Journal of Business and Economics, ISSN 2155-7950, USA
August 2019, Volume 10, No. 8, pp. 742-750
DOI: 10.15341/jbe(2155-7950)/08.10.2019/005

http://www.academicstar.us

A Critical Contrast between Technology and Society in Israel

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Abstract: The effects of technological change are creating immense transformations in the way nations organize their competitive structure. The research looks at the impact and role of governments in technological development as a means to examine the state of each country in terms of technological advancement and global competition. Israel is a prime example of the domination of technology over society. The country's development is a product of the digital revolution and economic changes, which situate Israel as a developed country in terms of technology. The question that stands at the heart of this research is, based on the Israeli experience: how technology is changing society? In order to examine this, the research is looking at the impact of technological advancement and the role of the Israeli government in the development of technology. It examines the way Israel has developed to a "Start-Up Nation", with the largest number of start-up companies globally, second only to the USA.

Key words: technology; globalization; innovation; government; high-tech
JEL codes: O32

1. Introduction

Innovation is a major driver of productivity, economic growth and development, and countries are looking to boost productivity through investments in technology (Brand, 2017). As the world is changing, competition between countries accelerates, and the role of governments in technology development is critical. Governments today play a critical role in spurring innovation — actively creating new markets, instead of just fixing them, as public investments are critical in creating and shaping new markets (Mazzucato, 2015).

Understanding the role of governments in advancing technology is important since the most distinctive factor that differs between countries in modern times is their technological status (Larsson & Hallvard, 2011). In the industrial age, the role of governments in technological development and economic growth varied widely based on political and economic ideology (Stever & Muroyama, 1988), and much of the policy focused on the proper links between trade policy and technology policy (Siebert, 1997). In the information age policies must change to meet global competition, and governments must formulate national strategy for technology creation, acquisition, absorption and dissemination throughout the productive sectors of the economy (Islam, 2014).

In examining the state of countries in global competition, the two things that dominate our time are technology and globalization. If we look at countries around the world, importance is placed on how countries adjusted to the information age — how they are involved in the global economy and how they have adapted to the

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technological era (OECD, 2011). Looking all over the globe and examining competition between countries, we have developed countries, developing countries, and third world countries (Chaudhry & Garner, 2006). Realistically speaking, there are issues even in the most structured and organized developed countries, but the main concern here is, Israel, and the question under which category Israel does fall. Israel is in a unique situation, being a developed country in terms of technology and a developing country in all that relates to social issues.

Research of Israel is critical to understanding the distinction between developing and developed nations, since Israeli society is split in half: on one hand it is in the information era, while on the other hand it is still considered a developing country. Sales (2015) explains that while high-tech is improving, other sectors are not improving. This shows that Israel is composed of two economies: while it is leading the world in technological development, other sectors lag behind. Even though technology is important, it is only one-third of Israel's economy and therefore more than half of the economy is not advancing. Other sectors are left behind, as the issue of inequality and socio-economic differences among the different groups of the population is still relevant and disturbing (Dattel & Maor, 2015).

Israel can be considered a developed country in technological advancement. This is a key aspect of Israel, which has an advanced market economy in terms of life expectancy, education, per capita income and other human development index indicators (US News, 2017). Israel is a remarkable example of global competition, as high-tech development has been based on the performance of the country in the field of innovation (OECD, 2016). Still today, however, a duel structure defines Israel, since the most distinctive aspect of its development is the supremacy of technology on the one hand the development under government supervision on the other (Reuben, 2014; Kaplan, 2015).

To understand the way the duel structure of a start-up nation and a developing country is coming into play in Israel, the research attempts to analyze the means that have promoted Israel's global ranking in innovation and technology. The analysis include four major issues which make-up the Israeli success in becoming a Start-up Nation: the supremacy of technology, openness to the world and globalization of national policy, development of secured economy and the active role of the government in the development of technology.

