



# High-Tech Sector as An Engine of Recovery From COVID-19 Crisis

Hila Axelrad, Niron Hashai, and Sergei Sumkin\*



Policy Paper 2021.04 / May 2021

This is a short summary, for the full paper (in Hebrew) see  
<https://www.idc.ac.il/he/research/aiep/pages/policy-papers.aspx>.

\* Prof. Niron Hashai is a Professor of Strategy at the Arison School of Business in the IDC Herzliya, nhashai@idc.ac.il. Dr. Hila Axelrad and Dr. Sergei Sumkin are senior researchers at the Aaron Institute for Economic Policy in the IDC Herzliya. We thank the professional staff at the Israel Central Bureau of Statistics: Ms. Anat Katz, Ms. Yifat Klopschtock, Ms. Leah Polachik and Mr. David Gordon for preparing the data file, and for their fruitful cooperation and willingness to help.

# Aaron Institute for Economic Policy

## In the name of Aaron Dovrat z"l

The vision of the Aaron Institute for Economic Policy is to sustain economic growth and social strength in Israel, by researching, modelling and developing modern, innovative and up to date strategies and policy tools for the Israeli economy, based on up-to-date global knowledge.

All modern economies aim for economic growth, achieved through employment increase and a rise in workers' productivity. The Aaron Institute conducts economic research that yields proposals for innovative policy tools and reforms for promoting growth, employment and productivity. The goal of policy research is to influence monetary and fiscal policy, as well as to formulate long-term plans for economic and social issues and contribute to the narrowing of social gaps. The institute aims to affect professional discourse, spur discussion based on credible information and socio-economic research, which will ultimately provide tools that will support a growth path and create social resilience in Israel.

The main aim of the Aaron Institute for Economic Policy at the Tiomkin School of Economics is to develop policy strategies that eliminate weaknesses and empower the strengths of the Israeli economy. We propose broad reforms as well as policy changes to particular industry sectors. In this framework Israel's relative advantages in technologic innovation and advances in the public and services sectors can be maximized. At the Aaron Institute, we crucially define quantitative goals while involving some of the countries' best economists in research and policy paper discussion meetings.

### → **Board Members:**

Mr. Shlomo Dovrat (Chairman), Ms. Yael Andorn, Ms. Judith Bronizki, Mr. Yoel Carasso, Prof. Zvi Eckstein, Prof. Martin Eichenbaum, Ms. Anat Levin, Mr. Zvi Limon, Prof. Rafi Melnick, Mr. Roni Naftali, Mr. Ronen Nir, Dr. Tali Regev, Mr. Haim Shani, Ms. Ofra Strauss, Mr. Erez Vigodman.

### → **Head:**

Prof. Zvi Eckstein.

### → **Scientific Committee:**

Prof. Zvi Eckstein (Chairman), Prof. Martin Eichenbaum, Prof. Zvi Hercowitz, Prof. Rafi Melnick, Prof. Omer Moav, Dr. Tali Regev, Dr. Yaniv Yedid-Levi.

### → **Contact details:**

The Interdisciplinary Center Herzliya - IDC, P.O. Box 167, Herzliya, ISRAEL 4610101

Phone: 972-9-9602431

Email: [aaron.economics@idc.ac.il](mailto:aaron.economics@idc.ac.il)

Website: <https://www.idc.ac.il/en/research/aiep/pages/main.aspx>

## High-Tech Sector as an Engine of Recovery from COVID-19 Crisis

The global economic crisis in the wake of the COVID-19 pandemic creates challenges and difficulties which the Israeli economy must overcome before it can return to growth and prosperity. As of now, it appears that the high-tech sector took a relatively small hit as a result of the COVID-19 crisis. During 2020, capital raising volume reached an all-time high of 10.2 billion USD, total high-tech export remained stable, the rate of furloughed employees was below 1%, and employee layoff rate was 7% - the lowest in comparison to all other industries. The enduring performance of the high-tech sector, and the steady demands in this sector, indicate its capacity to contribute to overall economic recovery.

