



A Long-Term Policy Plan for Developing Hi-Tech in Arab Society

Tsofen - High Technology Centers

Executive Summary and Recommendations

The purpose of the 5-year plan to advance hi-tech and innovation in Arab Society in Israel is the continuation of its socio-economic development by integration into the Israeli hi-tech industry – the main ‘engine’ of the Israeli economy. With the clear goal of turning this vision into systemic policy, a strategic map was developed for the 5-year plan that breaks down the vision into reachable goals and proposes measurements for success and meeting of said goals.

In the process of writing this policy paper, 53 policy initiatives for the advancement of hi-tech in Arab society have been examined: 14 were suggestions for changes and improvement of existing policies; 39 were new suggestions that we encountered during the comprehensive research that was undertaken for the writing of this paper.

10 initiatives were selected out of the total presented. These initiatives were chosen with the understanding that there must be a holistic treatment of the different and varied challenges along the long path towards integration into the hi-tech industry that are described in the methodological framework of this policy paper.

10 priority initiatives

High-school and informal education, STEM education

- Creating 6 regional community ‘Excellence Centers’ in cooperation with academia and the business sector
- Focusing informal education programs in hi-tech through financial incentives to municipalities

Academic and Non-academic post-secondary education

- Pre-academic preparatory programs (Mechina)
- Post high-school technology training for non-academic access to hi-tech positions

Job Placement

- Internship programs for 3rd and 4th year undergraduate students
- “Tech leadership future” – Training the future tech leadership in the public sector

Developing entrepreneurship infrastructure in Arab Society

- “Kangaroo” program – Start-ups adopting start-ups
- Tech greenhouse in the periphery (expanding current tech hub programs, Innovation Authority)

Employers

- Employers’ incentive for start-ups
- Implementation of tech infrastructure in Arab municipalities

The annual loss to Israel domestic product, is currently estimated at 32 Billion Shekels by the Bank of Israel. Together the initiatives chosen make up the recommendation for the 5-Year Plan for Advancement of Hi-Tech and Innovation in Arab Society in Israel. By addressing the challenges that have been identified, the policy plan is designed to achieve the strategic 5-year goals detailed in this paper and make significant strides towards its long-term goals. **The total cost of implementing the plan is estimated at 730 Million NIS for 5 years.**

Aside from the chosen initiatives, we recommend establishing a designated government implementation mechanism to ensure the policy plan is implemented on the ground. **This mechanism needs to be intra-ministerial and capable of amalgamating government budgets in the existing model.** We further recommend the establishment of a **public council** that includes representatives of the Arab society, the hi-tech industry and other public representatives that will monitor the implementation of the plan in light of its goals. Finally, we recommend that the **strategic map be accessible to the public** through a designated website, where viewers can observe the progress and goals reached towards full integration of Arab society into the hi-tech industry.

I. Preamble

This policy paper was written at the initiative of The National Council of Arab Mayors, the representative body of all elected Arab local government officials. The Council appointed 'Tsofen' to write the work plan in the area of hi-tech development, as part Tsofen's ongoing effort for social-economic development of Arab society in Israel and the integration of Arab society in the hi-tech industry – the engine of the Israeli economy.

The purpose of this paper is to form recommendations for a 5-year government plan that will further hi-tech and innovation in the Arab society, as part of the follow-up to resolution 922¹, in order to expand previous efforts, and sustain past results.

Arab society holds tremendous untapped potential. The empowerment and integration of Arab society in the Israeli economy is not only of the highest priority for Israeli Arabs but of the utmost priority for Israeli society at large. In this context the advancement of hi-tech and innovation in the Arab society is the key for economic growth and closing socio-economic gaps in Israel. Integration of Arab society in the hi-tech industry will increase the Arab society's contribution, first and foremost to itself – as an innovative society, more productive and stable, but at the same time will boost the hi-tech industry itself, the Israeli economy and Israeli society.

