, and advantages, our recommendations regarding the innovation policy are:

Expand Human Capital for Israel's High-Tech Future promoting high-tech skills

Implement the recommendations of the Perlmutter Committee to achieve an annual growth rate of 3.5% in tech jobs across the economy, focusing on women, ethnic groups, and peripheral regions by:

- Increasing the proportion of employees in tech jobs from 14.8% to 20% by 2035.
- Raising the proportion of high-tech degree graduates from 10% to 15% by 2028.
- Increasing the proportion of MAHAT graduates.
- Raising the proportion of high school graduates eligible for a high-tech matriculation certificate from 11% to 17% by 2028.
- Enhancing the digital and artificial intelligence (AI) skills of students, workers, and employees so that by 2030, at least 80% of individuals in Israel possess digital literacy and basic AI literacy, matching the levels of benchmark countries.

AI Skills:

- **Invest in AI Education at All Levels.** Introduce programs to strengthen AI-related skills at all educational levels, from primary school through university, to build a future workforce that is AI-literate. Expand AI-focused curricula in high schools and provide university students with opportunities to pursue degrees in AI and related fields such as data science, robotics, and computer vision.[44]
- **Upskill the Existing Workforce.** Launch nationwide reskilling and upskilling programs to train the current workforce in AI and digital technologies.
- **Attract and Retain Global AI Talent.** Implement policies to attract top global AI talent by offering visa incentives, research funding, and favorable working conditions for AI researchers, engineers, and data scientists.
    - Attract global AI talent with English-taught academic programs.
    - Retain talent.
    - Create AI talent hubs and research centers.

A central requirement for widely beneficial AI use is to bridge digital, mathematics and literacy divides.[45]

[44] Examples: Finland

[45] See "OECD Economic Surveys: Israel 2025", April 2025, Volume 2025/7.

Strengthen Industry–Academia Knowledge Transfer

To further drive innovation and ensure the relevance of Israel's high-tech workforce, it is essential to strengthen knowledge transfer between academia and industry. This can be achieved by:

- Establishing reliable metrics to track progress and identify the most effective policy tools.
- Aligning academic programs with industry needs, particularly in artificial intelligence (AI), to ensure graduates are equipped for the evolving job market.
- Enhancing collaboration mechanisms between universities and companies, including joint research initiatives, internships, and faculty exchanges.
- Removing barriers to commercialization, so that cutting-edge research and ideas can be effectively translated into market-ready technologies.

Ensure Internationally Aligned and Credible Tax Policy

To strengthen Israel's high-tech sector and maintain its global competitiveness, a modern, transparent, and reliable tax framework is essential. This should include:

- Providing certainty in granting capital gains tax exemptions to foreign investors, including legislation to ensure that capital gains tax exemptions remain valid even if the foreign investor has a permanent establishment in Israel or if the activity is not strictly defined as capital in nature.
- Simplifying merger and acquisition (M&A) procedures to make it easier for small companies to merge with larger ones, supporting continued growth and scaling.
- Allow tax deferral upon merger
- Establishing a "green tax path" for MNCs operating from abroad, ensuring they benefit from a predictable and favorable tax environment while contributing to Israel's innovation ecosystem.

Promoting Innovation in the Business Sector

Set a goal to achieve an annual growth rate of 2% in productivity within the business sector and a goal to achieve an annual growth rate of 3.5% in the number of employees in tech jobs in non-high-tech economic sectors through reforms aimed at:

- Enhancing research and development activities in the defense sector.
- Privatizing certain operations of defense companies to boost their productivity.
- Strengthening collaboration between academia and industry in research and development.
- Increasing support for startup companies with the potential to evolve into full-fledged technology firms.
- Expanding innovation and digitalization in non-high-tech business sector companies.
- Systematically collect and disseminate data on the adoption of digital tools by firms.[46]

Evaluate existing grants for technology adoption and digital training and expand effective programs targeted towards SMEs in traditional sectors.[47]

Business AI Development and Adoption

- Incentivize the development and adoption of human-complementary AI technology through tax incentives, grants, and funding programs for businesses that embrace and develop AI technologies.
- **Promote AI Adoption in Traditional Industries** by encouraging businesses across all sectors to adopt AI technologies.[48]
- Encourage AI-focused corporate R&D.
- Support **AI Startups and SMEs**. Provide dedicated AI accelerators, access to government contracts, and funding opportunities specifically for AI initiatives.
- Foster **Data Sharing Between Businesses:** The government should establish a framework for data sharing among businesses to facilitate AI development. By enabling companies to share non-sensitive data, AI systems can enhance their accuracy and effectiveness, benefiting the economy as a whole.[49]

[46] See "OECD Economic Surveys: Israel 2025", April 2025, Volume 2025/7.
[47] See "OECD Economic Surveys: Israel 2025", April 2025, Volume 2025/7.
[48] Example: Germany's Industry 4.0 initiative
[49] Example: the AI4EU platform facilitates in the EU

- The Innovation Authority provided financial assistance to companies and research institutions for the creation of databases in Hebrew and/or spoken Arabic, on the condition that these databases are widely shared with the research and development community for NLP.
- Promote **Public-Private Partnerships for AI Innovation** to foster collaboration among government, academia, and private companies. This approach can accelerate AI innovation while ensuring that advancements align with the public interest and are deployed responsibly.[50]

Enhancing Digital Infrastructure & E-Government

A. Expanding Digital Access and Connectivity to ensure equal access for all citizens to leverage the benefits of digitalization through accessible services, reducing gaps in digital orientation, and promoting investment in digital infrastructure (including full optical fiber coverage, reliable and fast connections, supercomputers, cloud computing, quantum technologies, and big data):

- Fully digitize public sector services for businesses and individuals.
- Increase the number of fixed broadband subscriptions (satellite and fiber) per 100 residents.
- Reduce broadband adoption gaps between households in central and peripheral areas.
- Increase the number of mobile broadband subscriptions per 100 residents.
- Raise the percentage of businesses connected to broadband with speeds of 30 Mbps or higher.
- Expand the percentage of households connected to broadband.
- Increase the percentage of the population with access to 4G or better mobile networks.

