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Integration of the Arab and Haredi Populations into Israel's High-Tech Sector

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Integration of the Arab and *Haredi* (ultra-Orthodox) populations into Israel's high-tech sector

- Maximizing the potential human capital of population groups that are under-represented in the high-tech sector, and specifically the Arab and *Haredi* (Ultra-Orthodox) communities, can play an important role in the continued growth of this sector and of the economy as a whole.
- Over the past decade, the share of Arab graduates in high-tech disciplines has risen considerably, but this has not translated into a corresponding increase in their share of employment in the sector. This points to an entry barrier to high-tech employment, alongside educational barriers.
- The share of *Haredi* women employed in the high-tech sector has risen over the past decade and is now approaching their share of the population. Most of these women received their qualifications in alternative training programs in *Haredi* colleges supervised by the Government Institute for Technological and Scientific Training (MAHAT). However, their wages are lower than those of other technology sector employees.
- In the past decade, young *Haredi* men have accounted for an extremely low proportion of all employees in the high-tech sector, despite the opening of dedicated tracks in pre-academic preparatory colleges and designated campuses. The principal barrier appears to be in earlier education stages, which fail to provide a sufficient background in core curriculum subjects. The dedicated training programs have not, to date, led to increased integration into the sector.

1. Introduction

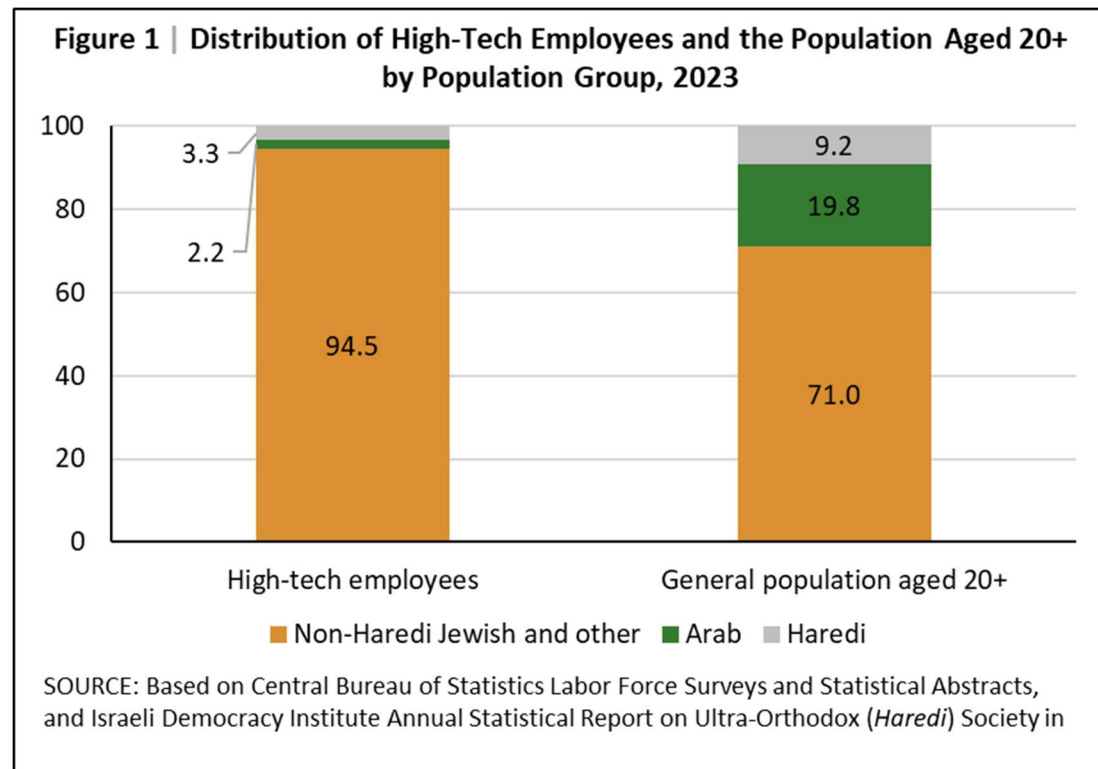
Over the past decade Israel's high-tech sector has established itself as the economy's principal growth engine, accounting for 18 percent of GDP, 60 percent of exports and one-third of GDP growth since 2017. In 2024, 11 percent of salaried employees in Israel worked in the high-tech sector.¹ The continued growth of this sector depends on increasing the supply of skilled labor. Brand et al. (2025) show that whereas Israel's high-tech sector is large compared with the OECD average and the skills of its workforce are similar to the average for the OECD countries, the level of skills in other sectors of the economy is noticeably lower than the OECD average.² The result is a structural constraint on the supply of skilled labor, particularly in high-tech, which hinders further expansion of this sector.³ Even as high-tech has expanded and its demand for skilled labor has grown, Arabs and *Haredi* (Ultra-Orthodox) Jews remain severely under-represented relative to their share of the population (Figure 1). Less than 6 percent of high-tech employees are Arabs or *Haredi*, whereas these groups account for 30 percent of the

¹ Based on Central Bureau of Statistics data.

² The benchmark OECD countries with available data are: Italy, the US, Belgium, Hungary, Japan, Lithuania, Latvia, New Zealand, Slovakia, Spain, Poland, Portugal, Czech Republic, Chile, France, South Korea, and Croatia.

³ The definition of "high-tech sector" is based on the International Standard Industrial Classification - ISIC Rev. 4, as adopted by the Israel Central Bureau of Statistics (CBS) in the standard classification of Israel's economic activities in 2011. It comprises two economic industry clusters: (a) high-tech manufacturing, including the manufacture of pharmaceutical products (21), manufacture of computers, electronic and optical products (26), and the manufacture of transportation vehicles (30); and (b) high-tech services, which includes computer programming, consultancy and related services (63), information services (63), and scientific R&D (72).

working age population, a figure that is expected to reach 40 percent by 2050.⁴ This finding points to unrealized human capital potential within these population groups. The difficulty in realizing that potential among those with the appropriate human capital may be due to integration barriers specific to high-tech, or more general barriers to the development and realization of human capital concentrated in these groups. Furthermore, the weak integration of these groups into the high-tech sector exacerbates economic inequality and income gaps between them and the non-Haredi Jewish population.



The integration of Arabs and *Haredi* Jews in the high-tech sector could reduce the structural shortage of skilled labor and also broaden the economic and employment opportunities for these groups. It should be emphasized that policy aimed at integrating Arabs and *Haredi* Jews into high-tech should focus on removing the barriers faced by those with the appropriate skills who seek employment in this sector, rather than intervening in the employment preferences of individuals or offering incentives and subsidies to individuals in the high-tech sector at the expense of other sectors of the economy.