In late 2019, Tsofen convened a volunteer steering committee comprising 15 leaders from government, hi-tech, academia and civil society, to delineate policy guidelines; and contracted Deloitte to conduct additional research and write the full policy recommendation plan, under the guidance of the steering committee and of Mr. Ayman Saif, former Head of the National Authority for Economic Development of Arab Society. The plan is now completed.

II. Introduction: Arab Society and the Hi-Tech Industry

Arab Society makes up 21% of the population in Israel, and an even larger part of younger age segments. This is a population with unique characteristics that suffers from major socio-economic gaps with the majority Jewish population. These gaps are apparent in many aspects of life: education, health, transportation, personal security and more. The root causes of these gaps are many and varied. Among them, an inequitable division of public resources, inadequate opportunity, discrimination and neglect, lack of proper infrastructure and inaccessibility to capital, as

¹ Resolution 922 is a historic decision to allocate 15 Billion NIS for economic development among minorities 2016-2020. It was followed with government decision 2397 for socio-economic development of Bedouin in the Negev, government decision 3780 and more.

well as internal cultural challenges such as low participation of women in the work force, obstacles for women to work outside their communities and low-level training of the work force.

In the economic sphere, the gaps between the Jewish and Arab society are most apparent in the average income per family. An average Arab household income is about 11,000 NIS, less than half of the average Jewish household income (non Haredi), which stands at about 23,000 NIS. This includes cases where the households are in close geographical proximity.² These realities lead to a significantly lower standard of living in the Arab Society and 2.5 times higher poverty rates than the general population. A recent government study³ identifies two sources for this income gap. First, low levels of job participation in the Arab Society, especially among Arab women whose employment rate is only 38% compared to 81% in the Jewish society⁴. Second, lower hourly salary. This is an indication of the type of jobs held, mostly low productivity employment.

Two of the core challenges of the Israeli economy, low productivity and high poverty rates, are present in the Arab Society. Aside from the gaps, detriment to equality and equal opportunity in society, the direct damage to the Israeli economy is also troubling. Even though Arab Society makes up 21% of the total population, it's contribution to national productivity is less than half that rate⁵. **By various estimations the loss to the Israeli economy stands at 32 Billion NIS per year.**

There is a growing realization among government institutions that the economic future of Israel is dependent to a large degree on the successful integration of the Arab Society into the high-productivity workforce, chief among them, the “engine” of the Israeli economy, the hi-tech sector⁶.

III. The Israeli High-Tech Industry

The hi-tech industry in Israel has developed in the last two decades to become the leading industry in Israel and its main growth engine. The industry is responsible for only 9.2% of employment but amounts to roughly 50% of Israel's exports. Hi-tech accounts for a quarter of tax revenue in Israel. The industry is characterized by innovation, high productivity and salaries twice as high as the average salary in Israel⁷.

²https://www.idc.ac.il/he/research/aiep/documents/arab_society_2019.pdf

³https://www.gov.il/BlobFolder/news/news310719/he/employment_report_0719.pdf

⁴ Among men employment rate is 76% compared to 88% in the Jewish (non Haredi) sector.

⁵ Bank of Israel <https://bit.ly/3inMzXg>

⁶ BOI General Manager, Mr. Hezi Kalo, Globes Conference & the Arab Economic Forum, Nazareth Nov. 2019.

⁷ http://taubcenter.org.il/wp-content/files_mf/employeeskillsheb.pdf

The success of Israeli hi-tech has created a high demand for Israeli engineers and developers. The difficulty in meeting the demand in the short term both increases competition and raises salaries. Rising costs challenge the competitiveness of large companies and raise difficulties for start-ups and small companies. Attempting to deal with the shortage of trained employees by outsourcing part of the work abroad poses difficulties and has a toll on the Israeli economy as well.

