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Building an Innovation Ecosystem as an Alternative of Oil Sector Exports in Azerbaijan (on the basis of the study of Israeli practice)

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XÜLASƏ

Uğurlu innovasiya ekosisteminin yaradılması yenilik və inkişafın əsas amilidir və Azərbaycanın neft ixracından asılılığının azaldılmasına alternativ ola bilər. Əlverişli innovasiya ekosisteminin formalaşması Azərbaycan hökuməti üçün də prioritet istiqamətlərdən biridir. Azərbaycan Respublikasının Prezidentinin 6 noyabr 2018-ci il tarixində Azərbaycan Respublikası Nəqliyyat, Rabitə və Yüksək Texnologiyalar Nazirliyi yanında İnnovasiya Agentliyinin yaradılması haqqında fərman imzalayıb. 2019-cu ildə qurulacaq İnnovasiya Agentliyi bu sahədə koordinasiya rolunu oynayıb Azərbaycan ekosisteminin innovasiya yol xəritəsini hazırlayıb həyata keçirəcək. Bu məqalədə dünya təcrübəsi, o cümlədən İsrailin Azərbaycanda ekosistem qurmaq təcrübəsi öyrənilir. Məqsəd İsrail ekosisteminin uğurlu olmasını təmin edən amillərin müəyyənləşdirilməsidir və bu faktorların Azərbaycanda oxşar həyata keçirilməsində tətbiq oluna biləcəyini öyrənməkdir.

Açar sözlər: Biznes Model, Ekosistem, İnnovasiya, Ekosistem, Qeyri-neft iqtisadiyyatı

1.INTRODUCTION

Innovation has become an essential concept in the economic growth related to the rapid development of Information Communication Technologies (Mercan and Göktaş, 2011, p. 1), and building a successful innovation ecosystem is an essential factor in the growth and global development. The establishment of a favourable innovation ecosystem remains an essential policy priority for the government of Azerbaijan as a part of a global trend and requirement of a modern economic system. President of the Republic of Azerbaijan signed a decree on the establishment of the Innovation Agency under the Ministry of Transport, Communications and High Technologies of the Republic of Azerbaijan on November 6th, 2018. The Innovation Agency to be established in 2019 will be a coordinating body to draft and realize an innovation roadmap of a country's ecosystem.

Considering the above-mentioned issues, studying the world practice in the case of Israel is imperative from an academic point of view to define policy lessons for thriving innovation policy. After the establishment of the State of Israel in 1948, it was remaining an underdeveloped and rural country negatively

affected by the war. However, Israel could successfully make a huge transformation into a global innovation powerhouse with multibillion innovation companies (David, 2016, p. 26).

2.THE CONCEPT OF INNOVATION ECOSYSTEM

‘The term innovation ecosystem refers to a dynamic, interactive network that breeds innovation’ (Oksanen, Hautamäki, 2014, p. 4). A widely believed agreement is that the main parties of innovation ecosystem include academic institutions, government agencies, policy-makers, research centers, venture funds, large companies and start-ups (Oksanen, Hautamäki, 2014, p. 4-5).

Briefly speaking, the development of an innovation ecosystem depends on the availability of skilled labor, research institutions, funding as well as the availability of private or government-sponsored infrastructure. Silicon Valley is a well-known example of an innovation ecosystem. India and Israel can also be mentioned as good examples of innovation ecosystems too.

3.THE CASE OF ISRAEL: POLICY LESSONS FOR AZERBAIJAN

As mentioned earlier, Israel is one of the most developed countries which possess a well-functioning innovation economy. Multinational companies and international venture funds have actively participated in investing in Israeli technology companies and start-ups. It was Israeli governments' programs that made an effective innovation ecosystem. Therefore, it is a good case for an empiric study to understand the role of government in innovation policy.

In 1948, when the State of Israel was established, it was a poor and agricultural country. Its economy was weakened by the war, and it had a little prospect of development. The country had scarce natural resources. Therefore, the government of Israel aspired to establish a robust innovation economy from the first days of its foundation (Claros, Mia, 2006, p.89). Claros and Mia (2006, p.89) write that ‘recent Israeli economic history is an excellent showcase of the key contribution efficient government intervention can make to the overall innovation potential and ICT readiness of a nation’.