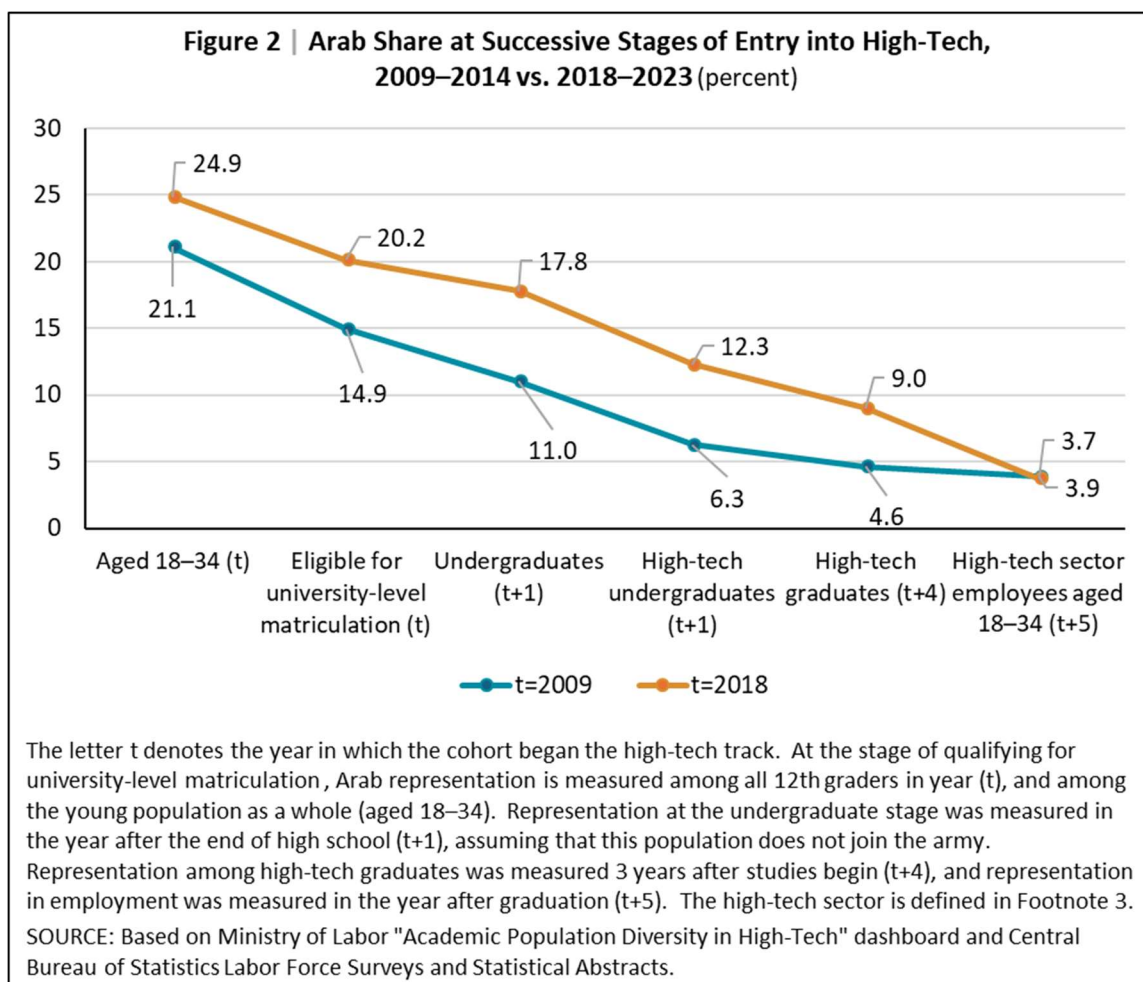
DeMalach (2021) analyzed the integration of Arabs in the high-tech sector at the end of the previous decade. He concluded that most of the barriers to high-tech faced by Arab society arose at the early stages of human capital acquisition, since the proportion of Arab students graduating with high-tech degrees in that period was extremely low (4 percent), similar to their representation in high-tech sector employment (3 percent). This paper offers a broader analysis and frame of reference—both with respect to the study of the population group and the method of monitoring the integration process. First and foremost, the analysis expands the reference groups to include *Haredi* society as well, based on the recognition that the *Haredi* sector, with its unique challenges, is similarly under-represented in the high-tech industry. Second, the analysis also focuses on the differences between men and women, since in both Arab and *Haredi* societies, men and women face different obstacles. Third, the analysis

⁴ According to the "intermediate" CBS scenario (Israel CBS, 2017).

covers an extended period (2009–2024), allowing long-term trends to be identified and an assessment of whether barriers were lowered or disappeared over time. Finally, the paper analyzes the characteristics of Arabs and *Haredi* Jews who have successfully integrated into the high-tech sector, and examines how they resemble or differ from other high-tech employees, as well as their peers from the population group who do not work in high-tech.

2. Representation of the Arab population in the high-tech sector

An analysis of the representation of the Arab population in high-tech employment (Figure 2) reveals substantial trends and changes in the integration process over time, across two periods: 2009–2014 and 2018–2023. In both periods, a steep funnel pattern is evident. As one advances through the stages of integration in high-tech—from the acquisition of basic education to actual employment in high-tech—the relative representation of the Arab population declines consistently and sharply.⁵

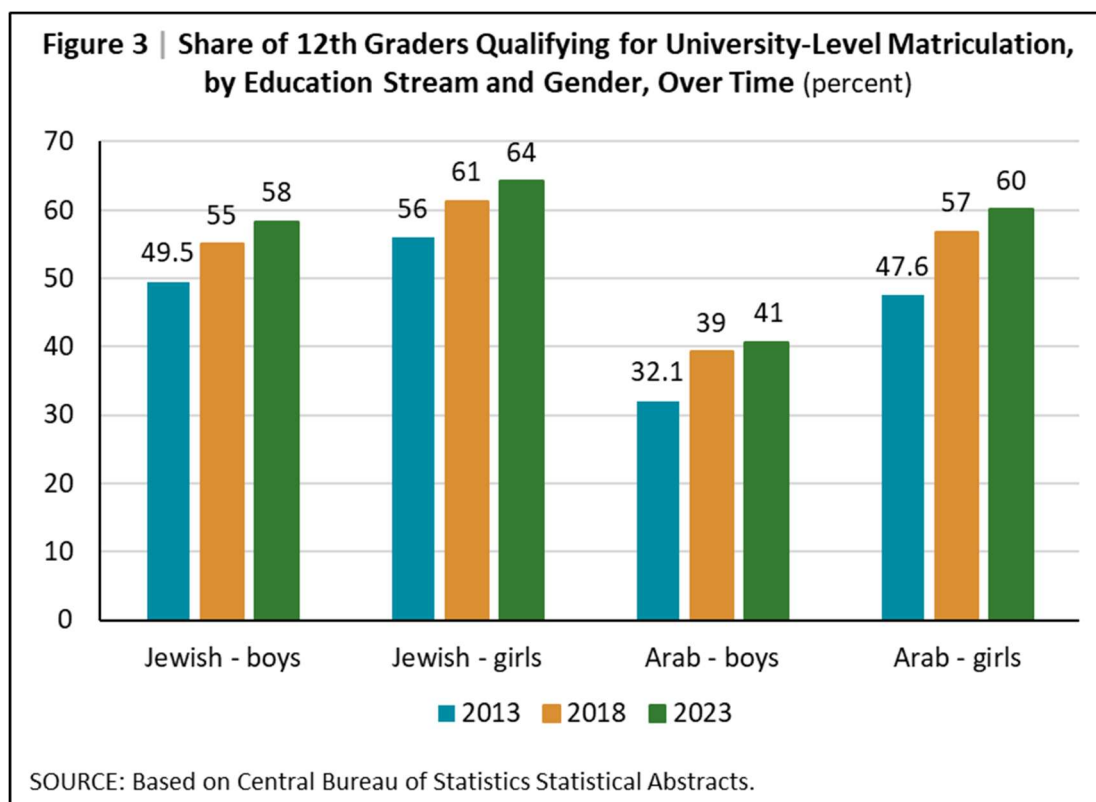


A comparison of the two periods reveals that at the stages of acquiring education, Arab representation increased over the period. Whereas the proportion of Arabs in the younger population (18–34) rose by 3.8 percentage points, their share at the stage of acquiring

⁵ The data and pattern of behavior of the funnel remain similar even if they are conducted over consecutive years and if we examine a period of four years rather than three between undergraduate students and high-tech graduates.

education and training rose even more. These figures point to an improvement in the integration of Arabs in high-tech studies in the higher education system. However, despite this marked increase of potential human capital, the representation of Arabs at the employment stage in the high-tech sector remained almost unchanged between the two periods, at slightly below 4 percent. The implication is that whereas the barriers to the integration of Arabs in high-tech once lay mainly at the stage of acquiring education and human capital, graduates of high-tech studies now face obstacles when attempting to enter the workforce in the high-tech sector. Nonetheless, their share among those with high-tech occupations, who do not necessarily work in the high-tech sector, is 6 percent.⁶ Although the difficulties among Arab academics in finding employment are not unique to the high-tech sector and are also present in other white-collar professions, they are particularly pronounced in high-tech.⁷

An analysis of the share of students who qualify for university level matriculation among 12th graders in the Arab education system compared with their counterparts in the Jewish education system (Figure 3) shows that whereas female Arab high school students narrowed the gap compared with their counterparts in Jewish education, among male Arab students the gap remained unchanged.⁸ Despite the overall improvement in Arab participation at this stage, Arab males show a considerably lower level of eligibility than the rest of the population, and this has not improved since 2018.