To examine how the high-tech sector can contribute to recovery of the Israeli economy from the COVID-19 crisis, with an emphasis on its impact on employment, we analyzed administrative data gathered by the Israel Central Bureau of Statistics (CBS) regarding people born between 1970 and 1995 who are employed in high-tech and other sectors, and conducted around 20 semi-structured interviews with human resources (HR) managers of high-tech companies, senior role holders in the high-tech sector, and policymakers. Our analysis examined whether and how the HR needs of various companies within the high-tech sector can be met by the human resources currently available in the Israeli economy, thereby increasing the employment potential of the Israeli high-tech sector, while highlighting occupations which provide peripheral support to core technological positions. In light of the data indicating the high quality of the workforce employed in the high-tech sector, as well as the high percentage of high-quality workers without an academic degree in tech-related fields, **who nevertheless earn significantly higher wages compared to employees in all other industries**, our premise is that high-tech companies which currently employ a high percentage of workers with tech-related academic degrees have a potential to take in employees holding academic degrees which are not tech-related, or those without an academic degree, who have been laid off or furloughed during the COVID-19 crisis, in order to develop and evolve into a mature company. Specifically, this refers to high-quality workers who previously had not been employed in the high-tech sector, but may consider such a career shift as a result of the negative impact of COVID-19 crisis on employment opportunities in some other industries. Our findings show that in sectors other than high-tech, and among the unemployed who were ousted from employment in the wake of the crisis, there are according to our estimation between 43,000 and 104,000 high-quality workers, at least some of whom may have the potential to successfully integrate into the high-tech sector. Furthermore, we found that

between 2010 and 2017 the high-tech sector exhibited a higher rate of increase in the wages of workers with non-tech-related academic degrees, in comparison to the rate of increase in the wages of workers with tech-related academic degrees. This trend indicates excess demand for workers with academic degrees in non-technological fields, and the potential for their assimilation into the industry.

Interviews with HR personnel further supported these findings. According to our interviews, many of the available positions are filled overseas and **do not require a tech-related degree**. Reasons for filling positions abroad include: lower labor costs compared to Israel, time differences between Israel and the target markets, legal regulation regarding work on Saturdays and holidays, and global orientation. These weighty considerations make it hard to compete over the positions which are currently filled overseas, and necessitate a well-wrought policy addressing this issue.

Fulfilling the potential for expanding employment in the high-tech sector requires a focused policy of training provision for those out of work due to COVID-19 crisis who have adequate skills to integrate into the high-tech sector and fill those positions which are in rising demand. Such job training should be done in collaboration with high-tech employers, in order to recognize the positions where the demand is rising and meet the actual needs of employers in this sector. Training courses should be targeted at workers who are unemployed or furloughed, with an emphasis on those with academic or practical engineering degrees in non-technological fields, who nevertheless have suitable skills for high-tech employment. Training courses should aim, among other things, to improve communication skills in English and digital skills, as well as selling, marketing, and service skills.

We also recommend incentivizing high-tech companies which take part in this endeavor to provide on-the-job training, which would enable workers without prior experience to acquire knowledge and work experience, as well as incentives for filled positions in order to encourage the repatriation of positions currently filled abroad for local placement in Israel. These incentives should be offered for job training and placement in non-technological occupations. A further recommendation is to remove the existing regulation regarding work on Saturdays and holidays, and thus allow local high-tech companies to provide continuous response for overseas clients. These policy measures may bring some of the workers which are currently unemployed or furloughed back to high-quality employment, raise overall growth and employment rates, and contribute to a gradual recovery from the employment crisis. In the longer term, we recommend placing an emphasis on improving English language communication skills as early as high school and undergraduate studies, and equipping high

---

school and university graduates with command of digital tools, as well as global business orientation, in order to enable students who are due to join the workforce a better integration into high-tech companies, which operate in the international business environment.

## 1. Summary and conclusions

The high-tech sector<sup>1</sup> is a significant industry in Israel; over the past few years it has constituted around 13% of the total GDP and nearly 20% of the business sector GDP. As of 2019, the high-tech sector employs around 10% of all salaried workers in the Israeli economy. In recent decades, Israel has been at the global forefront in terms of many factors which have been conducive to the growth of the high-tech sector, such as research and development investment in proportion to the GNP, number of startup companies per capita, share of workers employed in the high-tech sector, percentage of university students majoring in tech-related fields, and so forth. A considerable number of startup companies that develop cutting-edge technologies are founded every year in Israel, which also attracts many multinational corporations: about 500 of them maintain research and development activity in Israel. The high-tech sector is also notable in its share of total Israeli exports. In 2019, the share of the high-tech sector in Israeli exports was approximately 44% (around 47.4 million USD out of 107,306.9 million USD). Export of high technology services has increased rapidly over the last few years, and has been a major factor in the growth of high-tech exports in particular, and Israeli exports in general. Export of high technology services consists mainly of exporting R&D, software, and computerization services.