B. Facilitating Business Operations - Promote efficient bureaucracy by:

- Providing 100% of essential government services online.
- Reducing the time it takes for the government to provide services and the wait time for businesses by 25% within five years, based on the international Standard Cost Model (SCM), with a focus on the digitalization of services provided to the business sector.
- Making all regulatory requirements and procedures accessible online.
- Making government data available on the cloud for inter-ministerial sharing.

[50] For example, the AI4EU consortium in the EU.

C. Building AI Infrastructure:

- Establishing a **National AI Cloud infrastructure** is essential for enabling businesses and research institutions to process vast datasets critical for AI development.[51]
- Expanding **High-Speed Data Networks** (such as 5G) is necessary to ensure efficient AI deployment, particularly in sectors like autonomous vehicles, smart cities, and healthcare.
- Creating **AI Testing and Certification Centers**: Establish AI testing centers where companies can trial their AI technologies in a controlled environment, ensuring that AI solutions meet national safety, security, and ethical standards before widespread deployment.[52]
- Incentivizing **Green AI Data Centers:** Develop energy-efficient data centers optimized for AI processing to minimize environmental impact.[53]
- Building a **National AI Supercomputer** that provides businesses, research institutions, and startups with access to the advanced computational power necessary for developing cutting-edge AI technologies.
- NVIDIA has developed Israel's first supercomputer, ISRAEL-1. While the state is investing in its development, NVIDIA emphasizes that additional investments are needed for research in infrastructure and human capital.

D. Establishing AI Institutions:

- To ensure **responsible AI development and deployment**, Israel must implement:
  - A National AI Research Program - to lead cutting-edge research in AI and foster collaboration among universities, private companies, and public institutions. This program would be akin to the National Artificial Intelligence Research Institutes in the US.
  - A National AI Regulatory Program to oversee the responsible development and deployment of AI technologies, modeled after the European AI Act.
  - AI Ethics Guidelines and Data Privacy Laws to govern the use of AI technologies. This should include stringent data privacy protections and anti-bias measures to prevent the misuse of AI, particularly in facial recognition and surveillance.

[51] Example: National Artificial Intelligence Research Resource in the USA.
[52] Example: Germany's AI Quality and Testing Hub
[53] Examples: tax-efficient data centers in Norway, European Code of Conduct for Data Centres.

- Create a National Qualifications Framework defining clear learning outcomes ensuring a proper coverage of AI relevant areas including management and business skills alongside digital skills.[54]
- Improving Regulatory Clarity and Simplification: to reduce bureaucratic delays and facilitate operations for businesses, especially startups and small to medium-sized enterprises (SMEs). This could involve streamlining the process for obtaining licenses and permits, ensuring faster turnaround times, and enhancing transparency in regulatory decisions.[55]

To achieve these targets, Israel should formulate and implement a comprehensive action plan with an appropriate budget and a robust monitoring and evaluation framework to track progress and ensure that goals are met. By doing so, Israel will continue to foster innovation, economic growth, and global competitiveness.

[54] See "OECD Economic Surveys: Israel 2025", April 2025, Volume 2025/7.
[55] Example: Denmark consistently ranks high in regulatory efficiency (GII) due to its focus on reducing administrative burdens for businesses.

6. Research plan proposal for next year

Research Objectives

The research supports evidence-based policy to sustain Israel's high-tech leadership and economic growth. It focuses on key areas:

- **High-Tech Sector Trends and Economic Impact** – Analyzing technological advancements and market dynamics.
- **Human Skills and Brain Drain** – Examining workforce trends and talent retention.
- **Firm Growth and Scalability** – Identifying challenges in startup expansion.
- **Digital Transformation Policy** – Strengthening strategies for competitiveness and digital transformation.
- **Innovation Policy and R&D Effectiveness** – Evaluating the impact of government policy on innovation and economy growth.

Using data-driven analysis and stakeholder insights, the research aims to inform policies that drive sustainable growth and resilience.

Research questions

1. **How can Israel sustain and strengthen its comparative advantage in high-tech through innovation policy?**

- **Macroeconomic analysis** of the implications of major high-tech developments, including defining a set of measures for each field.
- Exploring high-tech-related government policies **for 2026 budget** reforms to support long-term growth.
- **Promoting the defense industry R&D and output**, examining how innovation in the defense sector contributes to broader technological and economic growth.
- Establishing measurements and setting targets for a **digital strategy in the public sector**, assessing how digital transformation policies can reinforce Israel's innovation leadership., supporting the implementation of digital transformation policies.

- **Brain Drain**: Researching the emigration of highly skilled Israelis (in collaboration with the Innovation Authority[56], using classified data) to assess the extent of talent migration and its economic impact, identify key drivers behind the growing trend, and propose policy measures to mitigate it.

2. **How can Israel improve human capital development and maximize the impact of R&D?**

- Executing the High-Tech Skills policy program (**Perlmutter Committee**) to address workforce development challenges.
- Examining what are the effective programs for **academic-industry co-creation**? Enhancing academic-industry co-creation, evaluating the role of research collaborations in fostering innovation and commercialization.
- **Improving data on firms' R&D activity** (joint research with CBS, the Innovation Authority, and Startup Nation Central) to provide better insights into factors affecting innovation and growth.
- **How effective are the R&D funding, and other Israel Innovation Authority programs, and what are the barriers and opportunities for scaling high-tech companies from the startup phase (development) to the sales phase (product)?**
- Conducting joint research with the Innovation Authority and Startup Nation Central to identify what market failures justify government interventions and to assess the **impact of funding programs on firm growth and innovation**.

[56] See "Israel Innovation Authority 2025 report": The number of employees in the high-tech sector who left Israel for the long term from the beginning of the "October 7 War" until July 2024 is estimated at 8,300, about 2% of those employed in the sector, https://innovationisrael.org.il/wp-content/uploads/2025/04/דות-התעסוקה-בהייטק-2025.pdf.