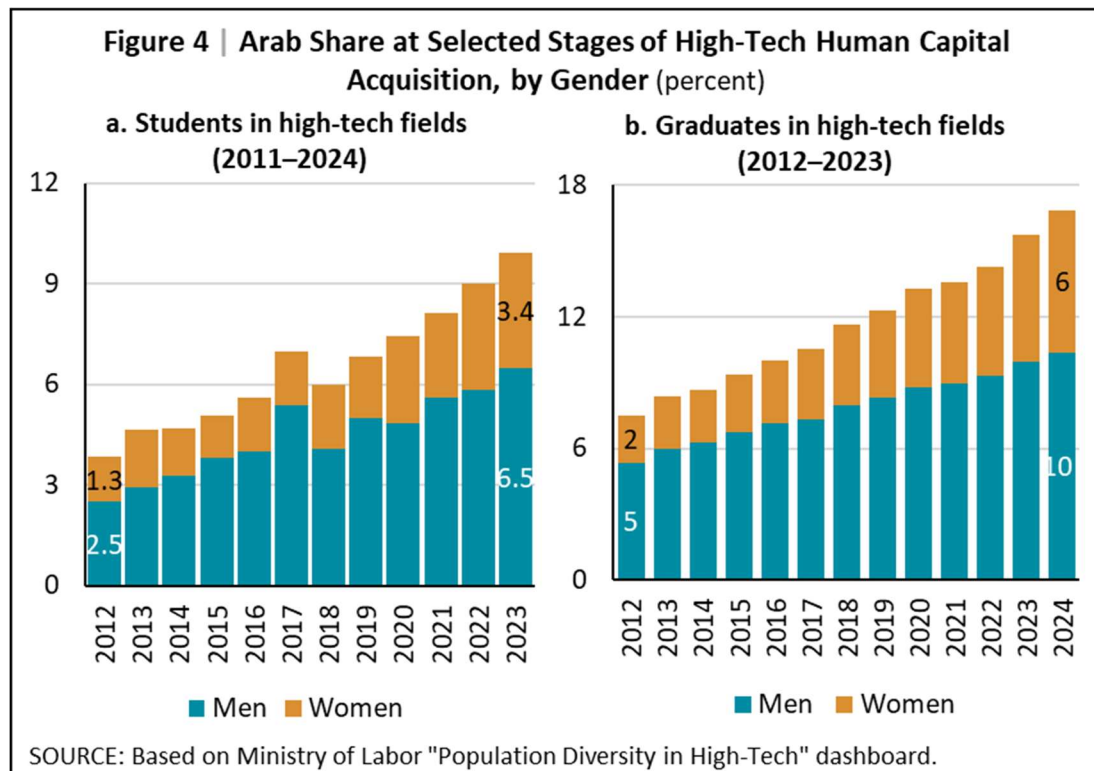
⁶ Based on the authors' processing of CBS Labor Force Surveys, presented below in Figure 5.

⁷ In the high-tech sector, the ratio of the share of Arabs among students (2019) to their share of the labor market (2023) is 3.3 and in high-tech occupations it is 2. In contrast, in accounting and law, the corresponding ratios between students and employees are 1.7 and 1.4 respectively.

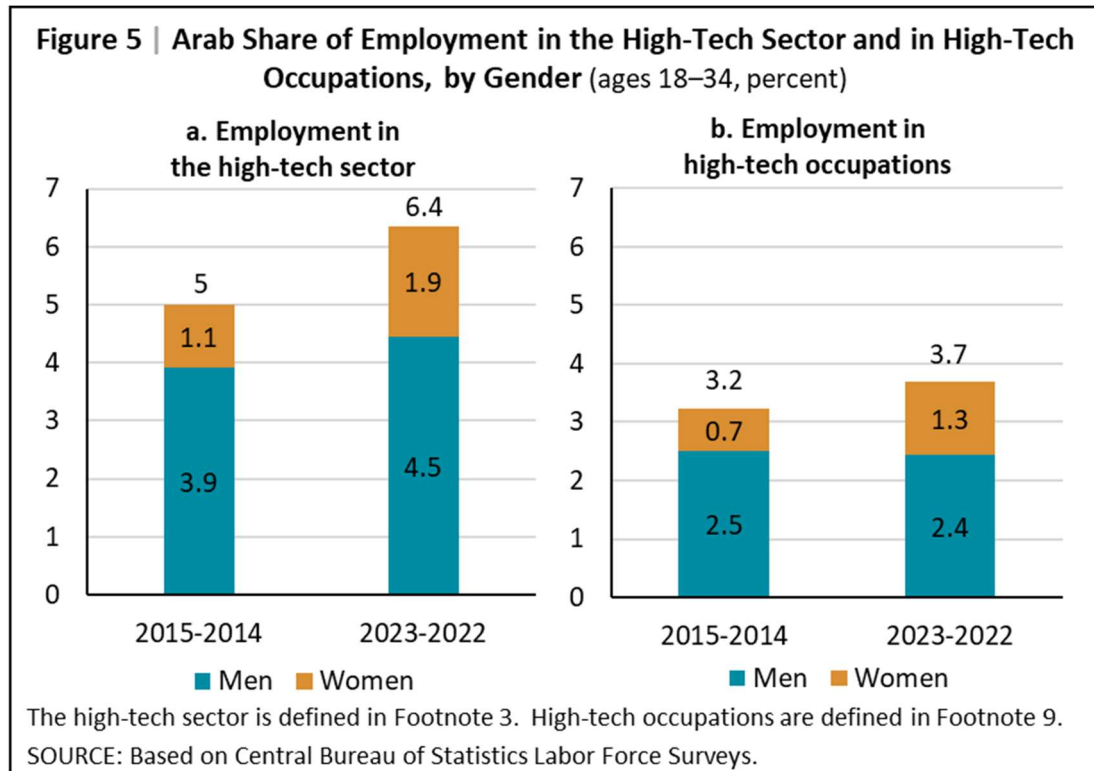
⁸ University grade matriculation is a matriculation (*bagrut*) certificate that meets the threshold conditions for university acceptance and, according to the CBS definition, includes a pass grade in 3 units in math, a pass grade in 4 units in English and at least one additional major subject to a level of at least 4 units.

In higher education in the high-tech disciplines too, Israel's Arab population demonstrates consistent growth of integration and a steady narrowing of the gender gaps. Arab students as a share of all male and female high-tech students (Figure 4a) rose from 7 percent at the beginning of the period to 16 percent at the end. However, this figure remains significantly lower than the share of Arabs in the young population (26 percent). The gender breakdown in this figure points to a marked increase in the integration of Arab women in higher education in the high-tech disciplines. Whereas women accounted for 28 percent of all Arab high-tech students at the beginning of the period, by the end of the period this share had increased to 38 percent.

In line with the increase among high-tech students, Figure 4 shows that the relative representation of Arabs among high-tech graduates rose from 4 percent in 2012 to 10 percent in 2023. This trend points to a marked expansion of the potential pool of human capital in high-tech among the Arab population. Nonetheless, the relative share of Arabs among high-tech students is higher than their share of those graduating three years later, indicating that the dropout rate among Arabs is higher than among the Jewish population.



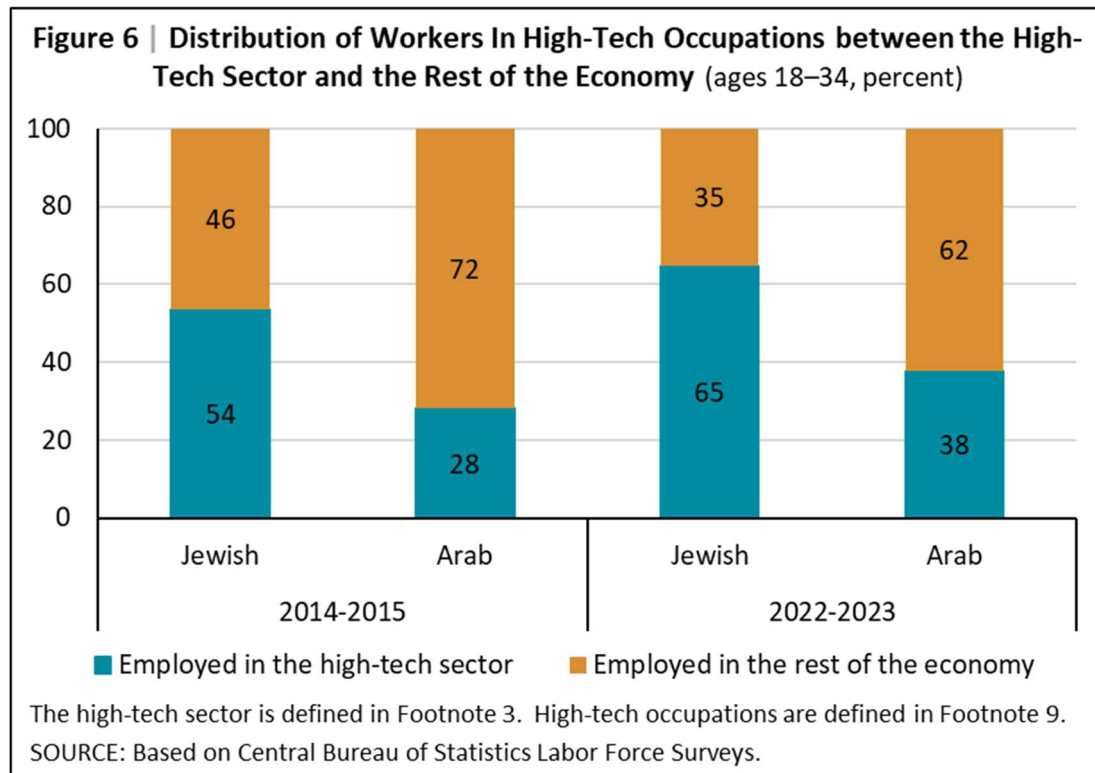
Finally, Figure 5a, which describes Arab representation among young salaried employees (18–34) in the high-tech sector, presents a general trend of under-representation. The share of Arabs among all young high-tech employees has remained almost unchanged, increasing by just half a percentage point over the reviewed period. However, despite the stagnation in the overall share of Arab employees in the high-tech sector, the representation of women increased steadily: from 22 percent at the beginning of the period to 34 percent at the end. The relative share of women among Arab high-tech employees is similar to the relative share of women among non-*Haredi* Jewish female employees (33.7 percent in 2022–2023). This may indicate a slight lowering of the barriers to Arab women's integration into high-tech employment.