The growth of the Israeli hi-tech industry is dependent on the supply of trained human resources available to work in the industry⁸. According to the Israel Innovation Authority there were 18,000 available jobs in 2018⁹. Government authorities have taken several steps to address this shortage of employees: creating incentives to increase the number of students in STEM frameworks in high-schools, increasing the number of students in universities in relevant faculties and creating non-academic entry paths to the industry. One of the main obstacles identified by the government in this regard is maximizing the existing human capital available in Israel by raising the participation rates of populations that have been previously absent or did not take a major role in the hi-tech industry, especially women, the Haredi community and the Arab society.

IV. Arab Society and Hi-Tech

The economic situation of the Arab Society in Israel and the shortage of employees in the hi-tech industry have been described as “two problems that solve one another”. Integration into the hi-tech industry can act as a springboard for improvement of job productivity in Arab society that will lead to an increase in household income and quality of life. The hi-tech industry in turn will have gained trained and highly qualified employees who will meet the employee shortage, in response to the growing demand and continued sustainable growth of the industry. Synergy between these two issues will lead to an increase in average household income and help close the social gaps between Jewish and Arab populations.

The foundation has already been established for the development of hi-tech in the Arab society. Following in the footsteps of first-generation ground-breaking individuals from Arab society who entered the industry before 2008, between 2008 and 2017 the second generation enabled hi-tech to begin to take root in Arab society, entering the industry with the intensive help of civil society

⁸ Much as the growth of the industry in the 1990's was in part due to massive immigration of Jews from the former Soviet Union, and in the early 2000's by the growth of relevant faculties in universities and colleges.

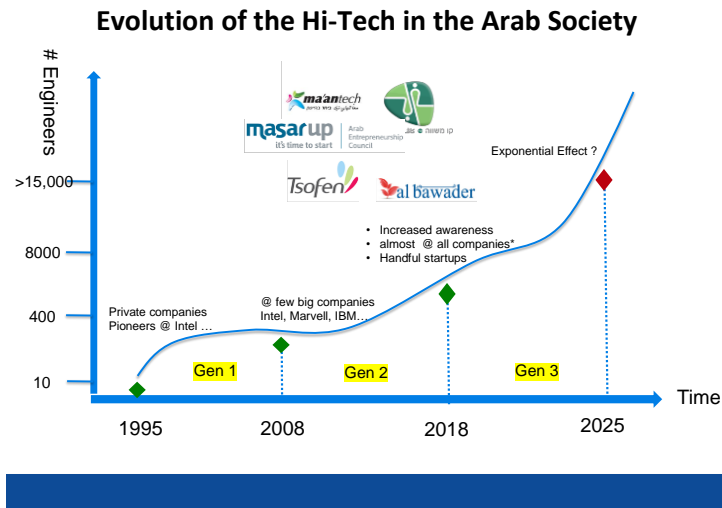
⁹ Report on human capital in the hi-tech industry, https://innovationisrael.org.il/HighTech_human_capital_report2019

organizations such as Tsofen, MasarUp and others. We are currently in the '3rd generation' of hi-tech in Arab society. This is the generation of empowerment, scalability and 'massification' where the Government and civil society utilize the existing infrastructure and leverage a powerful and significant expansion of the hi-tech industry in the Arab society, making it a central growth engine. These efforts by the government and civil society have borne fruit. In the last few years, we are witnessing a positive trajectory of integration of young Arab men and women in the hi-tech industry. While in 2008 the number of Arabs employed in the industry was approximately 400, today that number stands at roughly 8,000 men and women, most of them graduates, twenty times the number in 2008. A dramatic increase can also be identified in academia, where 5,200 Arab students are currently studying towards degrees in technology subjects¹⁰. By comparison, in the entire period between 1984 and 2014, there were only 1,598 Arabs who graduated technology faculties. Another indicator is the increase in Arab representation in hi-tech entrepreneurship. There are currently 90 start-ups led by Arabs out of an estimate of 5,000 companies¹¹. The most striking example of success is the city of Nazareth. The hi-tech scene has accelerated in Nazareth in the past few years. 1,300 engineers and academics work in Nazareth, 20% of whom are Jewish engineers who commute to Nazareth daily. This in comparison to roughly thirty hi-tech employees a decade ago. 40 hi-tech companies are located in Nazareth today. The city hosts networking meetings, a 'women in hi-tech' forum, incubators and accelerators for start-ups, an industrial park, co-working spaces and more. Another budding tech center can be found in the town of Kfar Kasem.