Appendix 1: GII Index Factors and Indicators

GII Index Factors

The Innovation Inputs Index includes five factors (32 indicators):[57]

1. Institutions: Political, legal, and regulatory frameworks supporting innovation.
2. Human Capital and Research: The quality of education, research, and skills of the workforce that drive innovation.
3. Infrastructure: Physical and technological foundations for innovation activities.
4. Market Sophistication: Access to financial resources, venture capital, and consumer demand for innovation.
5. Business Sophistication: The efficiency and complexity of businesses in supporting and utilizing innovation.

The Innovation Outputs Index focuses on two factors (49 indicators):

1. Knowledge and Technology: Concrete results of research, such as patents, high-tech exports, and technological advancements.
2. Creative Outputs: The production of creative goods, services, and cultural contributions to innovation.

[57] For more information on the composition of the index and the definitions of the indicators, see Global Innovation Index 2022.

GII Indicators

Table A-1: GII Indicators by Innovation and Policy

Layer	Indicator	Innovation	Doing Business	Innovation Policy
Institutions index	Political and operational stability		V	
	Government effectiveness		V	
	Regulatory quality		V	
	Rule of law		V	
	Cost of redundancy dismissal		V	
	Business environment		V	
	Entrepreneurship policies and culture	V		
Human capital and research index	Expenditure on education, % GDP		V	
	Government funding/pupil, secondary, % GDP/cap		V	
	School life expectancy, years		V	
	PISA scales in reading, math and science	V		V
	Pupil-teacher ratio, secondary		V	
	Tertiary enrolment, % gross		V	
	Graduates in science and engineering, %	V		V
	Tertiary inbound mobility, %		V	
	Researchers, FTE/mn pop.	V		V
	Gross expenditure on R&D, % GDP	V		V
	Global R&D companies, average expenditure top 3	V		
	QS university ranking average score of top 3 universities		V	
Infrastructure index	ICT access	V		V
	ICT use	V		V
	Government's online service	V		V
	Online e-participation	V		V
	Electricity output, GWh/mn pop.		V	
	Logistics performance		V	
	Gross capital formation, % GDP		V	
	GDP/unit of energy use		V	
	Environmental performance		V	
	ISO 14001 environmental certificates/bn PPP$ GDP		V	
Market sophistication index	Finance for startups and scaleups	V		
	Domestic credit to private sector, % GDP		V	
	Loans from microfinance institutions, % GDP		V	
	Market capitalization, % GDP		V	
	Venture capital investors, deals/bn PPP$ GDP	V		V
	Venture capital recipients, deals/bn PPP$ GDP	V		V
	Venture capital received, value, % GDP	V		
	Applied tariff rate, weighted avg., %		V	
	Domestic industry diversification		V	
	Domestic market scale, bn PPP$		V	

Layer	Indicator	Innovation	Doing Business	Innovation Policy
Business sophistication index	Knowledge-intensive employment, %	V		V
	Firms offering formal training, %		V	
	GERD performed by business, % GDP	V		V
	GERD financed by business, %	V		
	Females employed w/advanced degrees, %		V	
	University-industry R&D collaboration	V		V
	State of cluster development and depth			
	GERD financed by abroad, % GDP	V		V
	Joint venture/strategic alliance deals/bn PPP$ GDP	V		V
	Patent families/bn PPP$ GDP	V		V
	Intellectual property payments, % total trade		V	
	High-tech imports, % total trade	V		
	ICT services imports, % total trade	V		
	FDI net inflows, % GDP		V	
	Research talent, % in businesses	V		V
Knowledge and technology outputs index	PCT patents by origin/bn PPP$ GDP	V		V
	Patents by origin/bn PPP$ GDP	V		V
	Utility models by origin/bn PPP$ GDP	V		
	Scientific and technical articles/bn PPP$ GDP	V		V
	Citable documents H-index		V	
	Labor productivity growth, %		V	
	New businesses/th pop. 15-64		V	
	Software spending, % GDP	V		
	ISO 9001 quality certificates/bn PPP$ GDP		V	
	High-tech manufacturing, %	V		
	Intellectual property receipts, % total trade		V	
	Production and export complexity	V		V
	High-tech exports, % total trade	V		V
	ICT services exports, % total trade	V		V
Creative outputs index	Intangible asset intensity, top 15, %		V	
	Trademarks by origin/bn PPP$ GDP		V	
	Global brand value, top 5000, % GDP		V	
	Industrial designs by origin/bn PPP$ GDP		V	
	Cultural and creative services exports, % total trade		V	
	National feature films/mn pop. 15-69		V	
	Entertainment and media market/th pop. 15-69		V	
	Printing & other media, % manufacturing		V	
	Creative goods exports, % total trade	V		
	Generic top-level domains (TLDs)/th pop. 15-69	V		
	Country-code TLDs/th pop. 15-69	V		
	Mobile app creation/bn PPP$ GDP	V		

Source: The World Intellectual Property Organization (WIPO).

GII Innovation--Core Inputs and Outputs Indicators

Table A-2: Innovation-Policy Inputs Indicators (7), Israel and Selected Countries, DTF, 2022

Indicator	Israel	Benchmark average	USA	UK	SGP	KOR	CHE	DEU
ICT access	55	70	55	84	100	80	71	64
Government's online service	40	85	87	90	92	100	59	37
University-industry R&D collaboration			No quantitative measure					
Total GERD, % GDP	100	53	61	28	31	88	56	56
GERD performed by business, % GDP	100	41	52	25	23	77	43	42
GERD financed by abroad, % GDP	100	57	43	43	17	2	33	41
Venture capital investors, deals/bn PPP$ GDP	100	31	42	61	100	11	65	21

Source: Aaron Institute's processing of GII (WIPO) data.

