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What makes Israel a world leader in innovation?

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Abstract

Innovation is a major driver of economic development and what drives competition in modern age, allowing nations a competitive position through investments in technology. The research examines the role of governments is encouraging and facilitating innovation, while exploring the nature of Israel's innovation policy. Israel provides the perfect example for the success of governmental policy to encourage innovation, being different from policies of other developed countries, which encourage free trade and allow markets to dictate policy. It is a leading example of the policy that promotes innovation by the government, which is deeply involved in the market and dictates the scope of technological advancement. With the success of Israel's innovation policy, the country has become a world leader in innovation. It is known as a "Start-up Nation", which means that its economic growth is linked to innovation. The research shows that the nature of innovation changed significantly in the last decades, and it is today based on government policy, technological advancement, secured economy and openness to global developments. As the world is changing, competition between countries accelerates, and the role of governments in technology development is critical. Israel's innovation policy demonstrates that the most significant role in innovation is provided by the government, which needs to create new markets rather than just supervising them – encouraging technological advancement based on secured economy and globalization. The success of Israeli innovation policy requires to investigate the nature of this development, and the question that is examined here is: how a policy of governmental intervention can promote innovation?

Keywords: innovation, technology, government, competition, Israel

INTRODUCTION

Innovation is the catalyst for progress in any society and countries seek to advance their competitive position through investments in technology. Innovation is a major driver of productivity, economic growth and development, as a way to boost productivity through investments in technology (Brand, 2017). The most distinctive factor that differs between countries in modern times is their technological status, and governments must formulate national strategy for innovation policy (Islam, 2014). Economies score highly for innovation and should put more effort into increasing the readiness of populations and businesses to adopt new technology, says the Global Competitiveness Report 2017-2018 (Gray, 2017).

Innovation is about successfully implementing creative ideas (Amabile, 1996). The term innovation is used much more frequently today than a few decades ago, and policy-makers need to take all phases of the innovation process into account when designing and implementing policy (Eldar and Fagerberg, 2017). The OECD defines innovation as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations". The report published by OECD (2018) - Embracing Innovation in Government: Global Trends 2018 – argues that governments are transforming their operations and improving the lives of their citizens though innovation, and calls for a global call for innovation.

The research examines the way Israel is implementing its innovation policy, which has successfully placed the country as a world leader in innovation. In 2015, Israel was ranked 5th in most innovative countries, ahead of US and UK, according to the Bloomberg Innovation Index, an annual ranking of countries that measures performance in research and development, tech education, patents, and other marks of technology prowess (Coy, 2015). In 2017 and 2018 Israel was ranked 10th (Jamrisko and Lu, 2018).

In order to understand the government's role in facilitating innovation in Israel, the research examines two major issues:

Firstly, what is the role of innovation to the economic development of nations and how innovation has elevated the Israeli economy?

In examining the role of innovation to the development of economies in modern age, the research relates to the conclusion of former Chairman of the American Federal Reserve Department, Ben Bernanke, that innovation led to new products and more-efficient production methods, with dramatic changes in the way nations and economies are organized and managed, highlighting the connections between new ideas and methods and the organizational structure needed to implement them (Bernanke, 2011). In examining the role of innovation to the Israeli economy, the research adopts the conclusion of the Israel Innovation Authority (2019) that innovation is by far the most valuable resource for the State of Israel, serving as a national asset crucial to economic prosperity, and strengthening the innovation ecosystem would further develop and support technological innovation in Israel.

Secondly, what is the role of governments in facilitating innovation and how innovation has become a key element in the economic and technological development of Israel?

In examining the role of governments in innovation policy the research relates to the conclusion of the Global Competitiveness Report 2017-2018. According to the report, economies score highly for innovation and should put more effort into increasing the readiness of populations and businesses to adopt new technology (Gray, 2017). As the research demonstrates, Israel's innovation policy represents the new role of governments in encouraging innovation. This role is explained by the World Economic Forum (2018). According to them, the nature of innovation changed significantly: where once innovation was largely confined to corporate or university labs, it's now being driven from many different sources. In examining the active role of the Israeli government, the research shows that Israel`s success is based on the combination of highly developed technology sector and a successful a global oriented economy. The policy is implemented through technology that is supported by secured economy alongside with openness to the world and deregulation of financial markets.