2. Supremacy of Technology

The success of Israel in becoming a technology-developed nation is led by the policy adopted by the government, of concentrating on advanced technology. Israel is known as a "Start-up Nation", which means that its economic growth is stupendous and leading in high-tech worldwide (Reuben, 2014). It is considered one of the three leading countries in high-tech, with the largest number of start-up companies globally, second only to the USA. Aside from Silicon Valley, it has the highest concentration of high-tech companies in the world. Israel is a leading community for start-ups, entrepreneurs, investors, venture capitalists, angels, developers, researchers and recruiters, and a world leader in terms of research and development spending as a high percentage of the economy (Senor & Singer, 2009).

After the US and China, Israel has most companies listed on the NASDAQ stock exchange (McKenna, 2017). 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 & Lu, 2018).

The country has a highly developed technology sector. It produces more start-up companies than large, peaceful, and stable nations like Japan, China, India, Korea, Canada, and the United Kingdom. It has the highest density of tech start-ups in the world and they attract more venture capital dollars per person than any country — 2.5 times the U.S., 30 times Europe, 80 times India, and 300 times China (Senor & Singer, 2009).

Israeli scientists developed the first fully computerized, no-radiation, diagnostic instrumentation for breast cancer (Reuben, 2014). It is among the top five in space science and known for its innovations in the defense industry such as the first unmanned aerial vehicle (UAV) with real-time surveillance (Iron Dome) that blocks missiles attacks from Gaza. It is a world leader in terms of research and development spending as a percentage of the economy and in both the number of start-ups and engineers as a proportion of the population. Israel has almost 4,000 active technology start-ups — more than any other country outside the United States, according to Israel Venture Capital Research Centre (Ackerman, 2018).

A major factor in a developed country is a secured economy. This means that the economic structure must be growing and secure, meanwhile maintaining standards of living, education, consumer affairs (The World Bank, 2016). According to the Israeli Institute for Economic Planning (IEP), 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. Former Governor of the Bank of Israel, Karnit Flug, says that the Israeli economy is an open economy that is greatly influenced by developments abroad, which is reflected in growth rates in the economy, which are very much connected to those around the world. The influence of activity abroad is mainly reflected in global trade, which affects demand for Israeli exports, both in goods and in services (Flug, 2014).

One of the most important factors to the development of an economy alongside with technology is openness to the world and deregulation of financial a markets (Hina, 2015), and Israel`s success is based on the combination of highly developed technology sector and a successful a global oriented economy.

The Israeli economy is enjoying its 15th consecutive year of growth and remains resilient (Ackerman, 2018). OECD praises Israel`s efforts to cut regulation. The country removed most of the major foreign-currency restrictions for individuals and businesses before the turn of the century, enabling Israeli residents to invest abroad, thereby benefit from technology and globalization. According to the Bank of Israel (1998), all foreign-currency restrictions on households and the business sector were abolished. Since then, the policy of openness to the global economy market has been accelerated in encouraging innovation. According to the Israeli Ministry of Foreign Affairs (2016), to maintain and increase Israel's global leadership and intensify competition, the government established the National Authority for Technology and Innovation. In 2016, a five-year government program to simplify regulatory rules was approved (Temkin and Barkat, 2018). Recently the government unveils a program to slash regulation, and the Prime Minister's Office says its program of new measures to eliminate excessive government regulation will save the Israeli economy NIS 1.35 billion annually.

The policy initiated by the government demonstrates a strategic change and a broad mission to advance innovation. According to Prime Minister Benjamin Netanyahu, the government is committed to continue cutting excess regulation in order to take the Israeli economy to new levels of growth and prosperity (Barkat & Azulay, 2018). According to the Israeli Ministry of Foreign Affairs (2016), the government's innovation policy aims to link the innovation ecosystem to the public sector and to attract new employees from underrepresented groups of the population.

3. Human Resources

Another way of the government to develop the economy as part of a process of technological supremacy is in building human resources. According to the United Nations Commission on Science and Technology for Development (CSTD), science and technology, alongside trade, are the most powerful driving forces for achieving growth, poverty reduction and overall human (Baker and Sovacool, 2017). The success of Israel is to a large extent by following this policy. According to OECD figures, Israel spends more money on research and development as a proportion of its economy than any other country -4.25% of GDP against second place Korea's 4.23% (McKenna, 2017).