Overall, the stagnation of Arab representation in the high-tech sector contrasts sharply with the positive trend observed in their representation in academic high-tech studies. This is evidence of the difficulty faced by graduates of high-tech academic studies in finding actual employment in the high-tech sector. Moreover, Figure 5b shows that Arabs account for 6.4 percent of those with high-tech occupations—substantially higher than their actual representation in the high-tech sector—and this representation increased by 1.3 percentage points during the reviewed period under review. This increase is still extremely low when contrasted with their growing representation among academic high-tech graduates. This finding is reinforced by Figure 6, which shows that only a small proportion of Arabs employed in high-tech occupations successfully integrate in the high-tech sector, while with the reverse is true among Jews.⁹ The rate of integration of Arabs with high-tech occupations in the high-tech sector increased over the decade from 28 percent to 38 percent. However, the gap relative to the integration rate of Jewish Israelis with high-tech occupations remained constant. This indicates that there are clear barriers in the high-tech sector even among Arabs with high-tech occupations, and that these gaps cannot be explained by the prestige of the academic institutions at which high-tech degrees are obtained, since we find no difference in the distribution of institutional quality (university / college) between Arabs and non-*Haredi* Jews.¹⁰

⁹ "High-tech occupations" are defined according to the International Standard Classification of Occupations (ISCO-8) as adopted by the CBS in the Standard Classification of Occupations in Israel in 2011. The definition includes Categories 21 (occupations in the sciences and engineering), 25 (information technology [IT] occupations), 31 (related occupations in the areas of science and engineering), and 35 (practical engineers and technicians in information technology, ICT).

¹⁰ According to data from the Ministry of Labor's dashboard of "Academics from Diverse Populations in High-tech", in 2023 60 percent of Arab students in high-tech disciplines studied at university compared with 63 percent of non-*Haredi* Jewish students.



A number of obstacles stand in the way of translating the growing share of students studying high-tech professions into their actual integration into this sector. The first is geographical accessibility. Some 70 percent of Israel's Arab citizens live in the north and south of the country, whereas most high-tech jobs (68 percent) are concentrated in the Central and Tel Aviv districts.¹¹ However, Figure 7 shows that the geographical barrier is not the principal explanation for the disparity in Arab representation in the high-tech industry, since the gaps between Arabs residing in the center of the country and those living in the north are negligible compared with the gaps between Jews and Arabs living in the north. These findings are consistent with the analysis in the Bank of Israel *Annual Report* for 2022 (Bank of Israel 2023), which focused on the general distribution of academic occupations in Arab society and showed that residence in peripheral areas is not the key to explaining this distribution.

The second obstacle is information barriers and the absence of professional networks. In a study conducted in 2020 by Presentense, 78 percent of the Arab respondents stated that they had no acquaintances working in high-tech, compared with just 32 percent of Jewish respondents (Presentense, 2020). Furthermore, a survey conducted by Gomelsky-Haiby et al. (2024) found that Arab candidates for high-tech positions consistently report a lack of "networking", an absence of contacts with employees in the high-tech industry, and a lack of referrals—namely, existing employees or internal contacts in high-tech companies who are willing to pass their CVs on to their superiors and serve as references for their job applications. Respondents reported that these barriers make it difficult to find jobs posted through unofficial channels and to write compelling, personalized CVs, given that recruitment and placement practices in this sector rely largely on closed social networks, personal recommendations and referrals. This mechanism creates strong social homogeneity and could lead to a closed organizational culture, making it particularly difficult for candidates who are "outsiders"—i.e. who do not form part of Israel's social and/or geographical majority group—

¹¹ Data processed by the authors from Central Bureau of Statistics Labor Force Survey for 2023.

to find employment in high-tech, including Arab candidates. Finally, Arab candidates generally do not serve in the country's military technology units and therefore lack access to the training, experience and professional relationships acquired during military service, all of which may confer a competitive advantage in high-tech recruitment.

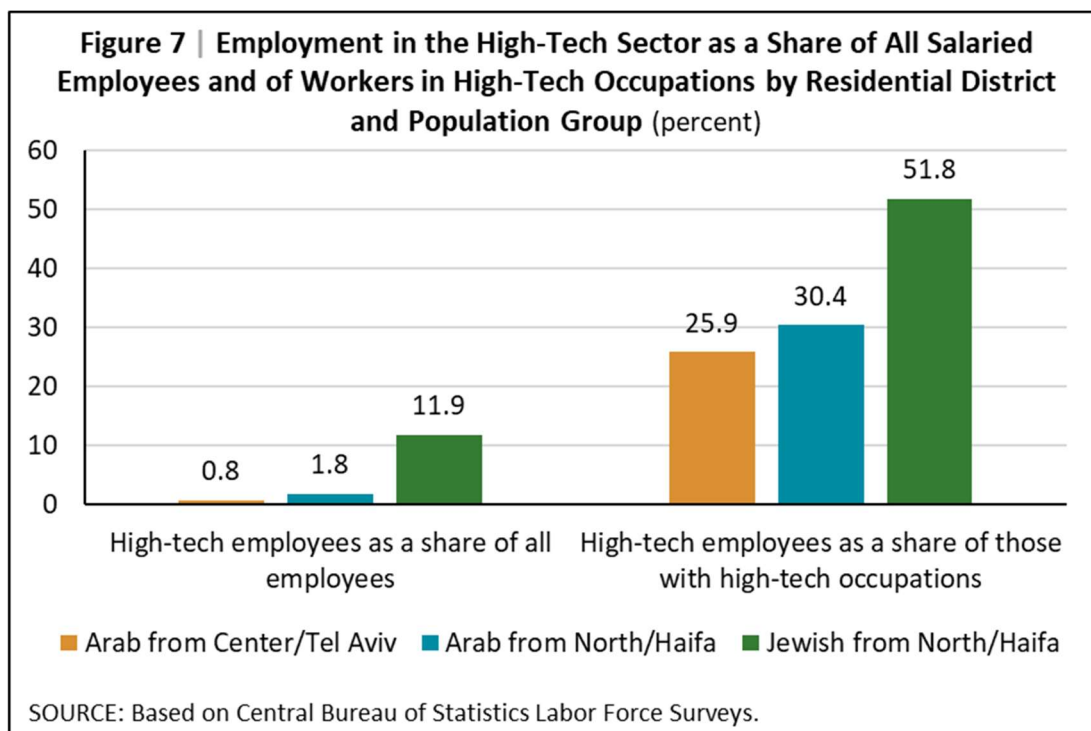
Accordingly, Arab high-tech students should receive support both during and after their studies, through dedicated training and workshops that equip them with the skills required to find work in the industry. Efforts should also be directed toward strengthening the networks of contacts within the industry and removing information barriers, in part by assigning mentors who already work in high-tech companies and can offer guidance during the application and initial integration process. Student employment in high-tech should likewise be encouraged among the Arab population, alongside continued integration in academia, investment in the Arab education system and measures to lower the drop-out rate along the routes to high-tech employment.

In recent years, a number of initiatives have been introduced to lower the entry barriers facing Arab candidates for high-tech employment. The Ministry of Labor's ForsaTech program combines technology training with English-language and job-search skills, alongside one-on-one support provided by professional "mentors".¹² Atidna's A. Tech program offers a training track for technology positions that combines broad skills acquisition, career support and a commitment to a job or internship placement upon completion of the training.¹³ Start-up Nation Central and the Rothschild Foundation offer the Excellenteam program, which runs a bootcamp for Arab computer science graduates and includes workshops and simulations focused on finding and securing high-tech employment.¹⁴

¹²According to information provided by the Ministry of Labor in November 2025, during the course of its activities between 2018 and 2014, the program assisted some 4,500 Arab students and academics leading to 2,600 high-tech job placements with a placement rate of 63%.

¹³ Information about this program was taken from the Atidna website: <https://atidna.org>.