Innovation and Economic Growth

The research examines the role of governments in innovation policy. It is argued that governments have a major role in advancing innovation and providing investments for new markets (Mazzucato, 2015). As the Israeli experience demonstrates, government support in targeting local companies effectively improves their innovation performance, and strong government intervention leads to the concentration of resources in selected sectors and players (Wang, 2017). According to Israel Innovation Authority, (2019) innovation is the key for financial growth, although since it involves a high level of uncertainty, lack of governmental involvement will result in a situation where private investment in R&D is significantly lower than socially desirable. As a result, Israel is ranked third place in most innovative countries in the world, after Switzerland and the US, according to the World Economic Forum, because it has a good capacity for innovation, high quality scientific research institutions and strong private sector spending and collaboration on R&D (Gray, 2017).

What makes Israel's success in innovation policy? It is evident that regulatory framework conditions are important factors influencing the innovation activities of companies, industries and economies (Blind, 2012) and the responsibility for innovation policy needs to be broadened across different levels of the government (Eldar and Fagerberg, 2017a). As can be seen in the Israeli case, regulation and standardization influence both supply and demand conditions and incentives (Blind, 2012), and innovation policy instruments must be designed to address the problems of the innovation system (Borrás and Edquist, 2013).

The role of the Israeli government in implementing its policy determines the way innovation policy should be conducted in the 21st century. It is evident that the conventional view in mainstream economics is that governments have little capacity to spark innovation, and the state should play as limited a role in the economy as possible, thus their policy should be limited to intervening only in cases of "market failure." However, as demonstrated by the success of the Israeli policy, this is far from the truth, since governments need to play a critical role in spurring innovation – actively creating new markets, instead of just fixing them. According to Mazzucatto (2015), governments need to play a key entrepreneurial role, envisioning and financing the creation of entire new fields in technology. Wang (2017)

claims that government intervention is vital in supporting R&D, since market alone cannot provide adequate incentives for knowledge production. He explains that the government is one of the determinants for innovation capacity, although its role and degree of involvement in innovation is debatable. This policy is best explained by Israel Innovation Authority (2019). According to them, high-tech projects are risky, as they involve a high level of uncertainty in the scientific and technological ability, and uncertainty in the demand for these developments, and without government support, private investment would not be suffice to guarantee a leading role of technical development.

In order to examine the nature and outcome of Israel's innovation policy, it is evident that first and foremost, innovation has elevated the Israeli economy. The technological advantage of Israel promoted its economy, which has grown more rapidly than most other advanced economies (OECD, 2018). According to Israeli Ministry of Foreign Affairs (2019), global rankings of the top innovation ecosystems in the world consistently find Israel to be one of the world's top locations for entrepreneurs and venture capitalists, together with the Silicon Valley in California and the economic capitals of Europe.

In order to examine the active role of the government in technology, it is important to explain that Israel's economy is dominated by the public sector and the government is playing a critical role in kick-starting innovative industries. The role of the government is crucial for the success of Israel's innovation policy, since the government made a strategic decision to promote technology by providing financial support for commercial R&D. According to the Israeli Institute for Economic Planning (IEP), structural reforms and huge investments in R&D led to a high-tech boom. They explain that the government's role in a free economy should focus on creating infrastructure for innovation and economic growth, improving access to education and business opportunities and handling market failures that limit competition. According to Israel Innovation Authority (2018), innovation is the most valuable resource for Israel, serving as a national asset crucial to economic prosperity. At the core of Israeli innovation policy is the matching grants program: firms submit R&D proposals to the Innovation Authority and grants are awarded on a competitive basis, with between 66 and 90% of the research costs covered (Israel Innovation Authority, 2019).