Despite these positive indicators the real gaps are still extremely large. The rate of Arab participation in the hi-tech industry is only 3% of the total workforce. Arabs are employed mostly in large, multinational companies and not in local companies and start-ups. The percentage of high-school students studying high level math and computer science is low, Arab university technology students make up only half of their proportionate number in the population, and the number of Arab entrepreneurs and start-ups is extremely small. In order to safeguard and fortify the small flame that has been lit in the past few years, there is a great need for a comprehensive, long term plan. To that end, we need to analyze and address the entirety of challenges facing Arab society on its path to full integration in the hi-tech.

¹⁰ According to the Israeli Council for Higher Education, 'hi-tech' degrees in academia include: electronics engineering, communication system engineering, software engineering, optical engineering, computer sciences and mathematics.

¹¹ "Arab Citizens' Integration into Israeli High-Tech: Achievements and Emerging Issues," <https://www.iatask-force.org/sites/default/files/resource/resource-1630.pdf>



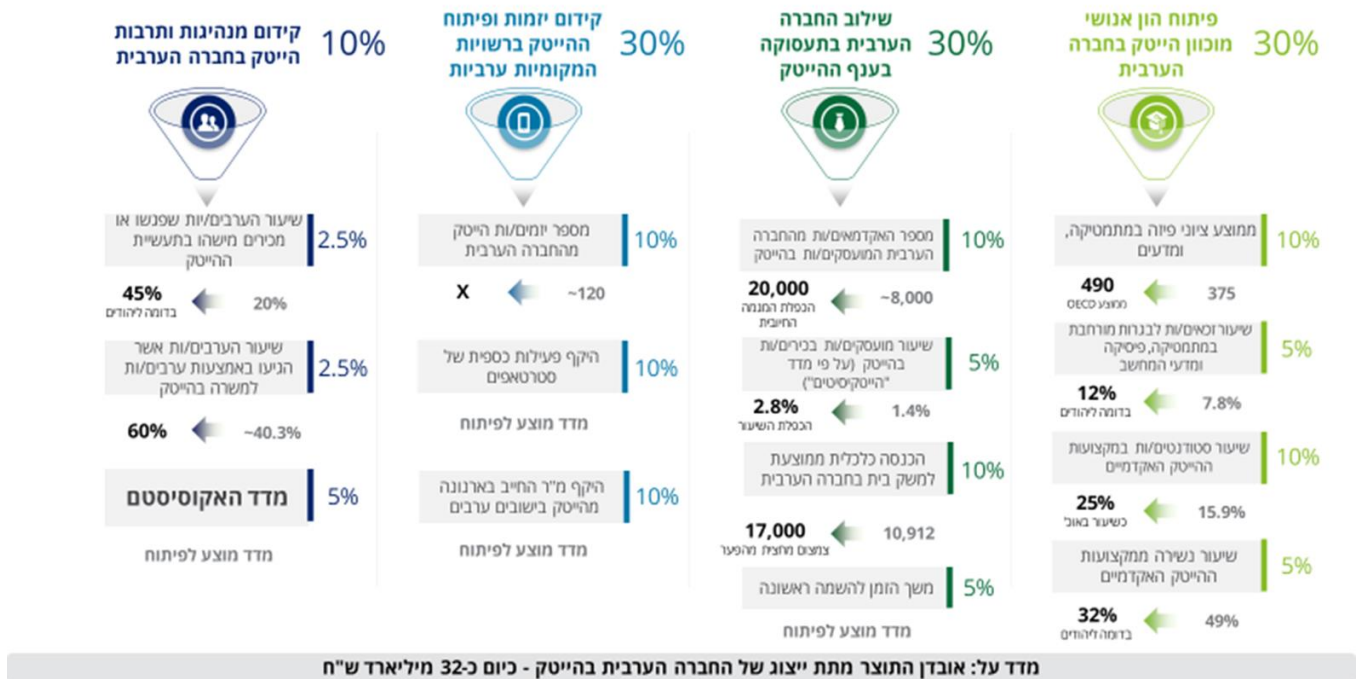
V. 5 Year Plan to Advance Hi-Tech and Innovation in Arab Society