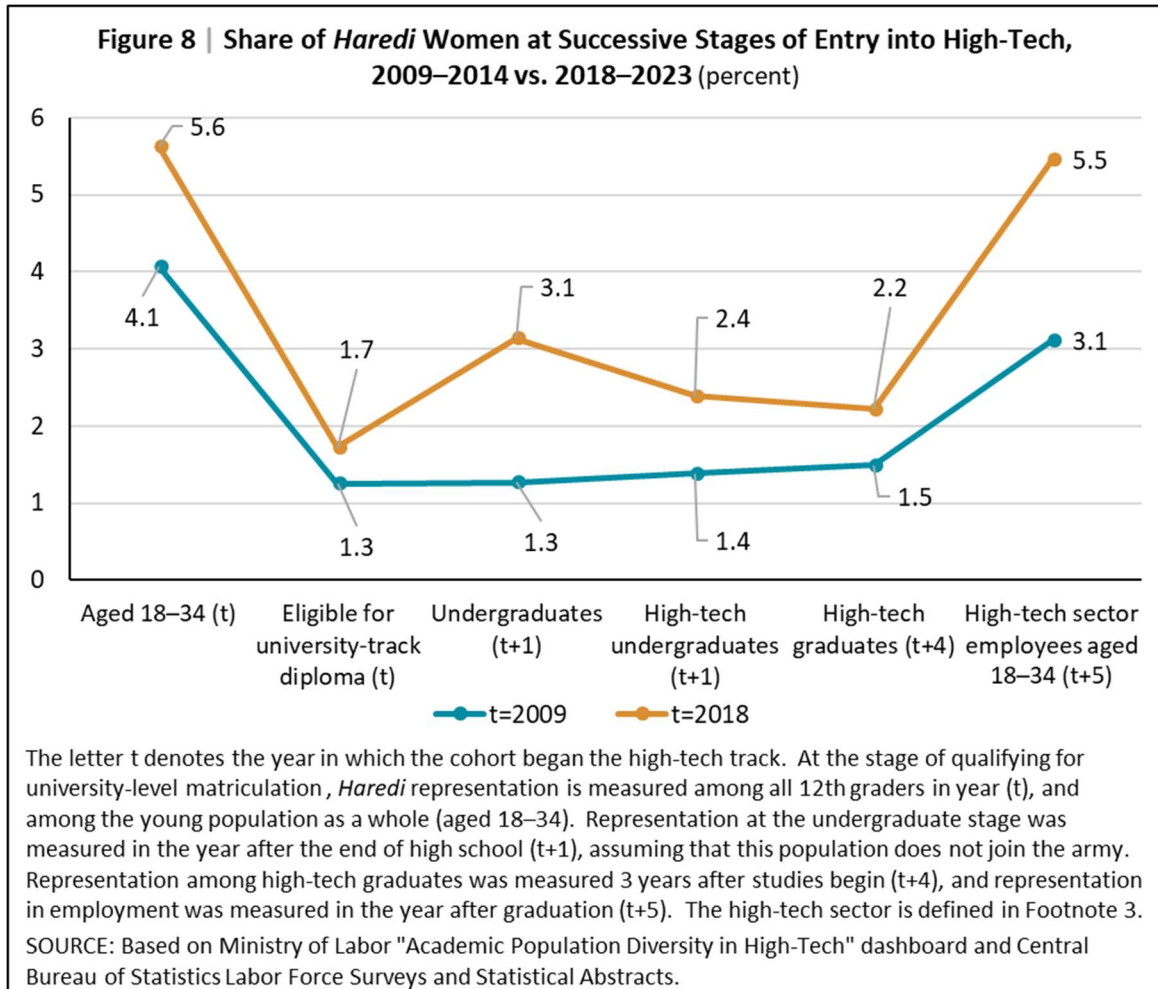
¹⁴ Information about Excellenteam relied on the annual reports of Start-up Nation Central (Start-up Nation Central, 2019).



3. Representation of the *Haredi* (Ultra-Orthodox) population in the high-tech sector

Haredi women

An analysis of how the representation of *Haredi* women at the stages of entering high-tech has developed over time (Figure 8) reveals an inverted funnel pattern. This reflects a distinctive process of acquiring education through tracks that bypass matriculation and academia, mainly through external exams set by the Henrietta Szold Institute and software practical engineering studies offered by the Government Institute of Technological and Scientific Training (MAHAT) in seminar colleges, as detailed below. A comparison of the two periods (2009–2014 and 2018–2023) shows that the proportion of young *Haredi* women (18–34) employed in high-tech rose to equal their share of the young population, and did so without any comparable prior increase in their share among those qualifying for university-level matriculation or among students and graduates of academic high-tech programs. This finding presents a complex picture. The secondary and post-secondary education of *Haredi* women appears to have provided them with the skills needed to integrate into high-tech employment, and the stage of entering employment appears to have been relatively accessible to them. However, there is concern that their high degree of representation in high-tech employment does not reflect the full maximization of their human capital potential and that the quality of their integration into high-tech could have been even higher.



Most *Haredi* women in the high-tech sector receive their training through "alternative" practical engineering training programs supervised by MAHAT under the auspices of the Beit Yaakov *Haredi* colleges (seminars). The program was established in 2004–2005 to meet the economic needs of *Haredi* society while preserving the post-secondary framework of the seminars, and was initiated by MAHAT, the Ministry of Education, and the Ministry of Finance in conjunction with the Joint Distribution Committee (Goldfarb, 2012). A key factor motivating its establishment was growing pressure within *Haredi* society to diversify the areas of employment open to women—who bear most of the burden of financing their families—beyond teaching, driven by economic hardship and a sustained decline in the demand for teachers at that time (Gotlieb and Erez, 2006).¹⁵ Most *Haredi* women studying under the auspices of MAHAT (approximately two-thirds) choose the software practical engineering track (Cahaner and Malach, 2022). Between 2015 and 2023, the number of female students in this track increased more than threefold, from 1,160 to 3,900. Figure 9 provides a breakdown of *Haredi* women in high-tech studies by category of training (academic / vocational), and indicates that most of those who acquire a high-tech qualification do so through MAHAT's software practical engineering course rather than through regular academic studies. The figure also shows that this pattern was further reinforced over the reviewed period. By 2023, only 22.5 percent pursued an academic track, compared with 77.5 percent who studied through

¹⁵ *Hevrat Lomdim*—a society of learners—a model adopted by *Haredi* society in which the women are generally responsible for income-generating labor while the men focus on full-time Torah study (Friedman 1988).

MAHAT. A comparison with non-*Haredi* Jewish women confirms that this pattern is specific to *Haredi* women, as 95 percent of the former acquire their high-tech qualifications in an academic setting.

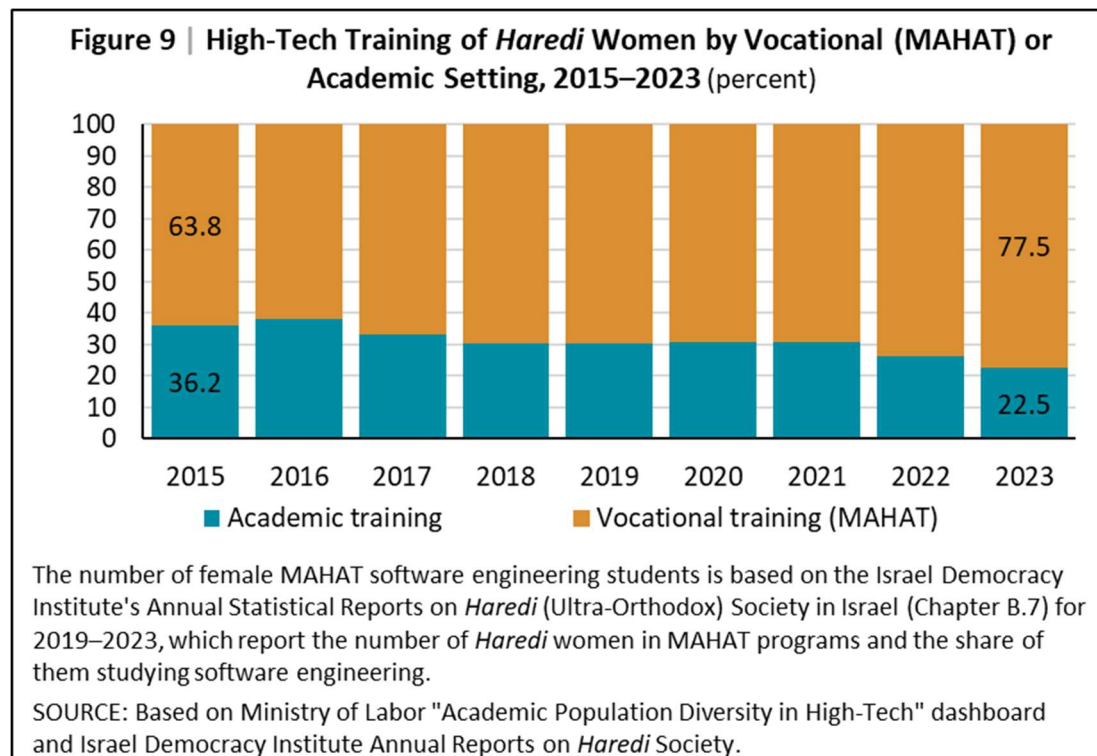
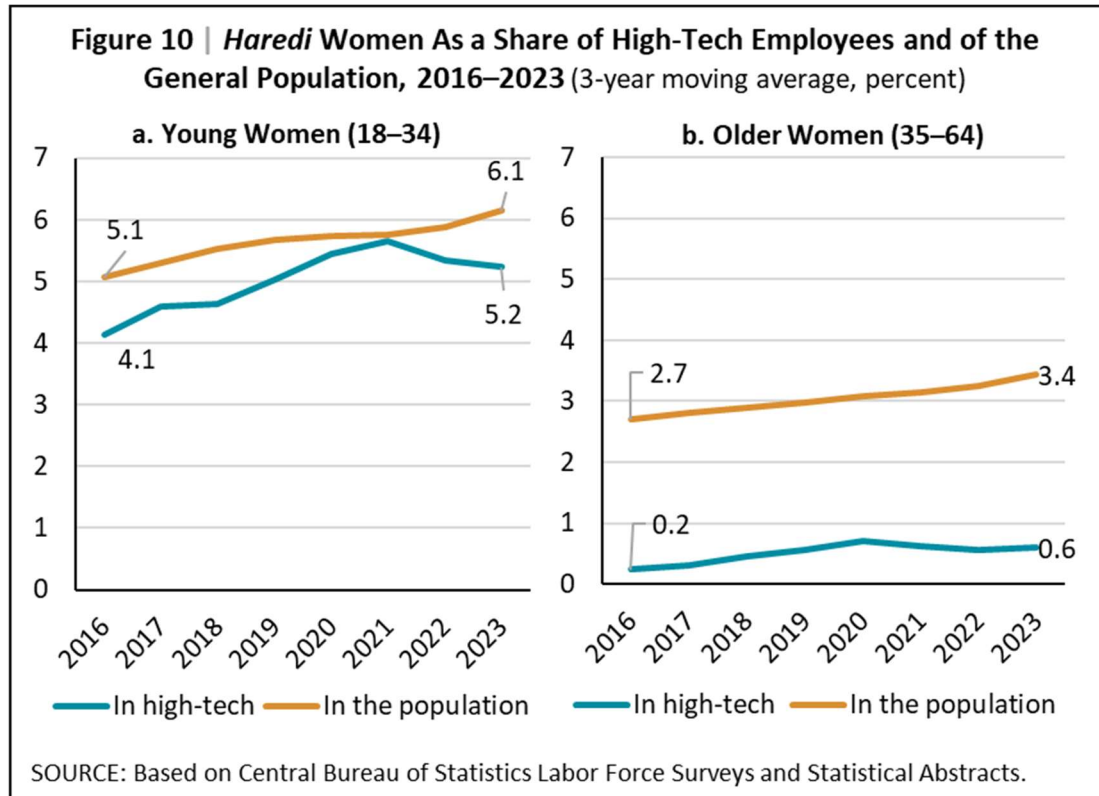