With the benefit of technology, encouraged by government policy, Israel has become a global leader in science and technology. The country is one of the most research and development-intensive economies in the world (Canadian Trade Commissioner Service, 2019). It is a world leader in terms of research and development spending as a percentage of the economy, according to the Innovation Authority (2019). Israel is the leading community for Israeli startups, entrepreneurs, investors, venture capitalists, angels, developers, researchers and recruiters. Israel's innovation sector receives significant support from government agencies, including the Ministry of Science, Technology and Space, and the Israel Science Foundation (Canadian Trade Commissioner Service, 2019).

The active role of the government in the economy, particularly in hi-tech, is evident in that the country invests 4.25% of GDP in research and development, with a large majority of this investment made by business. As a result of this policy, Israel was ranked #1 in private R&D expenditure as percentage of GDP – about 4.3% (as of 2016), of which 84% came from the private sector – the highest among OECD countries, reflecting the prospering private sector innovation ecosystem. Israel was also ranked #2 at the Innovation Index of the Global Financial Forum (Global Competitiveness Report, 2016-2017). In 2018, Israel was ranked in 20th place out of 140 countries on the World Economic Forum's Global Competitiveness Index, published by the World Economic Forum (WEF). It was ranked 14th on the human capital skills subcategory, fifth on "business dynamism", eighth on corporate governance and second only to the U.S. on the availability of venture capital (Schwab, 2018).

As a result of the policy initiated by the government, the high-tech industry is the economy's main engine of growth (Ministry of Economy, 2015). According to the OECD (2018a), Israel has been showcasing impressive economic data for 15 years in a row. Almost no other country out of the 33 OECD member countries has demonstrated such impressive growth over this number of consecutive years. It ranks third in the World Economic Forum's ranking of most innovative economies and its startups receive nearly 20% of global private investment in cyber-security. The country is leading in high-tech worldwide (Reuben, 2014) and in research and development (Senor and Singer, 2009). After the US and China, Israel has most companies listed on the NASDAQ stock exchange (McKenna, 2017).

Israel's Innovation Policy

The research examines the way Israeli government's support of technological developments is significant to the growth and prosperity of the innovation ecosystem and economic environment. With innovation being a major driver of productivity, economic growth and development, the Israeli government made a strategic decision to promote technology by providing financial support for commercial R&D (Moss, 2011). The result of this policy is that Israel's innovation ecosystem is characterized by a large number of start-ups and significant involvement of global corporates. As determined by this research, this success is the result of the active involvement of the government and various government agencies in directing the market and supporting technology and high-tech companies through indirect intervention.

Degrees of government intervention vary in different economies and range from directive intervention by actively advising industrial policy, investing in selected areas, or facilitative intervention by creating positive environment and providing public goods for industry (Wang, 2017). The active role of the Israeli government is unique in that respect, since it includes direct intervention by providing grants and loans for startup projects. It also includes indirect intervention, by providing tax incentives for companies dealing with R&D and innovation and developing supporting systems for these companies. A major player in technology and innovation ecosystem is the Israel Innovation Authority, a central government agency responsible for fostering innovation in various industries. Israel's innovation sector receives significant support from other government agencies, including the Ministry of Science, Technology and Space, and the Israel Science Foundation (Canadian Trade Commissioner Service, 2019).

Israel Innovation Authority (2019) explains the nature of intervention required by governments. According to this analysis, in a modern economy, innovation is the key for financial growth. However, part of the characteristics of research and development (R&D) activities result in a lower financial benefit to the investing business entity compared to the overall benefit for the market in general. As a result, private investment in R&D may be lower than what the market views as an optimal level of investment, and in order to overcome these market failures and reduce the companies' risk, a government

intervention to "compensate" these companies and encourage their investments in the required R&D is required.