Table A-3: GII Innovation--Core Outputs Indicators (16), Israel and Selected Countries, DTF, 2022

Factor	Indicator	Israel	Benchmark average	USA	UK	SGP	KOR	CHE	DEU
Digital Infrastructure	ICT use	74	89	86	95	64	95	97	73
	Online E-participation	31	85	100	94	94	100	77	40
High-Tech and Digital Skills	PISA scales in reading, Math and Science	40	64	60	65	100	76	61	63
	Graduates in science and engineering, %	18	50	20	54	98	70	48	100
	Researchers, FTE/mn pop.	No Data	80	55	54	84	100	64	62
	Research talent, % in businesses	No Data	79	88	51	64	100	59	74
	Knowledge-intensive employment, %	75	77	73	79	94	60	79	71
Knowledge and Technology	Scientific and technical articles/bn PPP$ GDP	55	72	18	62	32	38	78	32
	Patent families / bn PPP$ GDP	67	66	53	39	46	94	81	67
	Patents by origin/bn PPP$ GDP	33	80	100	46	24	100	100	100
	PCT patents by origin/bn PPP$ GDP	100	84	51	35	52	100	100	71
Business Innovation	Venture capital recipients, deals/bn PPP$ GDP	100	33	100	78	100	5	54	29
	Joint venture/strategic alliance deals/bn PPP$ GDP	91	44	75	55	71	13	58	18
	Production and export complexity	71	76	78	78	89	90	92	90
	High-tech exports, % total trade	73	57	64	59	100	99	54	71
	ICT services exports, % total trade	100	44	17	25	20	8	17	16

Source: Aaron Institute's processing of GII (WIPO) data.

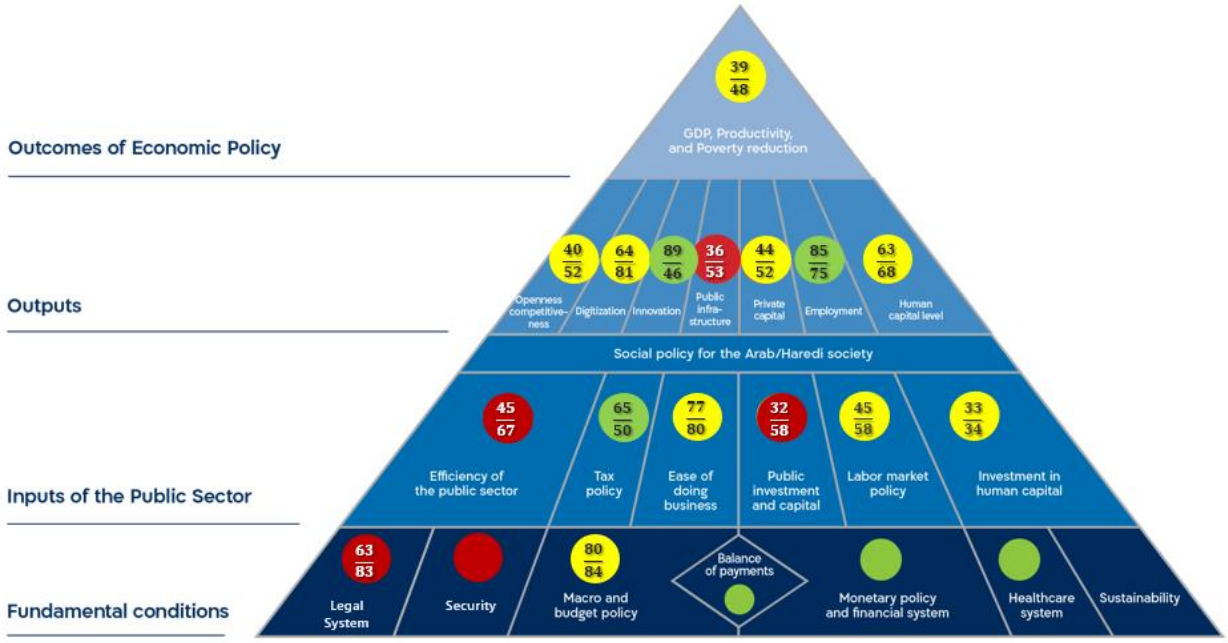
Appendix 2: Aaron Institute's Growth and Poverty Reduction Pyramid Model

The **Growth and Poverty Reduction Pyramid Model** serves as a foundational framework for the Aaron Institute's economic strategy, aiming to address gaps between Israel and benchmark countries to foster sustainable growth and reduce poverty. The model identifies critical areas for improvement and guides the development of actionable work plans based on data-driven analysis. It consists of four interdependent layers:

1. **Fundamental Conditions** – This base layer includes core elements such as the quality of the judicial system, national defense capabilities, and the effectiveness of macroeconomic policy, which provide stability and a foundation for growth.
2. **Public Sector Inputs** – This layer focuses on investments made by the public sector in key areas like human capital, infrastructure, and tax policy, which are essential for enabling growth.
3. **Public Sector Outputs** – This layer examines the results of public sector efforts, including the quality of human capital, the competitiveness and openness of the economy, and the quality of public infrastructure, all of which directly influence economic performance.
4. **Economic Policy Outcomes** – At the top of the pyramid are the measurable outcomes of economic policies, such as GDP per capita and poverty rates, reflecting the overall success in achieving growth and reducing disparities.

This pyramid framework underscores the interconnectedness of foundational stability, effective public investments, and measurable economic outcomes in shaping Israel's path toward greater sustainable growth and poverty reduction.