Figure 10, which reveals an intergenerational gap in participation in high-tech employment, further indicates that the opening of the software practical engineering tracks under MAHAT supervision, as part of the "alternative training programs" in the *Haredi* seminars, was an effective policy measure that eased the barriers facing *Haredi* women in acquiring technological education and entering high-tech employment. These findings help explain their equal representation in high-tech despite their relatively low share in academic high-tech studies.

Nonetheless, some barriers to the employment of *Haredi* women in high-tech may still remain. One is the low level of internet access in *Haredi* households, which limits the scope for remote work.¹⁶ Greater access would help *Haredi* women facing demanding family constraints to take up roles that require a high level of availability.¹⁷ Another is interaction with a secular, gender-mixed work environment that may be incompatible with a *Haredi* lifestyle (Gilboa, 2015).

¹⁶ According to information in the State of *Haredi* Society Annual Report (Institute for Strategy and *Haredi* Policy, 2024), which is based on the CBS Social Survey, in 2023 only 52 percent of *Haredi* families had an internet connection at home, compared with 91 percent of non-*Haredi* Jewish families.

¹⁷ The Annual Statistical Report on *Haredi* (Ultra-Orthodox) Society in Israel, published by the Israel Democracy Institute (2023) shows that *Haredi* women work significantly fewer hours than non-*Haredi* Jewish women (31 compared with 38 per week) and that many of them would like a job with convenient hours.



In summation, the participation rate of *Haredi* women in high-tech over the past decade has risen markedly, and is now on a par with their share of the young population. Their potential, however, does not appear to be fully realized. In practice, this integration often takes the form of low-wage technology positions and a relatively high rate of employment through contracting companies, as set out in Part 4 below. While the MAHAT track that bypasses academia provides *Haredi* women with an entry ticket to high-tech employment, it may at the same time impose a glass ceiling on the quality of the positions they fill and on their earnings. This argument is reinforced by the finding that between 2016 and 2019 the academic achievements of *Haredi* software practical engineering students in the seminars were noticeably higher than those of the rest of the population studying these professions.¹⁸ This may be explained by the fact that, in contrast with the non-*Haredi* population, some *Haredi* women enroll in MAHAT courses for social and cultural reasons rather than because low academic achievement bars them from a science or engineering degree.

To realize the full human capital potential of *Haredi* women in high-tech, the alternative training programs in the seminars require adjustment. Highly capable seminar students should be granted better access to courses that provide broader technology knowledge. One step in this direction is the Ministry of Labor's "premium practical engineers" program, introduced in 2022. This program broadens and deepens the study of technology professions in the MAHAT seminars, providing practical internship and job placement in leading high-tech companies. Resources should therefore be invested in high-quality teaching staff and in expanding such programs, in order to close the gap between supply and demand.

¹⁸ According to MAHAT data processed by the Office of the State Comptroller and Ombudsman of Israel in annual report 17B (2021), female ultra-Orthodox school students recorded a gap of 23-38 points in their average score in the language exams and 11-18 points in the linear algebra exams compared with the other MAHAT students from the general population.

Furthermore, the advent of artificial intelligence (AI) and the declining demand for basic software skills could impede the continued integration of *Haredi* women into high-tech if they lack the skills to use these tools. The seminar curricula must therefore be adapted to keep up with these changes in the labor market. Alongside upgrading the seminar software study programs, *Haredi* women with a suitable profile should be encouraged to enter academia, both to improve the quality of their education and to open up opportunities for higher degrees. The opening of a condensed pre-academic track at the Michlalah Jerusalem College for female high-school graduates who passed the Szold Institute exams is one such step.¹⁹ Consideration should likewise be given to opening fast-track degree-completion courses for outstanding graduates of the MAHAT software practical engineering programs.²⁰ This need is all the more acute given the development of AI and the growing demand in the field for holders of advanced academic degrees.

***Haredi* men**

An analysis of the representation of *Haredi* men in high-tech industries (Figure 11) shows that this group accounts for a particularly low share of high-tech employment relative to its share of the population, and the lowest of any group examined in this paper.²¹ Young ultra-Orthodox men (age 18-34) have a very low rate of labor market participation overall, and their representation among high-tech employees (1.1 percent) is even lower than their representation in other industries (2.8 percent). Their rates at the various stages of acquiring high-tech-oriented academic education are also extremely low. Moreover, the share of *Haredi* men who qualify for a matriculation certificate is negligible—lower even than their representation in academia—indicating that a substantial part of their academic training bypasses matriculation and runs through pre-academic colleges. A focused review of academic high-tech training shows that in the ten-year period from 2009 through 2019 there was a gradual increase in the relative share of *Haredi* men among students of high-tech disciplines, although from 2019 onwards this increase halted and their representation has remained static at around 2 percent.

The low representation of *Haredi* men in acquiring the education required for high-tech, including matriculation certificates and academic degrees, is associated with the absence of basic education in core curriculum subjects such as math and English in the *Haredi* education system. In 2024, just 8 percent of boys in *Haredi* elementary education attended schools within the national *Haredi* system (*Mamlachti-Haredi*), which teaches the full core curriculum under State supervision, while 49 percent attended exempt and "recognized but unofficial" ("Mokshar") schools that are not obligated to teach the full range of core curriculum subjects.²² Most of the remainder, approximately 40 percent, were enrolled in schools affiliated with the private *Haredi* education networks.²³ Although these institutions are obligated by law to teach core curriculum subjects, Finkelstein (2025) shows that in practice

¹⁹ On July 16, 2024, the Council for Higher Education in Israel approved an amendment to the Pre-College Programs Reform and added a designated (semester-based) condensed track for graduates of the Szold exams. On December 10, 2024, the Council authorized the Michlalah Jerusalem College to open a pre-academic preparatory course on this track, and it is offered in the year following the completion of twelfth grade. See: <https://www.michlala.edu/fr/node/1367> [in Hebrew].