A number of primary factors are prerequisites to building a sustainable innovation ecosystem (Avidor, 2011, p. 4). These elements include the availability of financial capital, human resources, economic incentives, information access, as well as the collaboration and interaction between government, the private sector, educational & research centers and individual entrepreneurs who are aspired to produce innovative products/ solutions (Avidor, 2011, p.4).

3.1 Venture capital, public-private partnership & human capital policies

Avidor (21, p.21) mentions that ‘Israel’s policy planning, responses to market developments, and luck led to the creation of proper economic incentives, fluid access to financial capital, skilled human capital and robust connections to global information networks for the emergence of an innovation economy’.

‘Innovation typically requires investment capital to pay for labor, office/lab space and/or materials. High-order R&D investments tend to require large up-front, uncollateralized cash and only offer varying probabilities of success’ (Avidor, 2011, p. 6). The requirement of uncollateralized cash and uncertain probabilities of success makes innovation project riskier for individual investors. Thus, a developed venture fund industry is crucial to financing inventions and technological creativity (Claros, Mia, 2006, p.99). ‘Venture capital (VC) firms are specialized financial intermediaries formed to invest in startup firms on behalf of a pool of investors’ (Avidor, 2011, p.9).

Especially, the involvement of international venture funds is useful in countries with limited financial capital. Israel has also lacked VC funds in the early 1990s since the country had 2 VC funds (Avnimelech, 2009, p.12). The creation of the VC fund industry was a crucial priority to provide funding for innovative programs.

Therefore, the most successful program of the Israeli government for nurturing VC fund industry, involving international capital as well as providing cooperation between private and government sectors was ‘Yozma’. The program was launched in 1992 with the goal of creating a competitive VC industry and involving international VC funds in Israel (Avnimelech, 2009, p.4). Eventually, a 100M\$ state-owned VC fund was founded with the first objective of investing in 10 private funds (80M\$) and with the second objective of making direct investments in high tech companies in Israel (Avnimelech, 2009, p.5). The main regulation to invest in VC funds was that Yozma fund would invest 40% in a newly established VC fund by stipulating that a fund has to be an independent Israeli fund, has to raise the rest of finance (60%) by establishing limited partnership with an international venture fund while most investment decisions have to be made by international investors (Baygan, 2003, p. 16).

Eventually, the program ‘Yozma’ did not only become a cornerstone program in building VC industry in Israel but also it provided early-stage funding for Israel companies to develop their products (Yin, 2017). In the 1990s, the venture capital investments increased from \$58 million by \$3.3 billion thereby making Israel second in the private equity market after the US (Yin, 2017). Between 1990 and 2008, there was a dramatic increase in the number of active VC funds in Israel. The number of venture funds increased from 2 to 68.

Furthermore, Yozma promoted the cooperation between professional American VC funds and local Israeli funds as well as private and government sector. As a result of the involvement of international funding in locally established VC funds, Yozma funds increased by 250 million US dollars (Baygan, 2003, p. 16). As the availability of financial capital was one of the key factors for a sound innovation ecosystem, the Israel government did not only play an important role for providing funding for Israeli startups but also stimulated the creation of VC funds industry and the entrance of international

VC funds into Israeli market under the Yozma program. Yozma program is considered an important program in VC fund policy.

'Inbal' was another program of Israel government for involving international investment in the innovation industry. The program which started in 1991 offered 70% equity guarantee for international VC funds which want to invest in Israeli start-ups (Baygan, 2003, p. 16). Although Inbal is not considered as successful as Yozma, it is important to note that the program can be characterized by its uniqueness for both attracting international VC funds by minimizing their risks. The program can offer incentives for global VC funds to invest in Israel start-ups.