The Innovation Authority works with industry to define innovation policies and collaborates with international partners on R&D efforts. It provides a variety of practical tools and funding platforms aimed at effectively addressing the dynamic and changing needs of the local and international innovation ecosystems. Startups are incubated for two years with funding of $500,000 to $800,000. The government takes no equity and provides 85% of the budget as a grant, which will only be paid back (as 3-5% royalties) when the startup generates revenues. By funding the riskiest part of the innovation process, the program helps startups survive their most vulnerable phase and scale up to receive private sector capital. The success of the program shows that of over 1,500 companies graduated from the incubators, while 60% have attracted private investments of $3.5 billion and 40% are still in operations. An Israeli product featured on Time Magazine cover of November 2018 was included in its list of Best Inventions 2018: the Nanobébé, which the magazine described as a "better baby bottle" (Israel Innovation Authority, 2019).

The Ministry of Science and Technology is responsible for investment in scientific research in fields of national priority, connecting between academic research and industrial development. It plays a central role in the creation and advancement of research and development in Israel, setting scientific priorities in order to enhance human and physical infrastructure, establish international scientific relations and leverage Israel's relative advantages. The Ministry aims to bring science to the community, strengthen sectors with a minor presence in scientific fields and develop scientific studies in the periphery.

The Ministry is responsible for two areas of innovation. Firstly, it is directly involved in investment in scientific research in fields of national priority, and secondly, it serves as a link that connects academic research with industrial development. According to the Ministry, it strives to improve Israel's knowledge and research infrastructure, to maximize the benefit from the knowledge amassed by researchers at Israel's research institutions in order to facilitate research with the potential for realistic application. To achieve these goals, the Ministry runs nine central divisions: the Chief Scientist Office, the Science Infrastructure Program, the Israel Space Agency,

the Science and Community Department that includes eight regional research and development centers, International Scientific Relations, the National Council for Civil Research and Development, the National Council for the Advancement of Women in Science and the Administrative Headquarters (Ministry of Science and Technology, 2019).

The Israel Science Foundation is the main body supporting funding for basic science for a broad range of research topics within the institutions of higher education, research institutes and hospitals, including the exact sciences and technology, life sciences and medicine, humanities and social sciences (Israel Science Foundation, 2019).

Another main government program is Yozma (which means "initiative" in Hebrew), which is considered to be "the most successful and original program in Israel's relatively long history of innovation policy" (OECD, 2010). It invests in new venture capital fund, offering insurance covering 80% of the downside risk and giving the option to buy out the government's share at a discount within eight years. According to the group, Yozma is investing in technology fields that Israel has global leadership in. It is recognized as the creator of the Israeli venture capital industry (Yozma Group, 2019).

CONCLUSION

The research attempts to analyze the role of governments in the development of innovation, while looking at the Israeli policy of developing an advanced start-up environment. It brings up the question: what is needed for countries to build innovation advantages and be successful in a global world?

In investigating the question of what makes Israel a world leader in innovation, the study defines Israel as a leading example of the policy that promotes innovation by the government. Technological advantage has promoted its economy, which has grown more rapidly than most other advanced economies. It is one of the most innovative economies in the world, considered to be a Start-up Nation, and has a growing economy based on the combination of advanced technology and an active policy on the part of the government. Innovation is a key for global competition and Israel's high-tech industry is its main engine of growth. The country's technological advantage has promoted its economy, which has grown more rapidly than most other advanced

economies. As the research demonstrates, the Israeli experience proves that the government has a major role in advancing innovation and providing investments for new markets.

The research shows that the role of the Israeli government in technology is different than in other countries: although its policy is influenced by global trends, the Israeli government is deeply involved in the market and dictates the scope of technological advancement. As determined by this research, the success of Israel's innovation policy is the result of the active involvement of the government in directing the market and supporting technology and high-tech companies. The research shows that the combination of government policy, technology, globalization and secured economy is what makes Israel a leader in innovation. In particular, the role of the government is distinctive in the development of technology, its economy is open to globalization, and deregulation policies dominate the economy.

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