The purpose of the 5-year plan to advance hi-tech and innovation in Arab Society in Israel is the continuation of its socio-economic development by integration into the Israeli hi-tech industry – the main ‘engine’ of the Israeli economy. With the clear goal of turning this vision into systemic policy, a strategic map was developed for the 5-year plan that breaks down the vision into reachable goals and proposes measurements for success and meeting of said goals.

The strategic map was defined by the Public Council for the Advancement of Arabs in hi-tech and Innovation founded by Tsofen. With the help of ‘Deloitte’, with their deep knowledge of strategic planning in government and extensive experience in accompanying such processes, four goals have been defined:

1. Developing Human Capital that is ‘hi-tech’ directed in Arab Society – 30%
2. Integration of Arab Society in Hi-tech Industry – 30%
3. Advancing Development and Innovation in Arab municipal government – 30%
4. Advancing Leadership and ‘Hi-tech Culture’ in Arab Society – 10%

מפה אסטרטגית: תכנית החומש לקידום הייטק בחברה הערבית



1. Developing 'Hi-Tech' Directed Human Capital in Arab Society

This goal is based on the understanding that the income gaps between Jews and Arabs in Israel are due mostly to the gaps in human capital, the number and quality of years in education¹². Additionally, integration into the hi-tech industry requires acquiring education, expertise and specific skills. Closing the gaps in human capital is required at all ages, from primary to post-secondary education. The rationale in setting 5-year goals was to reduce education gaps (both in test scores and drop-out rates) in the first instance or, in other words, bring the rate of participation of Arab students in technology education from the current under-representation of Arabs up to their proportion in society.

2. Integration of Arab Society into Hi-Tech Labor Force

The integration of Arabs into the hi-tech labor force is the "bread and butter" of the 5-year plan. The other goals are intended to support and revolve around this goal. Meeting this goal will bring a dramatic improvement in both the economic realities of the Arab Society AND the Israeli hi-tech

¹² https://www.idc.ac.il/he/research/aiep/documents/arab_society_2019.pdf, pg. 10.

sector. The gaps in the measurement values between the Jewish and Arab societies in this regard are very large. Therefore, our 5-year goals in employment rates are not to reduce the gap completely but to double the current growth rate. In measuring senior employment, our goal is to quadruple the number of employed. In measuring the average household income, our goal is to reduce 50% of the income gap with Jewish society. We also suggest a new measurement for success: the time lapse between completion of studies to first job placement.

3. Advancing Development and Innovation in Arab Municipal Government

In this strategic goal we aim for the embedding of development of hi-tech within Arab Society itself, making it not just a participant in the industry but a stakeholder. Developing hi-tech will enable a greater sense of ownership and pride, a cultural shift toward tech and, of course, enjoying the fruits of its labor. Our initial goal is to bring the number of hi-tech companies in Arab municipalities from 90 to 120, and to 300 by 2026 and 600 in the longer term. New measurements are also suggested, including the financial scope of Arab-owned start-ups, and the square meter-age of taxable hi-tech-zoned real-estate in Arab municipalities.

