Research Office
Legislative Council Secretariat

Fact Sheet

Innovation and technology development in Israel

FS05/16-17

1. Introduction

1.1 Since its independence in 1948, Israel has seen itself living in a hostile neighbourhood under constant threat of war by its neighbouring Arab countries. This has prompted Israel to achieve technological supremacy, particularly in military capabilities, for national survival. As early as in 1969, the Israeli government established the Office of the Chief Scientist ("OCS") under the Ministry of Economy and Industry (formerly the Ministry of Industry, Trade and Labor) tasked with implementing government policy regarding support and encouragement of industrial research and development ("R&D") projects undertaken by private firms.

1.2 The next key development was the passage of the Law for the Encouragement of Industrial Research and Development ("the R&D Law") in 1984. This is the main piece of legislation that has defined the parameters of government policy towards industrial R&D ever since. The stated goal of the legislation is to facilitate development of science-based, export-oriented industries capable of creating employment and improving the country's balance of payments. As such, at the heart of the R&D Law is a programme of financial incentives and support measures which companies, whether big corporations or small start-ups, are entitled to after meeting certain eligibility criteria.

1.3 After more than four decades of development, Israel has established itself as one of the most technologically advanced countries in the world and a global innovation hub. Reflecting this, Israel ranked 2nd in terms of innovation among the 138 economies covered in the Global Competitiveness Report 2016-2017.[1] It also ranked 21st out of 128 economies in the Global Innovation

[1] The Global Competitiveness Report is published by the World Economic Forum, which is an independent international organization comprising about 1 000 top corporations and global enterprises. The Report assesses the competitiveness landscape of the worldwide economies to provide an indication on the drivers of their productivity and prosperity.

Index 2016, outperforming other surveyed economies in the sub-indicator of ratio of researchers in the population and ranking the second highest in the sub-indicator of gross expenditure on R&D as a percentage of Gross Domestic Product ("GDP").[2] Added to this, Israel is home to more than 2 000 start-up companies and is second only to Silicon Valley of the United States in terms of the number of start-up companies. Against this, Israel has been widely regarded as the "start-up nation".

1.4 This fact sheet aims to provide the Panel on Commerce and Industry with information on: (a) development of the innovation and technology ("I&T") industry in Israel; (b) the Israeli government's policies relating to the I&T industry; and (c) development of the traditional manufacturing industries amid technological advancement in Israel.

2. Development of the innovation and technology industry in Israel

2.1 The development of the I&T industry in Israel originated in the military sector. In 1948, the Israel Defense Forces established a branch for developing new arms, explosives and a variety of electronic appliances for military application. Since then, the military industry in Israel has developed rapidly to meet the country's need for armaments and technologies. In the early 1970s, application of military technology to develop products for civilian use led to the inception of the first generation high-technology companies in Israel. At the same time, science and research centres of academic institutions also started engaging in scientific research that contributed to the technological advancement of Israel.

2.2 The effort for military self-sufficiency reached its limits in the 1980s, when Israel tried to develop Lavi, an Israeli-designed military jet. The ensuing financial burden pressured the Cabinet to cancel the project in 1987 and use the money instead to buy the less-expensive American-made F-16 fighter. This decision ushered in a breakthrough for Israel's I&T industry, with the release of hundreds of engineers with experience at the cutting edge of aerodynamic, avionics, computers and electronics into the commercial market.

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[2] The Global Innovation Index is co-published by the Cornell University, INSEAD (a graduate business school with global presence specialized in executive education programmes) and the World Intellectual Property Organization. The index is a composite indicator that ranks the worldwide economies in terms of their enabling environment to innovation and their innovation outputs.

2.3 Israel's I&T industry continued to grow in the 1990s and expanded briskly in the 2000s, attributable to (a) the influx of science and engineering talents from the former Soviet Union; (b) the successful transfer of technology from academia to industry; (c) the establishment of R&D centres by multinational companies to take advantage of the government's incentive measures; and (d) the development of venture capital industry during the period. After several decades of development, a vibrant and dynamic I&T industry has emerged in Israel with thousands of companies specializing in a diverse range of fields including telecommunications, semiconductors and components, software, cybersecurity, biotechnology and medical electronics. There were 288 700 employees working in Israel's high-technology industry in 2015, representing about 9% of the total workforce.[3]

2.4 At present, there are over 5 400 companies operating in the I&T industry, of which about 37% are start-ups, 56% small and medium companies, 1% large companies and 6% R&D centres of multinational corporations.[4] According to the Israel Central Bureau of Statistics, the national expenditure on civilian R&D totalled ILS 50 billion[5] (HK$99 billion) in 2015, almost doubled the amount of ILS 26 billion (HK$43.7 billion) in 2005. It also accounted for 4.3% of GDP in 2015, and this figure was among the highest in member countries of the Organisation for Economic Co-operation and Development. Analysed by operating sector, the business sector accounted for most of the national expenditure on civilian R&D, at 86% in 2015, followed by universities (11%), the public sector (2%) and private non-profit institutions (1%).[6]

2.5 As to the economic contribution of the I&T industry, exports of high-technology industries (including computers, electronic and optical products, and spacecraft and related machinery) totalled US$22.5 billion (HK$174.4 billion) in 2015, accounting for 50% of the total industrial exports (excluding diamonds). Exports of high-technology services such as computer software and R&D amounted to US$14.3 billion (HK$110.9 billion), representing 42% of the total service sector exports.[7]

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3 See Central Bureau of Statistics (2017).