The combination of structural reforms and huge investments in R&D led to a high-tech boom. Israel operates in a global market and able to focus on expanding globally, leading the world in scientific research and technology (Economist, 2010). It is ranks in the top 20 nations in the world on the UN's Human Development Index, which places it in the category of "Very Highly Developed". According to former Governor of the Bank of Israel, Karnit Flug, the country is a leading community for start-ups, entrepreneurs, investors, venture capitalists, angels, developers, researchers and recruiters, and a world leader in terms of research and development spending as a percentage of the economy. It has a highly developed technology sector. Israel has the largest share of early-stage and seed venture capital funding in GDP among OECD countries (Flug, 2017).

The role of the Israeli government is particularly relevant as it is committed to increase support for scientific and technological advances (Economist, 2010). Science and technology is one of the country's most developed sectors. The percentage of Israelis engaged in scientific and technological inquiry, and the amount spent on research and development (R&D) in relation to gross domestic product (GDP), is the second highest in the world (Shamah, 2015). Around 35 percent of Israel's exports are technology-related and high-tech exports are valued at about $18.4bn a year, making up more than 45% of Israel's exports, according to the Central Bureau of Statistics (2017). Its military is one of the most technologically advanced in terms of medicine, civil drones, satellites, and self-driving cars. Ultrasound was also developed in Israel, along with advanced MRI and CT scans. Waze was an Israeli company, which was a major rival of Google Maps. Google eventually acquired the company for $1.15 billion in a massive bidding war against Apple and Facebook (Tiwari, 2017).

The role of venture capital is also very important. Israel attracts around two billion dollars a year in venture capital, the highest per capita in the world and more than Germany and France combined. The government has a large role through the Office of the Chief Scientist, which uses its annual budget of $450 million to offer up to 85 percent of seed funding for close to 200 incubated companies a year as well as support massive R&D projects from larger companies (Kilner, 2014).

Israel is a country with a strong entrepreneurial spirit (Wilfried Marshal Center, 2013). Former Governor of the Bank of Israel, Karnit Flug, explains that the strong points upon which economic growth has relied on due to a very high rate of people with post-secondary education, a very high level of research and development, which is carried out mainly by the private sector, and a high percentage of high technology industries in the economy (Flug, 2014).

Six Israelis have won the Nobel Prize for Chemistry. In 2004, biologists Avram Hershko and Aaron Ciechanover of the Technion — Israel Institute of Technology, were two of the three winners of the prize, for the discovery of ubiquitin-mediated protein degradation. In 2009, Ada Yonath was a co-winner of the prize for her studies of the structure and function of the ribosome. She is the first Israeli woman to win a Nobel Prize. Michael

Levitt and Arieh Warshel received the Nobel Prize in Chemistry in 2013 for the development of multi-scale models for complex chemical systems.

Another aspect of strength of the Israeli economy is related to security issues, as human resources are encouraged by government policy and the mandatory services in the army. According to the OECD (2018), Israeli military intelligence unit drives country's hi-tech boom. Israel`s security needs have promoted the role of the Israeli Defense Forces (IDF) and the compulsory service requirement allows the intelligence unit to choose the best people to serve in technology based and cyber intelligence units. The IDF is leading the world in security development and expertise, and serving in these units allows to develop leadership skills that can afterwards be applied to startup. Barnea (2016) explains that part of this culture is that the job needs to be done: don't worry about how the job is done, just get the job done. He explains that this approach trickles out into Israel's high-tech sector, where problem solving and fast innovation drive products to market. This anti-bureaucratic approach fuels innovation, as an IDF soldier serving and advancing in an IT unit controls a budget and operational responsibility equivalent to that of a mid-career IT executive twice his age employed by a US firm. As Google CEO Eric Schmidt explains: "Israel is booming in terms of entrepreneurship because you have a culture that allows you to challenge authority and question everything."

4. Active Role of the Government

As can be seen from the development of Israel`s technology sector, changes in telecommunications policy have been part of a global trend which led to a growing recognition of the need for wider regulatory changes. Here too, the role of the government is notable. The regulatory responses to both global and local forces endorsed a new market, with deregulation policies being a major factor in accounting for the convergence of new policy. However, the role of the government in technology in Israel is different than in other countries: although policy is influenced by global trends, the process has been moderate, with the main policy objectives being to maintain the role of the government in innovation policy.