Figure A-1: Aaron Institute's Pyramid of Growth and Poverty Reduction

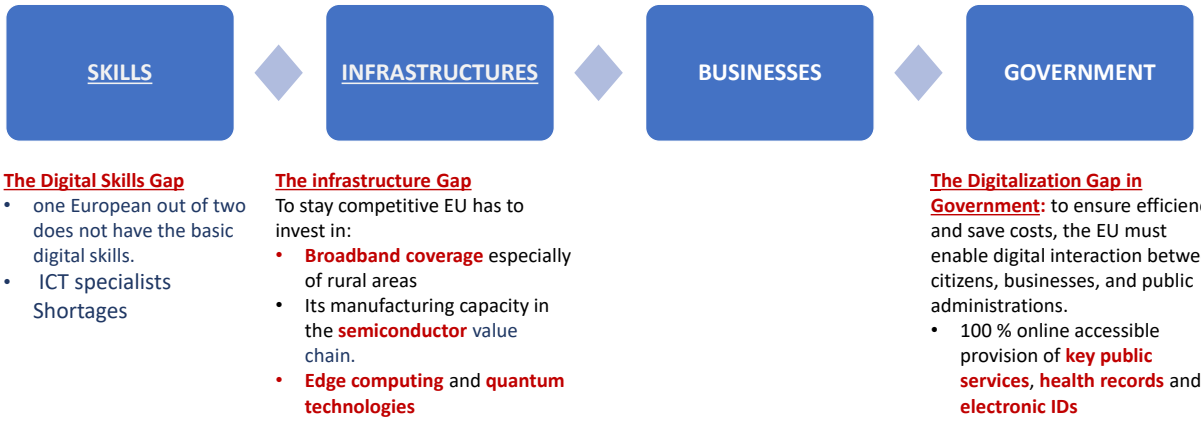


Appendix 3: The EU's 'Digital Decade 2030' Policy

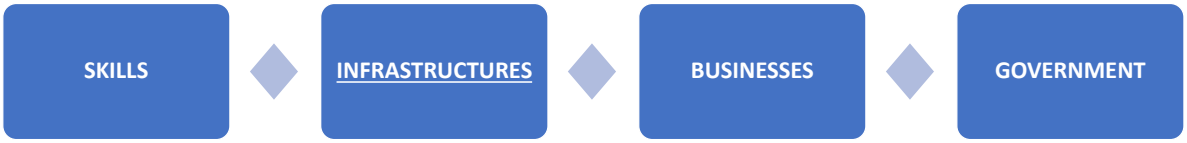
The EU's "Digital Decade 2030" program:

- Focuses on skills, infrastructure, business, and government by identifying current challenges, opportunities, and strategic priorities.
- Set targets in each area to ensure Europe remains competitive in the digital age and harnesses the opportunities presented by technological advancements.
- Establishes guidelines for cooperation between the EU and member states:
  - A transparent monitoring system to measure progress toward the targets.
  - An annual report in which the Commission evaluates progress and provides recommendations for actions at both EU and national levels.
  - Biennial National Strategic Roadmaps for Achieving the Goals of the Digital Decade.
  - Mechanisms for cooperation and support for large-scale cross-border projects.
- Supports member states through a range of initiatives, including budgets, acts, reforms, and regulations aimed at fostering digital transformation.

The EU's 'Digital Decade 2030' policy focuses on the following areas by identifying current **challenges, opportunities, and strategic priorities**:



The policy establishes specific **targets** for 2030 to ensure that Europe remains competitive in the digital age and capitalizes on the opportunities presented by technological advancements.



ICT Specialists: 20 million + gender convergence
Basic Digital Skills: min 80% of population

Connectivity: Gigabit for everyone
Cutting edge Semiconductors: double EU share in global production
Data - Edge & Cloud: 10,000 climate-neutral highly secure edge nodes
Computing: first computer with quantum acceleration

Tech up-take: 75% of EU companies using Cloud, AI, or Big Data
Innovators: grow scale-ups & finance to **double EU Unicorns**
Late adopters: more than 90% of **SMEs** reach at least a basic level of digital intensity

Key Public Services: 100% online
E-Health: 100% of citizens have access to medical records online
Digital Identity: 100% of citizens have access to digital ID

The EU **measures** the digital performance of each state to track their progress in digitalization:

Digital Skills	Digital infrastructure	Digital Transformation of businesses	Digitalization of public services
% Internet use	% At least 100 Mbps fixed broadband take-up	**% SMEs with at least a basic level of digital intensity**	% e-Government users
% At least basic digital skills	% At least 1 Gbps broadband take-up	% Electronic information sharing	**Digital public services for citizens (Score)**
% Above basic digital skills	**% Fixed Very High-Capacity Network (VHCN) coverage**	% Using social media	**Digital public services for businesses (Score)**
% At least basic digital content creation skills	% Fibre to the Premises (FTTP) coverage	**% Using big data**	Pre-filled Forms (Score)
% Enterprises providing ICT training	# Mobile broadband take-up	**% Using cloud**	Transparency of service delivery, design, and personal data (Score)
% Females having at least basic digital skills	**% Overall 5G coverage**	**% Using artificial intelligence**	User support (Score)
% ICT specialists	Amount of 5G spectrum	% Using e-Invoices	Mobile friendliness (Score)
% ICT graduates		% SMEs selling online	**Access to e-health records (Score)**
% Female ICT specialists		% e-Commerce turnover	
		% Selling online cross-border	

Appendix 4: International Comparison to Benchmark Countries and the United States: GDP, Employment, Productivity

Data

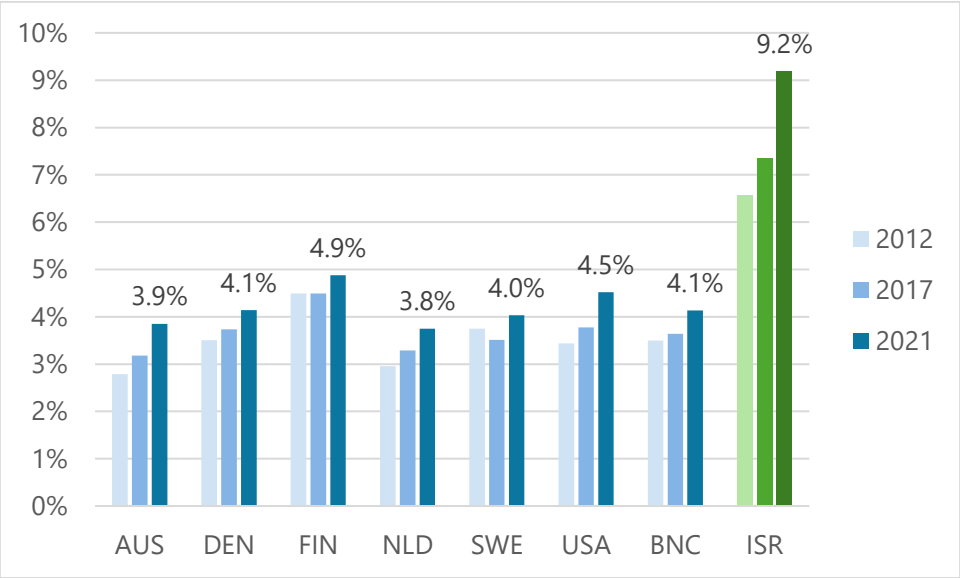
OECD data on employment and value added by economic activity (first order) were analyzed, with high-tech sector aggregated from second-order activities and excluded from the original industry classification. The high-tech sector included the Manufacture of basic pharmaceutical products and preparations; Manufacture of computer, electronic and optical products; Manufacture of other transport equipment; IT and other information services; and Scientific research and development.