4. Advancing Leadership and 'Hi-tech Culture' in Arab Society

This goal was set with the understanding that, in order to grow hi-tech and innovation, there is a need for creating a supportive and adequate enabling environment, that offers solutions to different needs of the industry. Such an environment includes, first and foremost, leadership and role models, as well as professional networks, meet-ups and conferences, shared work space, accelerators, incubators and more. The measured goal is to increase two parameters: 1) Increase the number of young Arab men and women who met or know someone in hi-tech from 20% to 60%; and 2) Increase the rate of employment through social-professional networks from 40% to 60%.

VI. Challenges, Government Response and New Initiatives

The challenges facing a young Arab man or woman who are interested in joining the hi-tech industry are identifiable in different ways, each one high-lights a different aspect of the problem as a whole. The Inter-Agency Task Force on Israeli Arab Issues' report,¹³ for example, suggests a geographical challenge. Most Arab centers of population are in the geographical periphery, which has poor public transportation infrastructure, while the hi-tech centers are mostly located in the center of the country: Tel Aviv, Jerusalem and Haifa. Additionally, there are socio-economic challenges that stem from the general economic situation, as mentioned earlier, language, culture and acceptable norms. And finally, there are structural challenges stemming from the closed nature of the industry itself, which is largely populated through personal connections, cliques and military service, especially in start-ups.

Deloitte offered a different methodological framework with which to analyze these challenges, from the view point of the potential employees and employers themselves, entrepreneurs and local Arab councils at the different stages they encounter. This methodological framework suggests that Integration is a process, a **"Pipeline"**, which young Arab men and women enter at the high-school level that takes them all the way to full employment in the industry. Such a framework enables a chronological mapping of the challenges and identifying "bottle necks" that stand in the way of optimal integration. This policy paper chooses this framework and suggests solutions at each stage.



From both directions, that of the employers and of the employees along the 'pipeline', are dozens of challenges and bottle necks, as well government programs and initiatives that have been

¹³ "Arab Citizens' Integration into Israeli High-Tech: Achievements and Emerging Issues", <https://www.iatask-force.org/sites/default/files/resource/resource-1630.pdf>

implemented, from raising awareness, strengthening formal and informal education frameworks, to developing physical infrastructure (real-estate, communications, internet, transportation, accelerators, conferences, meetups and more). Our policy paper reviews and assesses the implementation and relative success of each program and suggests a priority scale. Challenges are assessed as **critical, significant** or **limited**. Government programs and local initiatives were analyzed and assigned **sufficient, partial** or **lacking** markers.

The challenges, government responses and offered solutions, including examples implemented around the world, are presented using the above-stated methodological framework, from high school to job placement, and advancing innovation, entrepreneurship and hi-tech in Arab municipalities.

In the process of writing this policy paper, 53 policy initiatives for the advancement of hi-tech in Arab society have been examined: 14 were suggestions for changes and improvement of existing policies; 39 were new suggestions that we encountered during the comprehensive research that was undertaken for the writing of this paper. As in any strategic plan, it was vitally important to identify the core issues that will make the program successful. The steering committee appointed by the Public Council for Advancement of Arabs in Hi-Tech prioritized **10 chosen initiatives** out of the total presented. These initiatives were chosen with the understanding that there must be a holistic treatment of the different and varied challenges along the long path towards integration into the hi-tech industry that were described in the methodological framework of this policy paper.

The 10 chosen programs were prioritized in light of 3 main concerns: 1) the level of impact of the policy, which is dependent on the number of beneficiaries who are directly affected by the implementation of the policy and the estimation of the effect it will have on the advancement of the 5-year plan as a whole; 2) the applicability of the policy, which is dependent on the type of intervention (raising awareness, government incentives or budgeting, regulatory changes), financial costs of the policy and expected resistance by various actors, and, as mentioned previously, 3) the importance of creating a holistic action plan that offers solutions to the different and varied challenges along the steps towards integration into the hi-tech industry.