The global economic crisis caused by the COVID-19 pandemic creates challenges and difficulties which the high-tech sector, and the Israeli economy as a whole, must overcome in order to return to growth and prosperity. At this stage, it appears that the high-tech sector has been less badly hit than other economic sectors, in part because the crisis has caused a large increase in the demands for digital tools and services. During the Coronavirus pandemic, from March 2020 to early January 2021, it was evident that the damage suffered by the high-tech sector was relatively small, and in some respects this sector notably outperformed the rest of the economy: (a) an effective and extensive shift to working from home; (b) high employment rates, and low rates of dismissed or furloughed employees; (c) high export volume; (d) large capital raising and a large number of deals; (e) higher likelihood for

---

<sup>1</sup> The high-tech sector comprises the high technology industry sector and the high technology service sector. High technology industry sectors include: sector 21 – conventional and homeopathic medicine manufacturing (sector 245 according to the 1993 classification); sector 26 – computer, electronic and optical equipment manufacturing (sectors 32, 33, 34 according to the 1993 classification); and sector 303 – aircraft, spacecraft, and related equipment manufacturing (sector 355 according to the 1993 classification). High technology service sectors include: sector 62 – computer services (sector 72 according to the 1993 classification); sector 631 – information services (sector 72 according to the 1993 classification); and sector 72 – research and development (sector 73 according to the 1993 classification).

graduates in tech-related fields to be employed;<sup>2</sup> (f) an optimistic forecast regarding the probability of surviving the crisis in the long term. The solid performance of the high-tech sector during COVID-19 crisis, and the steady demands in this sector, indicate its capacity to contribute to overall economic recovery.

To examine how the high-tech sector can support the recovery of the Israeli economy from the COVID-19 crisis, with an emphasis on its impact on employment, we analyzed administrative data gathered by the Israel Central Bureau of Statistics (CBS) regarding people born between 1970 and 1995 who are employed in high-tech and other sectors, and conducted around 20 semi-structured interviews with HR managers of high-tech companies, senior role holders in the high-tech sector, and policymakers. Our analysis involved differentiating between three types of high-tech companies: small companies which employ up to 20 workers, most of which are startup companies; medium-sized companies which employ 20-250 workers; and companies with over 250 employees. Our classification also noted the distinction between local- and foreign-owned companies, and checked whether and how the HR needs of various companies within the high-tech sector can be met by the human resources currently available in the Israeli economy, thereby increasing the employment potential of the Israeli high-tech sector, while highlighting occupations which provide peripheral support to core technological positions.

The outcomes of our analysis suggest the existence of: (a) a high quality of human resources in the high-tech workforce; (b) a high rate of high-quality workforce in the high-tech sector without a tech-related academic degree; (c) high variation in the rates of employees with tech-related degrees among companies with different sizes and ownership structures. This variation demonstrates the great heterogeneity of the high-tech sector, which comprises companies with various characteristics: R&D inclined companies, growth companies, and mature companies. In other words, the manufacturing function of the high-tech sector relies on high-quality workforce, in a composition (varying among startup, growth, and mature companies) which includes a high percentage of workers who do not have an academic degree in tech-related fields – **and yet earn significantly higher wages compared to their counterparts in all other economic sectors.**

Our premise is that some high-tech companies (specifically growth companies and those which are R&D inclined), which currently have a high percentage of employees holding a degree in tech-related fields, carry a potential to take in employees with an academic degree

---

<sup>2</sup> See Appendix D, which shows that the rate of workers out of employment is very low in the fields of engineering and mathematics (around 5-7 percent), compared to other fields such as social sciences (11-14 percent) or law (11-16 percent).

which is not tech-related, or those without an academic degree, in order to turn R&D outcomes into product sales and to evolve into a mature company.