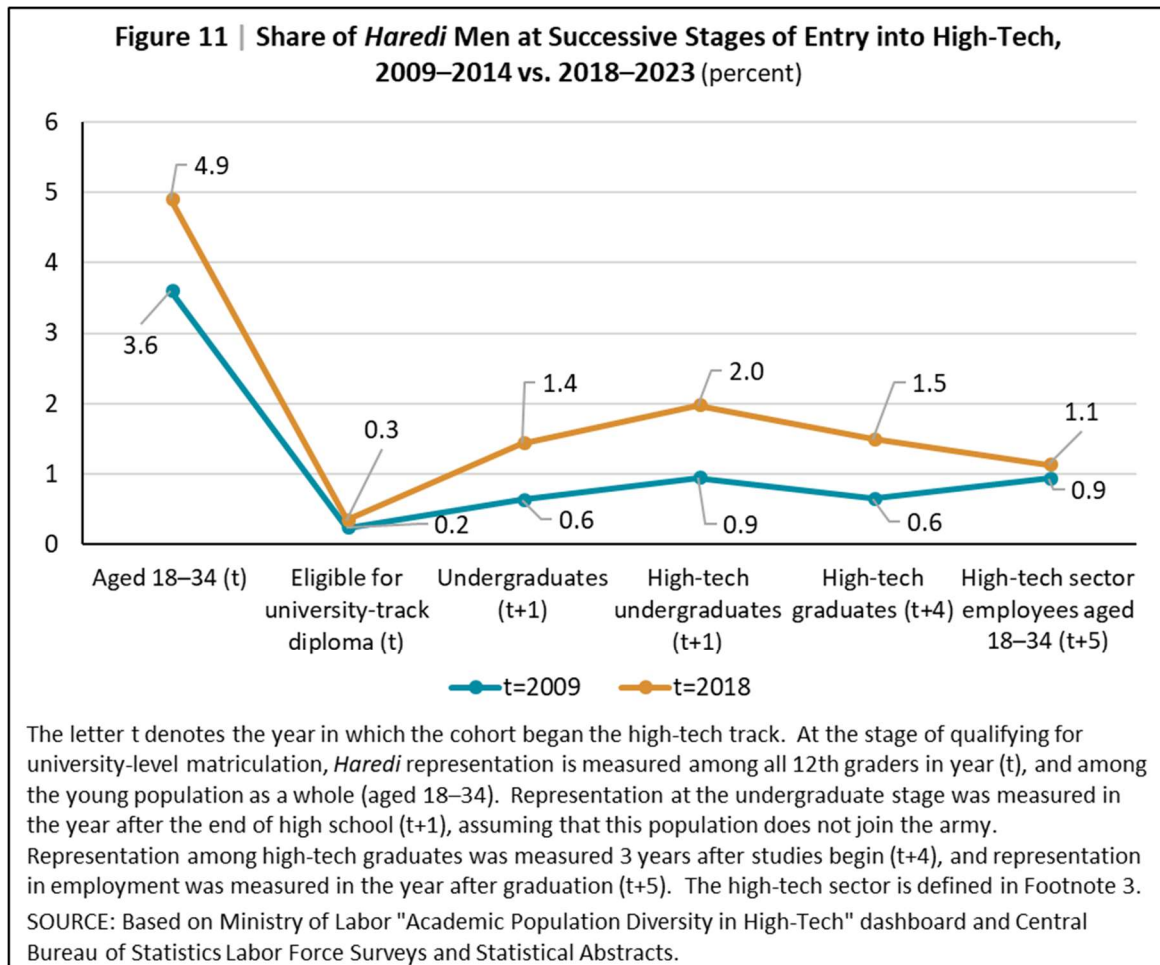
²⁰ The various colleges of engineering (e.g. Afeka and SCE) already offer programs for progressing from practical engineer to engineer or for completing a first degree. However, consideration should be given to adapting programs of this kind to *Haredi* society.

²¹ Labor Force Survey data processed by the authors.

²² Processed by Finkelstein (2025) from "A Broad Perspective" produced by the Ministry of Education for 2023–2024).

²³ The remainder (9 percent) were enrolled in special education institutions.

enforcement and supervision are extremely lax and that noncompliant schools are not penalized through the withholding of budgets. A comprehensive study by Barak-Koren et al. (2025) examined the teaching of core curriculum subjects in boys' *Haredi* education, drawing on interviews with principals in a representative sample of schools. The study found that in almost all the schools, including those that received Ministry of Education budgets, core subjects, particularly English, science, and math, are taught only partially. The teaching of core curriculum subjects within the *Haredi* education system is critical for future integration in the high-tech sector, which demands that its employees have strong skills, particularly in English and math (Hashai et al., 2022).



A review of the nature of the integration of *Haredi* men in high-tech studies shows that most study in dedicated frameworks established for them ("*Haredi* frameworks" and "platforms") under the Council for Higher Education's Planning and Budget Committee multiyear plan, with 80 percent concentrated in five higher education institutions (Axelrad et al., 2021). The *Haredi* frameworks and platforms operate close to the academic institutions, or in gender-segregated classrooms on campus, so that in practice *Haredi* students do not mix with other undergraduates in high-tech disciplines. This may limit their subsequent integration into high-tech employment, since they lack the networks and "soft" skills needed to find and secure a suitable position.

The State also runs extra-academic high-tech training programs on designated tracks for *Haredi* men, some of them through the IDF. "Kodcode" offers fast-track software development training that combines theoretical instruction with placement in key roles in IDF technology

units.²⁴ Shachar integrates *Haredi* men into the IDF by helping them acquire a profession and practical experience in computing and technology units, alongside study of core subjects (math and English) and tailored technological training.²⁵ MeGo, which is run by the Kemach Foundation in conjunction with high-tech companies and philanthropic funds, offers a long-term track for integrating *Haredi* men into Israel's technology sector, comprising supplementary basic education, a preparatory course in technology, practical engineering studies (MAHAT) and professional experience.²⁶ Data collected by the Haredi Institute and the Aaron Institute for Economic Policy (Axelrad et al., 2021) show that between 2012 and 2019, 55 percent of *Haredi* men who received dedicated training in high-tech disciplines participated in these extra-academic frameworks. Since high-tech employment rates did not rise, however, it appears that these efforts—including the opening of *Haredi* frameworks and platforms and of extra-academic training tracks—have had no significant impact on the volume of their employment in the sector.

4. Characteristics of the Arab and *Haredi* populations working in the high-tech sector

Table 1 compares Arabs and *Haredi* Jews working in the high-tech sector with non-*Haredi* Jewish employees and with their peers employed in other sectors of the economy, across education, earnings, geographical distribution, and distinctive patterns of integration.

With respect to geographical distribution, the high-tech employees in each group appear to live in the “traditional” concentrations of their group. About 74 percent of Arab high-tech employees live in the Haifa and northern districts; 87 percent of *Haredi* employees are spread among the Tel Aviv and central districts (43 percent) and Jerusalem and Judea and Samaria (44 percent); and most non-*Haredi* Jewish employees (63 percent) are concentrated in Tel Aviv and the center of the country. This broadly mirrors the residential patterns of these population groups.²⁷

The gender breakdown shows that *Haredi* and Arab women employed in high-tech are significantly younger than non-*Haredi* Jewish employees and than male employees from their own population groups. This supports the proposition that an intergenerational gap exists among women in acquiring education and integrating into high-tech employment. At the same time, *Haredi* and Arab women are more likely than their non-*Haredi* Jewish counterparts to work within their district of residence. This points to constraints on employment mobility, which may reflect stronger family commitments associated with larger-than-average households in these groups.²⁸

²⁴ Information about Kodcode—*Haredi* program for training programmers can be found at: <https://kodcode.org.il>.

²⁵ Information about Shachar from the Kol Zchut website: <https://www.kolzchut.org.il/he/%D7%A9%D7%97%D7%A8%E2%80%93%D7%A9%D7%99%D7%9C%D7%95%D7%91%D7%97%D7%A8%D7%93%D7%99%D7%9D%D7%91%D7%A6%D7%94%D7%9C>

²⁶ Information about MeGo can be found at: <https://mego.org.il/about/>

²⁷ As Table 1 shows, the relative representation of Arab high-tech employees in the northern and Haifa districts is even slightly higher than their representation among the other employees, mainly due to the low representation of Bedouins in the south and of eastern Jerusalem Arabs. This is also true of the representation of high-tech employees in the Tel Aviv, central, and Jerusalem districts due to the low level of representation of *Haredim* in the north and south.

²⁸ For example, Barak (2021) showed that care for children or a family member is the principal and most common reason among Arab women for not participating in the labor market.

A review of education characteristics shows that Arab and *Haredi* high-tech employees are generally less well educated than non-*Haredi* Jewish employees, in both years of schooling and the share holding academic degrees. Nevertheless, their level of education is significantly higher than that of other members of their population sector employed in the rest of the economy. These findings indicate that the degree of selectivity of high-tech employees relative to other employees is similar across population groups, and that the general education gaps between the Arab and *Haredi* populations and the rest of the population are reproduced within the high-tech sector. For *Haredi* women, the distinctive feature is not years of schooling or the share holding academic degrees—both particularly low relative to the other groups—but the share holding a nonacademic post-secondary certificate. This is exceptionally high (71 percent), against 37 percent for *Haredi* women in the rest of the economy and 11 percent on average for the other high-tech groups. The figures also show that the percentage of *Haredi* women employed in the high-tech sector who hold technology occupations (89 percent) is higher than that of other population groups in the high-tech sector (63 percent on average). Together, these figures illustrate the distinctive integration pattern of *Haredi* women and reinforce the finding that the MAHAT-supervised software engineering track in the *Haredi* seminars is their principal route into high-tech.