VII. 10 priority initiatives

High-school and informal education, STEM education

- **Creating 6 regional community ‘Excellence Centers’**; in cooperation with academia and the business sector, that will provide students a supportive framework to nurture leadership, excellence in science and technology, ‘soft skills’, and technical know-how. Excellence Centers can function as a hub for other programs described in this paper such as “exposure and mentoring in schools”, “hi-tech cadets” and others.
- **Providing financial incentives to municipalities**; to focus informal education programs on hi-tech by adjusting their budget formulas to match the financial costs in the field of hi-tech

Academic and Non-academic post-secondary education

- **Pre-academic preparatory course (Mechina)**; for high-school graduates for technology subjects. The Mechina will offer skills and tools towards academic studies with the perspective of future employment. The course will emphasize collaboration with the hi-tech world, for example with mentors from the industry for program participants, during the program through academic studies, to employment.
- **Post high-school technology training for non-academic access to hi-tech positions**: Creating specialized tracks for Arab students with the existing programs of the Innovation Authority. The track offers training in technology to many Arab men and women who have the potential to work in hi-tech but are not suitable for academic studies.

Job Placement

- **Internship programs for 3rd and 4th year undergraduate students**: Students of relevant subjects will be placed in internships with participating technology companies. These internships will act as a bridge to employment. The program will be implemented with collaboration between institutions of higher-education and leading companies in the industry. Funding will be offered by the academic institution and subsidized by the government. This mechanism will enable the academic institution to offer practical courses with accreditation and become more competitive. The participating companies will gain a new cadre of interns.
- **“Tech leadership future” – Training the future tech leadership in the public sector**: The public sector needs technology-oriented leadership to match the growing saliency of technology in our economy. This program is intended to incorporate young, talented, and excellent university tech graduates in the national and local tech and innovation divisions. In this framework participants will undergo dedicated training in technology, business leadership, public sector and municipal government. Later they will be placed in position with a career path towards management in the technological divisions of national and local government. It is possible to include within the program an ‘innovation track’ with an emphasis on technological innovation that is designated to product and/or development as well as hi-tech community coordinators in municipal government. (Similar to the initiative suggested in the next segment).

Developing entrepreneurship infrastructure in Arab Society

- **“Kangaroo” program – Start-ups adopting start-ups:** In the framework of this program, early stage start-ups will be adopted by more established start-up companies. The established companies will receive government grants in exchange for providing work space to early stage start-ups, guidance and mentoring. They will also assist the young start-ups in overcoming networking challenges and raising capital, as well as other areas of expertise. Thus, the program will support the connection between Jewish and Arab societies and the long-term integration of Arab hi-tech professionals in Israel.
- **Expanding the “Tech greenhouse in the Periphery” track:** This Innovation Authority program is currently running as a pilot and includes the construction of 3 hi-tech incubators in Arab towns. Incubators will be designed to advance initiatives in local Arab municipalities by Arab entrepreneurs or university students, collaborative initiatives between industry and entrepreneurs or start-ups and the academia. Similar to the existing program, the incubators will aim to assist at the earliest stage of the start-up until proof of concept, product development and functioning business model. Entrepreneurs participating in the incubator program will be eligible for a grant from the Innovation Authority of 85% of the total budget costs up to 1 million NIS.