To test our premise, we analyzed the quality of the workforce employed in other sectors and the wage progression of high-tech workers without a tech-related degree (i.e., those with academic degrees in non-technological fields). We found that other economic sectors have a large number of high-quality workers, suggesting that at least some of them may have the potential to make a successful shift into high-tech employment. Furthermore, we found that between 2010 and 2017 the high-tech sector exhibited a higher rate of increase in the wages of workers with non-tech-related academic degrees, in comparison to the rate of increase in the wages of workers with tech-related academic degrees, a trend which indicates excess demand for workers with academic degrees which are not tech-related, and the potential to take in high-quality workers whose academic degree is not tech-related – a potential which could be realized now, in the wake of the current economic crisis which has crippled employment rates in economic sectors other than high-tech. Put differently, this crisis is also an opportunity.

Interviews with HR personnel supported our hypothesis regarding the excess demand of high-tech companies for workers with academic degrees in non-technological fields. According to those interviewed, there are many positions which are filled overseas by workers with academic degrees in non-technological fields (positions in the fields of marketing and sales, law, finance, and first-tier technical support for users). However, repatriating these jobs back to Israel and expanding employment opportunities in these fields would not be easy, due to the considerations which encouraged outsourcing them abroad in the first place: lower labor costs compared to Israel, time differences between Israel and the target markets, legal regulation regarding work on Saturdays and holidays, and the need for global orientation.

To examine whether there is an unrealized potential of high-quality workers who might be employed in the high-tech sector, we assessed the potential for expansion of high-tech employment among those who are out of employment due to COVID-19 crisis, in the 25-54 age group. According to our estimate, the number of people with a high quality score<sup>3</sup> among those out of employment due to COVID-19 crisis, who do not have a tech-related degree, is around 43,000 people (around 15% of those out of work) if we include only the top 20% of jobless workers in terms of quality score, and around 104,000 people (around 35% of those out of work) if we include the top 40% of jobless workers in terms of quality score.

---

<sup>3</sup> A score calculated on the basis of matriculation, PIAAC, and psychometric exam grades.

That is to say, there is a potential for expansion of high-tech employment, specifically by taking in high-quality workers without tech-related academic degrees. In order to realize this potential, two fundamental market failures must be overcome:

1. Insufficient information and lack of coordination between workers wishing to transition into the high-tech sector and high-tech employers seeking to fill vacant positions. These issues are manifested in workers who are not aware of the opportunities available to them in the high-tech sector, and of the job requirements.
2. Necessary training to adapt the skills and competencies of prospective workers to meet the demands of high-tech companies – training is essential in order to adapt the skills and competencies of workers seeking high-tech employment, for them to be able to successfully fill these positions.

There is a need for a targeted policy, closely coordinated with employers, aiming to provide job training for workers out of employment due to COVID-19 crisis who have the adequate skills to fill those high-tech positions which are in rising demand. There is a demand across the board in the high-tech sector for high-quality, highly skilled workforce. This demand should be matched with the skill availability of the potential workforce through skill diagnosis, needs assessment, and well-tailored training courses. These training courses should be conducted in association with high-tech employers, in order to identify the positions whose demand is increasing and meet the actual needs of companies. The provision of training should be targeted at unemployed and furloughed workers, with an emphasis on those with academic or practical engineering degrees in non-technological fields, who nevertheless have suitable skills for integration into high-tech employment. The interviews we conducted suggest that training courses should also highlight: (a) improving English language communication skills; (b) improving digital skills; (c) improving selling, marketing, and service skills.

To ensure the training scheme fulfills actual needs, we recommend engaging high-tech companies in the training process and incentivizing companies for: (a) on-the-job training for a duration that would allow the employee to gain valuable experience; (b) job placement. These incentives would encourage companies to fund training for prospective employees, despite them lacking experience or background in this field.

As stated above, the incentives offered by the government should be channeled towards training and hiring of workers in non-technological positions,<sup>4</sup> unlike the current situation in which incentives are provided mainly for training and hiring in technologically oriented

---

<sup>4</sup> See Appendix C for a partial list of study subjects.

---

positions. A further recommendation is to remove the existing regulation regarding work on Saturdays and holidays, and thus allow local high-tech companies to provide continuous response for overseas clients.

These policy measures may bring back to high-quality employment some of the workforce which is currently unemployed or furloughed, raise growth and employment rates, and contribute to a gradual recovery from the employment crisis.

In the longer term, we recommend placing an emphasis on improving English language communication skills as early as high school and undergraduate studies, and equipping high school and university graduates with command of digital tools, as well as global business orientation. Conversations with employers indicate that such measures would enable students who are due to join the workforce a better integration into high-tech companies, which operate in the international business environment.