The remaining activities were similarly aggregated. We compared the performance of Israel's high-tech sector – both total and second-order components – against those of benchmark countries and the United States across three time points: 2012, 2017, and 2021, while also examining trends over these periods.

Total Employment

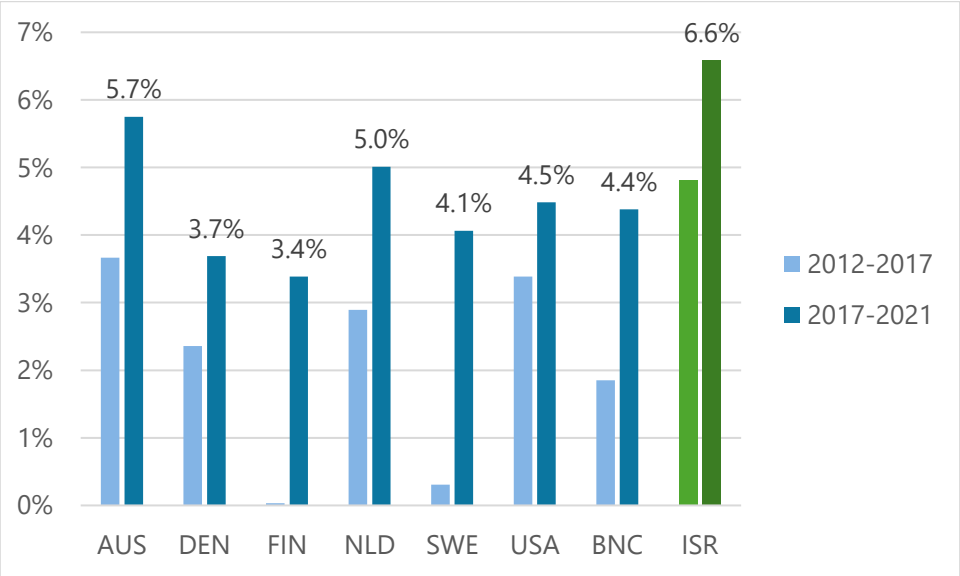
Israel stands out with a high share of employment in the high-tech sector, accounting for 9.2% of workers aged 15 and older, compared to an average of 4.1% (Figure A-2). High-tech employment has increased in both Israel and the benchmark countries, but Israel leads in total employment growth within the sector, recording a 6.6% increase compared to 4.4% in the benchmark countries (Figure A-3).

Figure A-2: High-tech Share of Employment, Total High-tech



Source: Aaron Institute's processing of OECD data.

Figure A-3: High-tech Employment Growth, Total High-tech



Source: Aaron Institute's processing of OECD data.

High-tech Industry-specific employment comparisons indicate that Israel excels in employment shares for computer, electronic, and optical manufacturing, as well as IT and information services, and scientific research and development (Table A-4). Additionally, Israel demonstrates higher growth rates in the latter two sectors, further widening the gap in its favor.

Table A-4: High-tech sector-specific* Employment Share 2021 and Growth 2017-2021

		Israel	United states	Benchmark average	Austria	Denmark	Finland	Netherlands	Sweden
21	Share (2021)	0.4%	0.2%	0.4%	0.4%	0.9%	0.2%	0.2%	0.3%
	Growth (2017-2021)	-0.7%	2.2%	4.0%	4.4%	2.0%	2.1%	3.6%	7.8%
26	Share (2021)	**2.0%**	0.3%	0.5%	0.6%	0.5%	0.8%	0.3%	0.4%
	Growth (2017-2021)	1.8%	-4.4%	2.3%	3.4%	1.6%	0.9%	2.9%	2.7%
30	Share (2021)	0.5%	0.7%	0.2%	0.3%	0.1%	0.3%	0.2%	0.3%
	Growth (2017-2021)	-0.5%	1.1%	3.5%	14.2%	0.0%	0.3%	1.4%	1.6%
62-63	Share (2021)	**4.9%**	2.8%	2.5%	2.1%	2.1%	3.0%	2.7%	2.7%
	Growth (2017-2021)	**10.1%**	6.6%	5.0%	6.2%	4.8%	4.6%	5.6%	3.8%
72	Share (2021)	**1.4%**	0.5%	0.5%	0.4%	0.6%	0.6%	0.5%	0.3%
	Growth (2017-2021)	**8.4%**	5.3%	4.2%	4.0%	5.0%	3.0%	4.9%	0.0%

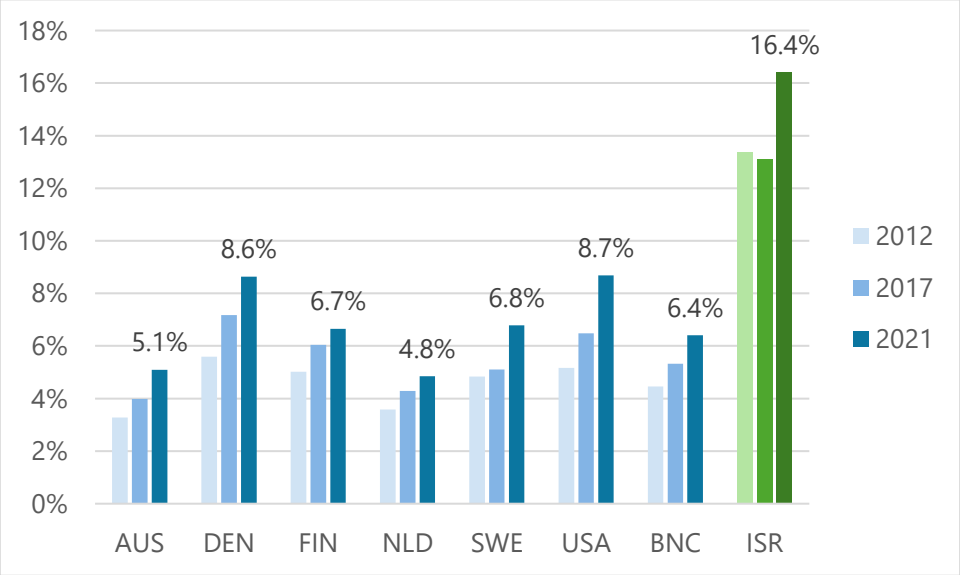
* 21 – Manufacture of basic pharmaceutical products and preparations, 26 – Manufacture of computer, electronic and optical products, 30 – Manufacture of other transport equipment, 62-63 – IT and other information services, 72 - Scientific research and development.