Employers

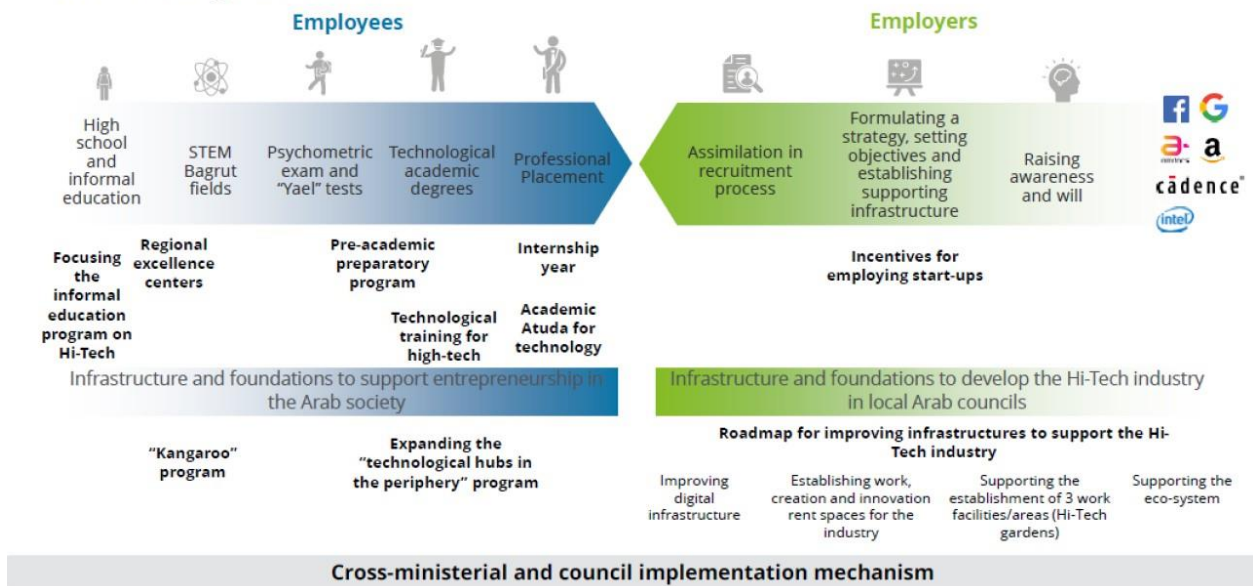
- **Employers’ incentive for start-ups:** Creating incentive tracks for employers in the Economic Investment and Development Authority that are targeting start-ups and small to medium size companies, that will promote hiring Arab candidates similar to tracks 4.17 and 4.20 of the I&D Authority¹⁴.

Development of Tech infrastructure in Arab municipalities

- Implementation of the pathway for strengthening tech infrastructure in Arab municipalities, including digital infrastructure, work space, creativity and entrepreneurship, and advancing modern employment centers as detailed in the Infrastructure Development chapter in this document.

¹⁴ https://www.gov.il/he/departments/policies/economy_dgi_instructions_04_20
https://www.gov.il/he/departments/policies/economy_dgi_instructions_04_17

Selected initiatives for the integration of the Arab society in Hi-Tech across the methodological framework



VIII. Summary and Recommendations

Measurement and Evaluation

It is important to set one scale for measurement and evaluation when it comes to the 5-year overarching plan to advance hi-tech and innovation in Arab Society in Israel ("One Number"). The unified scale enables a simple monitoring tool for measuring the progress in implementation and success of all aspects of the plan, while giving proportionate weight to each of the elements that have been defined as most significant.

Beyond these measurements, an additional evaluation tool that examines the basic goal of the 5-year plan of integrating Arab Society in the Israeli economy, is the estimation of annual loss to Israel domestic product, as mentioned earlier, **currently estimated at 32 Billion Shekels**¹⁵.

Together the initiatives chosen make up the recommendation for the **5-Year Plan for Advancement of Hi-Tech and Innovation in Arab Society in Israel**. By addressing the challenges that have been identified, the policy plan is designed to achieve the strategic 5-year goals detailed in this paper and make significant strides towards its long-term goals. The total cost of implementing the plan is estimated at 730 Million NIS for 5 years.

¹⁵ Bank of Israel.

Aside from the chosen initiatives, we recommend establishing a designated government implementation mechanism to ensure the policy plan is implemented on the ground. This mechanism needs to be inter-ministerial and capable of amalgamating government budgets in the existing model. We further recommend the establishment of a public council that includes representatives of the Arab society, the hi-tech industry and other public representatives that will be monitor the implementation of the plan in light of its goals. Finally, we recommend that the strategic map be accessible to the public through a designated website, where viewers can observe the progress and goals reached towards full integration of Arab society into the hi-tech industry.