Hourly wage data for high-tech employees in technology occupations show that *Haredi* women earn considerably less than all other groups. This suggests that most of them enter high-tech in junior positions with lower earning capacity.²⁹ It reinforces the proposition that while the MAHAT training programs succeed in bringing *Haredi* women into high-tech employment, they also constrain their earning potential once there. The figures further show that, although low in absolute terms, the share of *Haredi* women employed through manpower or technology contracting companies (9 percent) is higher than in the other high-tech groups (2.4 percent on average). Overall, the hourly wage data show that the unadjusted gender wage gap, which averages some 32 percent, is 6–9 percentage points narrower among Arabs and *Haredim*.

²⁹ This finding reinforces the conclusions in “Female Students for High-Tech Professions: A National Goal and Practical Recommendations”, authored by Nili Ben Tovim and Noam Kost for the National Economic Council (2017).



Table 1: Summary statistics for high-tech and other employees – Arab, Haredi, and non-Haredi – by gender, 2019–2023

	Arab				Haredi				Non-Haredi Jewish			
	Men		Women		Men		Women		Men		Women	
Percentage of total population	10.8%		10.5%		6.9%		7.0%		32.0%		32.9%	
	High-tech employees	Other employees	High-tech employees	Other employees	High-tech employees	Other employees	High-tech employees	Other employees	High-tech employees	Other employees	High-tech employees	Other employees
Years of schooling	14.6	12.4	15.4	13.8	14.1	13.1	14.8	14.6	15.7	13.9	15.9	14.5
Academic degree (percent)	50.8	18.2	62.0	39.8	44.2	15.9	15.8	28.8	65.5	32.5	73.8	44.1
Nonacademic post-secondary certificate (percent)	9.9	4.8	5.1	6.2	17.3	12.6	71.1	37.4	13.9	11.8	8.1	8.7
Aged under 35 (percent)	52.2	47.5	70.1	47.0	39.1	38.3	82.0	55.3	30.4	38.3	37.9	35.9
District of residence: Jerusalem and Judea & Samaria (percent)	9.3	20.1	13.7	12.4	34.1	41.3	53.9	42.6	7.5	11.5	6.8	11.6
District of residence: North and Haifa (percent)	76.8	62.4	71.4	68.6	6.8	11.3	3.5	10.5	20.4	21.9	19.1	21.3
District of residence: Center and Tel Aviv (percent)	5.2	9.4	11.1	12.8	48.3	33.5	37.8	33.5	62.1	50.8	65.4	51.9
District of residence: South (percent)	8.6	8.1	3.8	6.2	10.7	13.8	4.8	13.5	10.0	15.9	8.6	15.1
Technology occupation (percent)	61.4	3.1	62.7	1.5	73.3	3.4	89.1	3.6	68.4	10.4	52.9	4.6
Works in district of residence (percent)	46.4	61.5	54.9	80.2	48.7	69.2	57.0	82.4	40.6	48.3	48.2	63.7
Employed via manpower or contracting firm (percent)	2.9	1.5	1.3	0.9	4.7	0.8	9.1	0.7	1.5	0.8	1.4	0.7
Monthly wage* (NIS)	22,636	10,887	15,281	8,221	22,248	10,152	15,548	7,983	33,262	17,635	22,876	11,752
Monthly wage*, technology occupations (NIS)	26,318	17,940	17,754	10,130	24,938	18,778	15,811	12,211	32,999	23,642	24,878	16,937
Hourly wage* (NIS)	118	60	91	58	116	66	91	63	165	91	121	73
Hourly wage*, technology occupations (NIS)	139	95	109	59	130	99	93	72	166	120	132	93
Observations	687	42,199	288	25,413	529	14,517	1,240	24,753	34,372	165,387	17,164	197,832
Population (individuals)**	5,296	320,006	2,083	188,015	3,204	85,093	8,525	150,809	228,065	1,069,684	110,888	1,223,482

* In 2022 prices.

** Weighted annual average.

SOURCE: Based on Central Bureau of Statistics Labor Force Surveys and Israel Tax Authority data. The high-tech sector is defined in Footnote 3, and high-tech occupations are defined in Footnote 9.

5. Conclusion

This paper analyzes the integration of the Arab and *Haredi* populations in the high-tech sector, while addressing the unique gender-based barriers and challenges facing each group. The data show that although the past decade has brought a significant improvement among the Arab population at the stages of acquiring high-tech-compatible education, Arabs continue to account for a smaller share of students and graduates than of the population. Moreover, this rise in higher education and technology degrees has not translated into a comparable rise in their share of high-tech employment. The reason appears to be that Arab graduates of high-tech disciplines face obstacles in entering suitable employment. Specifically, Arabs who do possess the human capital required for high-tech employment are impeded by a lack of professional networks and acquaintances who can refer them to relevant positions, and they lack prior knowledge of how to write a suitable CV or prepare for an interview. Arab students in high-tech disciplines should therefore be given both these skills and opportunities to build contacts during and after their studies, through dedicated mentoring and workshops.; Efforts should also be directed at strengthening ties to industry and removing information barriers. The gender breakdown of the Arab population sheds further light on the integration process. Over the past decade, the representation of Arab women has increased while that of Arab men has remained static, even though the men's share of high-tech students and graduates has more than doubled. This indicates that Arab men face the most serious barriers at the point of entry into the high-tech workforce.

An examination of the integration of the *Haredi* population into high-tech shows that the State has invested considerable resources in dedicated programs that allow them to acquire an education separately from the general student tracks. Among *Haredi* women, these efforts seem to have partially achieved their goals. The representation of young *Haredi* women in high-tech employment is on par with their representation in the general population, thus confirming the relative success of the MAHAT software engineering track offered in the Beit Yaakov seminars as part of the "alternative training" programs for initial integration into high-tech employment. However, an examination of the quality of this integration shows that *Haredi* women working in high-tech earn a lower wage than other high-tech employees and that they are generally employed in low-level software positions. Emphasis should therefore shift to improving the quality of their integration, particularly in view of technologies such as artificial intelligence, which are likely to render basic and low-level software jobs redundant. This goal could be achieved through the development of high-tech training tracks at a higher level than those offered in the seminars, while at the same time encouraging participation in academia, including more advanced degrees.

Among *Haredi* men, the State's efforts do not appear to have achieved their objectives. Their relative share of high-tech employment remains extremely low, both relative to their share of the population and by comparison with the other groups examined in this paper. Even at the stages of acquiring education, the opening of dedicated tracks for *Haredi* men does not seem to have led to any significant increase in their integration in academia. Efforts to integrate *Haredi* men into high-tech should therefore be concentrated at the earliest stages of education, by teaching the core curriculum subjects, particularly English and math.

Since 2022, the expansion of activity in the high-tech sector has slowed, mainly due to a global slowdown, following an unprecedented boom during the COVID-19 period. This is reflected in lower demand for junior employees, which appears to be partly driven by the growing use of

artificial intelligence technologies.³⁰ Between 2023 and 2025, the number of high-tech employees remained stable, after a decade of strong growth.³¹ This presents a further challenge to the absorption of employees into high-tech generally, and among under-represented populations such as Arabs and *Haredi* Jews in particular. At the same time, it underscores the need to make full use of Israel's human capital by building broad skills within the education system and over the course of working life, and by adapting those skills to an era of ever-growing reliance on artificial intelligence.³²

Integrating minority populations into the high-tech sector matters both for the well-being of these groups and the reduction of socioeconomic gaps, and for maximizing the future growth potential of the Israeli economy. The analyses presented here demonstrate the value of examining these subgroups separately, since each has its own dynamic and faces different obstacles on the path into high-tech. Identifying what is distinctive to each group is a precondition for designing focused, effective policy—and for improving existing policy—so that barriers can be removed and a broader, more durable integration of these groups into Israel's high-tech sector can be achieved.

³⁰ For example, a study in the US by Brynjolfsson et al. (2025) found that since the end of 2022, there has been a 20 percent decrease in the employment of entry-level software developers (ages 22–26)—a sharp change compared with the increase of the previous years. This contrasts with the fact that the employment of those aged 30–50 was unaffected.

³¹ Data from the CBS Labor Force Survey processed by the authors.

³² Ann et al. (2025) show that the sifting of CVs based on Large Language Models (LLM) consistently grades candidates with the same skills from minority groups lower than similar white candidates.

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