Source: Aaron Institute's processing of OECD data.

Value Added

In 2021, Israel led the world with a high-tech share of GDP at 16.2%. From 2017 to 2021, the growth of Israel's high-tech sector's share of GDP was 9.8%, matching that of the United States and significantly exceeding the average of benchmark countries, which was 6.4% (Figure A-4).

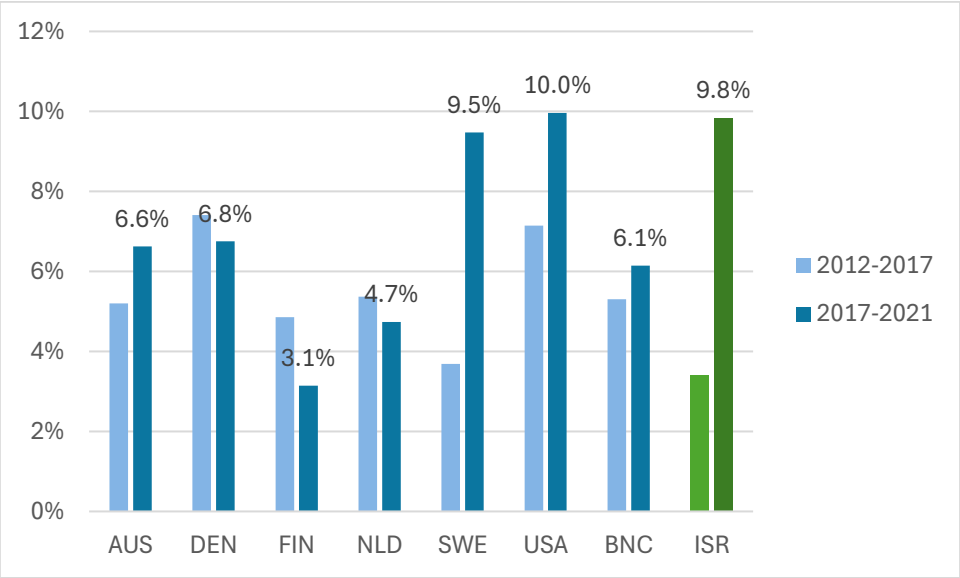
Figure A-4: Share of GDP, Total High-tech



Source: Aaron Institute's processing of OECD data.

Notably, the GDP shares of IT and information services, along with the manufacture of computer, electronic, and optical products, have risen substantially. In Israel, these sectors account for 8.6% and 4.9% of GDP, respectively, significantly higher than the shares in benchmark countries, which are 3.2% and 1.1%. This gap continues to widen, driven by Israel's higher growth rates of 12.4% and 15.3%, compared to 7.9% and 1.1% in benchmark countries (Figure A-5).

Figure A-5: Value-added Growth, Total High-tech



Source: Aaron Institute's processing of OECD data.

However, the share of GDP attributed to R&D in Israel has declined by 3.2%, although it remains higher than that of benchmark countries and the United States (Table A-5). Nevertheless, benchmark countries are closing the gap with higher growth rates of 5.5%. The manufacture of basic pharmaceutical products and other transport equipment are among Israel's smallest high-tech sector, both experiencing a decline in GDP shares. While Israel holds a competitive advantage over some benchmark countries, it faces disadvantages compared to others in specific sectors.

Table A-5: High-tech sector-specific GDP Share 2021 and Growth 2017-2021

		Israel	United states	Benchmark average	Austria	Denmark	Finland	Netherlands	Sweden
21	Share (2021)	0.7%	1.1%	1.3%	0.8%	3.7%	0.5%	0.4%	0.8%
	Growth (2017-2021)	-1.2%	10.6%	4.5%	3.0%	8.0%	-5.2%	3.5%	13.2%
26	Share (2021)	**4.9%**	1.8%	1.1%	1.4%	0.7%	1.9%	0.8%	0.5%
	Growth (2017-2021)	**15.3%**	7.1%	2.5%	7.9%	-3.4%	-0.2%	4.5%	3.9%
30	Share (2021)	0.4%	0.8%	0.3%	0.5%	0.1%	0.2%	0.2%	0.5%
	Growth (2017-2021)	-0.3%	3.1%	2.7%	13.2%	1.8%	-0.3%	-2.9%	1.6%
62-63	Share (2021)	**8.6%**	4.0%	3.2%	2.6%	2.4%	3.3%	3.5%	4.4%
	Growth (2017-2021)	**12.4%**	12.2%	7.9%	7.2%	8.7%	7.6%	5.4%	10.8%
72	Share (2021)	**1.6%**	0.9%	0.6%	0.5%	1.0%	0.7%	0.4%	0.2%
	Growth (2017-2021)	-3.2%	13.1%	5.5%	1.6%	6.8%	3.4%	6.0%	9.8%