The third promising initiative that was designed to fill the funding gap for early innovation projects was the Technological Incubators Program of the Israeli Innovation Authority which was established in 1991. The Technological Incubators Program established 24 incubation centers (Yin, 2017). The program offered \$500,000 to \$800,000 for funding and incubating early-stage ideas for the period of two years (Yin, 2017). Incubators are hubs with the appropriate human and material resources which carried 1300 projects between 1991 and 2008 while involving additional private investment up to 3 billion US dollars (Avidor, 2011, p. 28).

In addition to the above-mentioned programs, the government of Israel offers R&D grants, especially to those products and solutions that are related to innovation. Thus, the Office of the Chief Scientist was established in 1969 to encourage research and development in industrial innovation, and it distributed R&D grants (with an annual budget of \$500 million) between 1988 and 2000 (Avidor, 2011, p. 25).

Israeli government's programs including Yozma, Inbal and the Technological Incubators Programs provided seed funding and R&D grant for early-stage ideas. The availability of financial capital is an essential component of a sound innovation ecosystem, and the programs of Israel created the emergence of VC industry and grants for funding early-stage ideas.

Another interesting program of the Israeli government was Magnet which started in 1993. Under this program, multi-year R&D grants were offered for an academic institution to cooperate with an industrial firm to produce innovative technologies/solutions, while the program provided 66% of the total R&D budget (Claros, Mia, 2006, 98). The program played an important role in facilitating cooperation between the academic and industrial sector and initiated the establishment of 31 consortia by 2005 (Claros, Mia, 2006, 98).

Uniqueness and effectiveness of Israeli government's programs is that the government took the responsibility of risky funding for technological start-ups, creative ideas and venture funds, while it offered economic incentives and infrastructure support (R&D grants, venture capital funding, early-stage investment in start-ups) for various sectors (venture funds, educational

institutions, international venture funds, start-ups) to cooperate and interact with each other.

Development of human resource is another criterion for an effective innovation economy. Since Israel lacks natural resources, the governments another priority was to develop human capital through building a quality education system. Skilled engineers, scientists, and inventors can contribute to research and innovative product development. When the state of Israel was founded in 1948, another priority of the government was to enhance the quality of education and academic excellence with the special focus on preparation and training of world-class engineers, scientists and industrial managers (Claros, Mia, 2006, p. 91). In the early 1970s, a number of universities in Israel were offering world-class research and education including Ben Gurion University in Beer Sheba, the Technion in Haifa, the Weizman Institute in Rehovot, Hebrew University in Jerusalem, and the Universities of Haifa and Tel Aviv (Claros, Mia, 2006, p. 91).

Finally, the activity of Innovation Authority of Israel is interesting to study from the perspective of international cooperation. Along with distributing R&D grants, the authority conducts its operation internationally to find global opportunities for Israeli companies (Innovation Israel, 2018).

3.2 Policy Lessons for Azerbaijan

A number of policy lessons can be deduced from the case of Israel to build an innovation ecosystem in Azerbaijan. First of all, the role of government is inevitable in innovation management and funding. Second, the Israeli case shows that the development of the innovation economy requires a huge financial investment. Since these kinds of investments are risky for private companies, the government is supposed to both provide incentives and sponsorship in the sector innovation. The following policy directions can be studied from Israel.

- Development of VC fund industry;
- Provision of the collaboration between academia, industry, & government;
- Funding support, infrastructure, and resource provision;
- Development of human capital;
- Fostering International collaborations.

4 CONCLUSIONS

This paper reviewed and deduced policy lessons for Azerbaijan by analyzing and discussing the policies and programs in Israel for building innovation ecosystem. The main finding of this paper is that the government has a vital role in building the innovation ecosystem as an alternative of an oil sector. The paper deduced that several factors and policies of Israeli government made it one of the best innovation ecosystems in the world, including VC fund policies, R&D grants, facilitating public-private partnership support as well as sponsorship support for start-ups. Based on Israel experience, the paper determined several

key policy lessons for Azerbaijan which include the development of VC fund industry, provision of cooperation between academia, industry, and government, start-up funding, infrastructure support, human capital development and international cooperation.

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