4 See Israel Innovation Authority (2016a).

5 ILS is the currency code for the Israeli new shekel (the currency unit of Israel).

6 See Central Bureau of Statistics (2016).

7 See Ministry of Economy (2016).

2.6 However, growth of the I&T industry in Israel has slowed down in recent years. According to the Israeli government, the I&T industry has been facing challenges such as growing global competition and shortage of skilled manpower such as experienced engineers.[8] Besides, insufficient experience in business management has enticed many local start-ups to sell their potentially successful business pre-maturely to venture capital funds. This hinders the expansion of start-ups into large enterprises and leads to a loss of added value to the Israeli economy.

3. Government's innovation and technology policy

3.1 The Israeli government has adopted a multi-pronged approach for the development of the I&T industry in the country. This includes the establishment of specific government authorities to promote the industry, engagement of private sector participation, incentive programmes offered to stimulate industrial R&D, and support rendered to immigrants and returning resident scientists.

Specific responsible authorities

3.2 In early 2016, the Israeli government established an independent public entity – the Israel Innovation Authority ("IIA") – to nurture the development of the I&T industry in Israel while creating and strengthening the infrastructure and framework needed to support the entire industry. The inception of IIA is to replace OCS and its Israeli Industry Center for R&D,[9] which had been entrusted with administering the R&D Law and overseeing all government-sponsored support of industrial R&D in Israel.

3.3 The establishment of IIA stems from the Israeli government's acknowledgement of the need to quickly and efficiently confront the rapidly changing needs and challenges facing the I&T industry. As such, IIA has

[8] Until recently, the I&T industry was helped by two trends: academics and employees of state-owned industries moving into the private sector and the arrivals of tens of thousands of Jewish engineers emigrating from the former Soviet Union. Both these sources of fresh talent have now dried up. In addition, there has been a decline in the share of Israelis graduating in the sciences from 13% of all graduates in 2004 to 8.7% in 2014. See Economist (2016) and IMRA (2016).

[9] The Israeli Industry Center for R&D was the executive agency of OCS responsible for administering the national and international programmes developed for promoting industrial R&D.

greater power and flexibility to enable rapid response, minimum restrictions and new support systems. It also introduces new creative lending programmes, guarantees, funds and financial instruments.

3.4 IIA comprises six innovation divisions, namely: (a) Startup Division; (b) Growth Division; (c) Technological Infrastructure Division; (d) Advanced Manufacturing Division; (e) International Collaboration Division; and (f) Societal Challenges Division. These divisions are responsible for managing support programmes that are tailored to the business needs of specific target groups of entrepreneurs and companies.

3.5 In addition to IIA, other authorities involved in formulating and/or implementing policies related to the I&T industry include: (a) the Ministry of Science, Technology and Space which funds the operation of eight regional R&D centres to draw young scientists into R&D activities and promotes international scientific cooperation; (b) the Planning and Budgeting Committee of the Council for Higher Education which promotes and allocates funding for scientific research in the academic sector; and (c) the Ministry of Finance which is involved in policy making and coordinating with other authorities on policies related to the I&T industry.

Engagement of private sector participation

3.6 The Israeli government encourages local and foreign investment in industrial projects by offering a wide range of incentives and benefits provided under the Law for the Encouragement of Capital Investment. Government grants of up to 20% of the approved investment are available to companies establishing their plants in designated national priority regions in Israel.[10] Tax benefits are also offered to investors meeting specified criteria. For example, companies with an annual total income of at least US$375 million (HK$2.9 billion), a minimum capital investment of US$100 million (HK$776 million) in a national priority region, and a combined balance sheet exceeding US$5 billion (HK$38.8 billion) can enjoy a reduced corporate tax rate at 5%.[11] As a result of the government's incentives, many major multinational companies have established their presence in Israel. For example, Apple, General Motors, Google, Microsoft, Cisco and Hewlett Packard have established R&D centres and acquired companies in Israel.

[10] National priority regions refer to Israel's peripheral areas or areas that the Israeli government plan to develop.

[11] The average corporate tax rate in Israel is 25%.