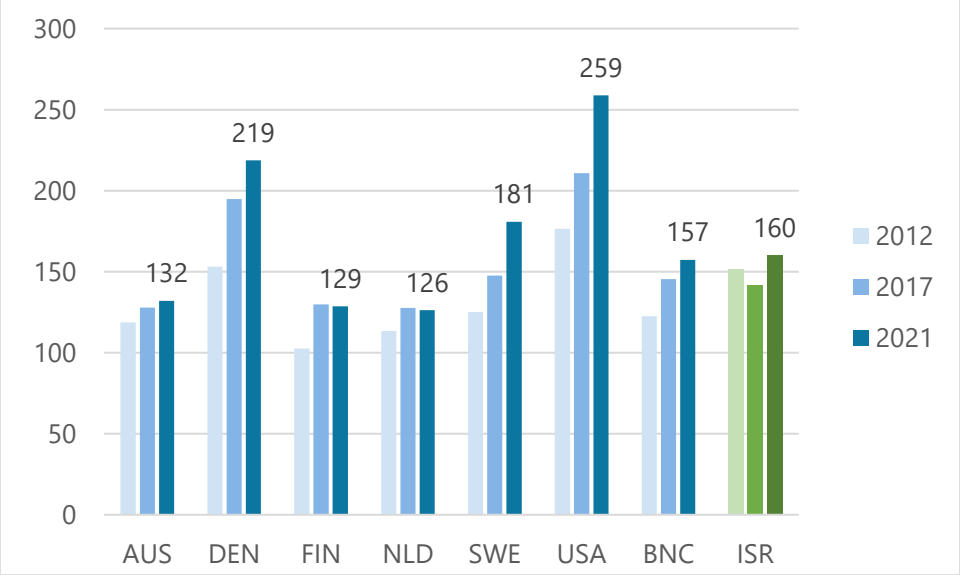
* 21 – Manufacture of basic pharmaceutical products and preparations, 26 – Manufacture of computer, electronic and optical products, 30 – Manufacture of other transport equipment, 62-63 – IT and other information services, 72 - Scientific research and development.

Source: Aaron Institute's processing of OECD data.

Productivity

High-tech productivity (GDP per worker) in Israel closely aligns with the benchmark average of $160K, but it significantly trails behind the United States, which stands at $260K. There is notable diversity in productivity among benchmark countries, with Denmark and Sweden leading at $219K and $181K, respectively. Most other countries exhibit much lower levels, averaging around $130K (Figure A-6).

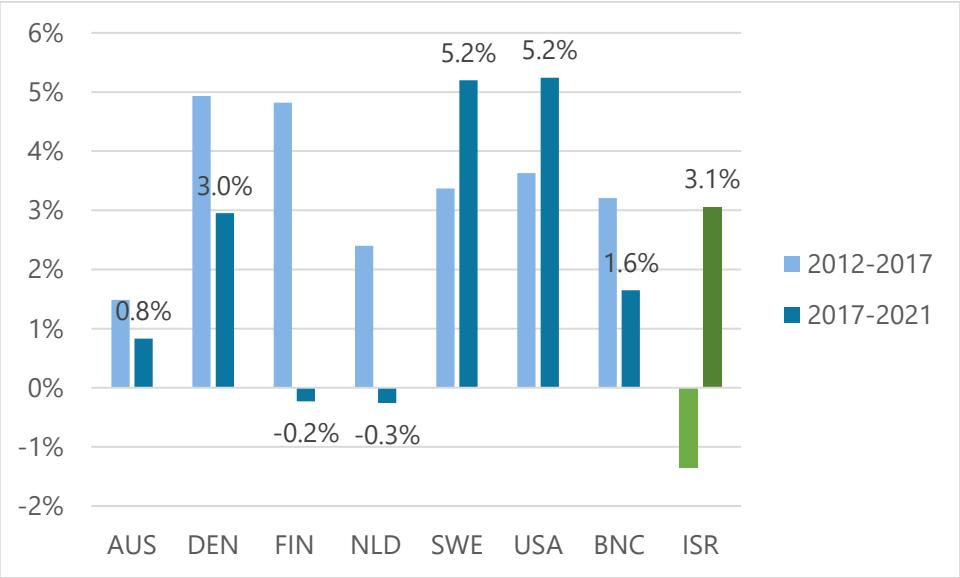
Figure A-6: Value-added per Worker, Total High-tech



Source: Aaron Institute's processing of OECD data.

Israel's High-tech productivity growth is at 3.1% (Figure A-7), exceeding the benchmark average of 1.6% but falling short of the United States' 5.2%. Among benchmark countries, Sweden leads with a growth rate of 5%, while Finland and the Netherlands report no growth.

Figure A-7: Value-added per Worker Growth, Total High-tech



Source: Aaron Institute's processing of OECD data.

Israel's High-tech exceeds the benchmark average in productivity within IT and information services ($160K vs. $129K, Table A-6) and in the manufacture of computer, electronic, and optical products ($220K vs. $197K). However, it lags behind the United States, where productivity levels are $192K and $928K, respectively. In the manufacture of computer, electronic, and optical products, Israel's productivity advantage over benchmark countries is widening, while it is narrowing the gap with the United States due to a higher growth rate. In contrast, in IT and information services, benchmark countries are closing the gap with Israel, while the gap with the United States is widening as both the benchmark countries and the U.S. experience growth rates that surpass Israel's.

Table A-6: High-tech sector-specific Productivity 2021 and Growth 2017-2021

		Israel	United states	Benchmark average	Austria	Denmark	Finland	Netherlands	Sweden
21	Share (2021)	160	754	297	171	495	273	254	294
	Growth (2017-2021)	-0.5%	8.2%	2.5%	-1.4%	5.9%	-7.2%	-0.1%	5.0%
26	Share (2021)	**220**	928	197	201	149	223	259	153
	Growth (2017-2021)	**13.2%**	12.0%	0.7%	4.4%	-4.9%	-1.1%	1.6%	1.2%
30	Share (2021)	77	156	116	153	67	63	103	192
	Growth (2017-2021)	0.2%	2.0%	-0.9%	-0.9%	1.8%	-0.6%	-4.3%	0.0%
62-63	Share (2021)	**160**	192	129	108	132	104	117	183
	Growth (2017-2021)	2.0%	5.3%	2.5%	0.9%	3.7%	2.8%	-0.2%	6.8%
72	Share (2021)	104	239	111	97	214	111	66	69
	Growth (2017-2021)	-10.7%	7.4%	0.5%	-2.3%	1.8%	0.3%	1.1%	0.0%

* 21 – Manufacture of basic pharmaceutical products and preparations, 26 – Manufacture of computer, electronic and optical products, 30 – Manufacture of other transport equipment, 62-63 – IT and other information services, 72 - Scientific research and development.

Source: Aaron Institute's processing of OECD data.