Still, there are ups and downs to the adoption of technology and globalization as they are implemented in Israel. One of the most distinctive contrasts in the telecommunications market has always been the dilemma of policy-makers between technology and competition. Israel can also be considered a developing country because the government is strongly involved in the market. As a leading country in technology, Israel developed large and powerful companies based on the assumption that they would be capable of developing advanced services. The result of this policy however, is lack of competition, as the telecommunication system is dedicated to advance technology. The goal of developing a leading technology market required that the most influential role would be that of the government, and its supervision is dominating both public and commercial media and telecommunication services (Katz, 2009).

The aim of this policy is to upgrade telecommunications infrastructure by utilizing advanced technologies. According to this policy, the role of the government has been to create large telecommunication companies and maintain little and sometime no competition – under the assumption that there large corporations could concentrate on developing advanced technology, thus maintain Israel's leading technological position in the world. Amadeo (2018) explains that sometimes a monopoly is necessary to ensure consistent delivery of a product or service that has a very high up-front cost. Likewise, Israel's telecommunications network is highly developed, yet controlled by Bezeq, which is a monopoly in telephone and Internet services. Cable services are provided by

another national monopoly, Hot, which was required by the government to add telephone services, to compete with Bezeq. Today it offers a combined service of multi-channel television, telephone, Internet and cellular. Another monopoly is the multi-channel satellite service of YES, however this company is controlled by Bezeq. For many years only three cellular companies provided services, although today there are five national companies and a few virtual operators that maintain competition in the market. Similarly, there are virtual operators that provide telephone and Internet services over the infrastructure of Bezeq, although their market share is limited (Schuster, 2015).

As can be seen from this course, the development of Israeli telecommunications sector has been influenced global trends — which forced technological advancement and policy changes. Yet, a main reason for the supremacy of technology is the impact of local interest groups — which maintain the active role of the government. In trying to examine who is superior in that conflict — local interest forces or global policy that dictates free trade and openness to the world — we should consider one of the most important aspects of Israeli economy, as it is being dominated by monopolies. This alone can explain the complexity of government policy and intervention in the free market, since, as explained by Amadeo (2018), monopolies restrict free trade, prevent the market from setting prices and decrease incentive to innovate.

This aspect of the financial and social markets creates major differences in the role of the government in Israel in comparison to other developed countries. For example, although monopolies are not illegal in the United States, the Sherman Anti-Trust Act prevents them from using their power to gain advantages (Amadeo, 2018). It seems however, that the policy of the Israeli government challenges this conception, as the government's innovation policy aims at achieving broad national goals of encouraging growth of industrial companies and maintain technological innovation. According to the Ministry of Economy (2015), innovation became one of the main engines of growth for the Israeli economy and a source of national pride.

5. Conclusion

The conclusion from this analysis is that the Israeli government is deeply involved in the market and dictates the scope of technological advancement. Although this policy is different from policies of developed countries, which encourage free trade and allow the market to dictate policy, the question that examined here is if the Israeli model of government policy is not more suitable for global completion between countries.

The research attempts to analyze the role of governments in the development of technology, 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 comparative advantages and be successful in a global world?

The combination and contradictions of three main aspects establish the conclusions of this research. Firstly, in technological terms, Israel is a Start-up Nation, which has technology gap between segments of society. Secondly, in policy issues, the role of the government is distinctive in the development of technology and society. Thirdly, openness to globalization and deregulation policies advance the economy, which is growing rapidly through the combination of advanced technology and an active policy on the part of the government.

Israel is a leading example of the policy that promotes innovation by the government. It has defined scientific and technological policies aimed at enhancing its competitive position, establishing centers of excellence around outstanding scientists and maintain high performance of technology development. According to the World Economic Forum for competitiveness, Israel is one of the most innovative economies in the world. Ranking high

in the field of innovation while maintain global leadership in technological development is a result of its continued growth of the economy and the active role of the government. This is the special role of the Israeli government, and, as determined by the research, the main reason that the country has become a world leader in technology.

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