3.7 Israel's venture capital industry, which plays an important role in the booming high-technology sector, also benefits from the government's incentive measures. For example, foreign investors in eligible venture capital funds are entitled to receive tax exemption on the income generated from investment in the Israeli I&T industry. In 2016, there were about 50 active venture capital funds in Israel. During 2007-2016, a total of about US$9.13 billion (HK$70.85 billion) was raised by Israel's venture capital industry.[12]

Incentive programmes offered by the Israel Innovation Authority

3.8 In the past few decades, OCS was empowered by the R&D Law to manage various incentive programmes for supporting R&D projects undertaken by companies ranging from novice companies with innovative concepts to start-up companies and established industrial R&D enterprises. OCS also promoted international cooperation in R&D by setting up bi-national funds to support joint R&D projects with foreign countries.

3.9 IIA, which replaced OCS in 2016, has recently expanded the scope of the incentive programmes and organized them under its six innovation divisions. Each division focuses on managing a number of programmes to address the needs of and challenges faced by a specific target group of companies in the I&T industry. For instance, the Startup Division manages incentive programmes targeting at entrepreneurs with an innovative technological idea and start-up companies at early stage of development. These programmes include:

(a) the Tnufa Incentive Programme which supports entrepreneurs with innovative technological concepts at the initial stage of R&D to raise funding for further development and commercialization;

(b) the Incubators Incentive Programme which provides financial incentives for entrepreneurs to establish a start-up company based on an innovative technological concept;[13] and

(c) the Young Entrepreneurship Incentive Programme which is designed for training the next generation of entrepreneurs in Israel.

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[12] See IVC Research Center (2017).

[13] Currently, there are 18 technological incubators and one designated biotechnological incubator, which are privately owned by experienced groups such as venture capital funds, multinational corporations and private investors. The incubators are selected through competitive processes and are licensed to operate for a period of eight years.

3.10 As another example, the Growth Division of IIA manages incentive programmes for promoting technological innovation of mature and growth companies. They include (a) the R&D Fund which is the main incentive programme designed for industrial R&D support for the development of new products or upgrade of existing technology; and (b) other incentive programmes to support R&D in specific fields such as agriculture, alternative fuels for transportation and space technology.

Support rendered to immigrant and returning resident scientists

3.11 Israel is a large immigrant-absorbing country with many immigrants being science and engineering talents. Through the Center for Absorption in Science under the Ministry of Aliyah and Immigrant Absorption, the Israeli government assists new immigrants with relevant qualifications and experience in finding employment in the academic and commercial sectors. The hiring employers are subsidized the cost of employing the immigrants in the initial period. In order to meet the demand for experienced scientists in the I&T industry, the Center for Absorption in Science also provides employment assistance to Israeli scientists who return to work in Israel from abroad.

4. Israel's traditional manufacturing industries in the technological world

4.1 In 2015, there were 10 754 establishments operating in the traditional manufacturing industry, accounting for about 84% of the total number of manufacturing establishments in Israel.[14] Yet, the traditional manufacturing industries, which are operating with low- and medium-low-technology,[15] are losing their importance in the Israeli economy. According to IIA, the traditional manufacturing industries are mostly labour intensive with low productivity. They accounted for a mere 19% of industrial exports (excluding diamonds) in 2015 notwithstanding employing 56% of the total manufacturing workforce.[16]

[14] See Central Bureau of Statistics (2017).

[15] The Israel Central Bureau of Statistics classifies manufacturing industries by four levels of technological intensity i.e. low, medium-low, medium-high and high levels. Low-technology manufacturing industries include food and textile industries, while medium-low-technology manufacturing industries include plastic and metal product industries.

[16] See Central Bureau of Statistics (2017).

4.2 Against the above, the Israeli government has considered that revitalization of the traditional manufacturing industry through adoption of R&D is imperative to enhance its productivity and competitiveness and help achieve a diversified economy. Up till 2016, the Israeli government has spent about ILS1 billion (HK$2.1 billion) on the revitalization programme, and allocated grants to over 560 companies for supporting over 1 380 R&D projects, mostly for improvement of their manufacturing processes.

4.3 Recently, the Advanced Manufacturing Division under IIA is tasked to further strengthen the efforts on promoting R&D in the traditional manufacturing industries. IIA has planned to set up a national institute of advanced manufacturing and enhance support for breakthrough R&D projects in the traditional manufacturing industries. It also manages two incentive programmes to encourage traditional manufacturers to develop innovative products, technologies and manufacturing processes.

4.4 The first incentive programme aims at encouraging traditional manufacturing industries to implement innovative technological processes. Under the programme, manufacturers engaging in traditional manufacturing industries such as textile, leather product and metal product industries are provided with grants on R&D projects, as well as subsidies for employing R&D employees and acquisition of innovative technology or intellectual property. The second incentive programme aims at providing guidance and consultation services for manufacturers which are not experienced in carrying out R&D activities.

4.5 In addition, the International Collaboration Division of IIA manages an incentive programme to encourage multinational companies engaged in low- or medium-low-technology manufacturing industries to establish project centres in cooperation with an Israeli entity to stimulate and create R&D activities in the low-technology sector. Under the programme, government grants are provided to encourage establishment and continuous operation of the project centres in Israel.

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20 March 2017
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