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THE KNOWLEDGE-BASED ECONOMY THE ISRAELI EXAMPLE AND ITS IMPLICATION IN SLOVAKIA

Master Thesis

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FACULTY OF NATIONAL ECONOMY

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Affidavit

I hereby declare that this master thesis has been written only by the undersigned and without any assistance from third parties.

Furthermore, I confirm that no sources have been used in the preparation of this thesis other than those indicated in the thesis itself.

Bratislava, 30th April 2015: .....

Signature

"O God, give us the serenity to accept what cannot be changed,

The courage to change what can be changed,

And the wisdom to know the one from the other."

Serenity Prayer
Reinhold Niebuhr

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ABSTRACT

MINÁRIKOVÁ, Katarína: Knowledge-based Economy, the Israeli example and its implication in Slovakia. – University of Economics in Bratislava. Faculty of National Economy; Department of Economics. Ing. Marcel Novák, PhD. – Bratislava: NHF EU, 2015, 74 p.

Main purpose of this master thesis is to show how successfully implemented policies can help a country to became modern knowledge-based economy. As a model country was chosen Israel. The thesis is divided into three chapters and contains 12 graphs, 3 figures, 2 tables and 1 picture that visually explain the problematic. The thesis is divided into three parts. First part deals with theoretical aspects of knowledge-based economy. It describes different view on definition of KBE and characterized the main pillars of KBE. The first chapter contains also comparison of Slovak and Israeli economies and KBE determinants for better understanding why Israel has been chosen as a model country. The second part of thesis defines goal of the thesis and methodology which has been used. The third, last part, of the thesis is focus on main policies that Israel has made in order to become knowledge-based economy. Policies supporting entrepreneurship, inflow of venture capital, development of human capital and innovations are deeply analyzed. The result of the thesis is brief proposition of main strategies Slovakia could implement in order to move more effectively to developed knowledge-based economy.

Key words:

Knowledge-based economy; Israel; Technological Incubators; Innovations; Start-up; entrepreneurship; human capital development.

ABSTRAKT

MINÁRIKOVÁ, Katarína: Znalostná ekonomika, príklad Izraela a jeho implikácie pre Slovensko – Ekonomická univerzita v Bratislave. Národohospodárska fakulta; Katedra ekonomickej teórie. – Ing. Marcel Novák, PhD. – Bratislava: NHF EU, 2015, 74 s.

Cieľom záverečnej práce je ukázať ako krajine môžu pomôcť úspešne zavedené hospodárske politiky k tomu, aby sa stala modernou znalostnou ekonomikou. Ako modelová krajina bol zvolený Izrael. Diplomová práca je rozdelená do troch kapitol a pre lepšie znázornenie problematiky obsahuje 12 grafov, 3 schémy, 2 tabuľky a jeden obrázok. Prvá časť pojednáva o teoretických aspektoch znalostnej ekonomiky. Popisuje rôzne pohľady na definíciu znalostnej ekonomiky a charakterizuje hlavné stĺpy znalostnej ekonomiky. Prvá kapitola taktiež obsahuje podrobnú komparáciu slovenskej a izraelskej ekonomiky pre lepšie vysvetlenie, prečo bol práve Izrael vybraný ako vzorový model. Druhá časť práce definuje cieľ diplomovej práce a metodológiu, ktorá bola v práci použitá. Tretia, posledná časť, je zameraná na analýzu politík, ktoré Izrael zaviedol, a ktoré mu pomohli stať sa znalostnou ekonomikou. Opatrenia zavedené na podporu podnikateľského prostredia, prílivu rizikového kapitálu a rozvoju inovácií sú hlbšie analyzované. Výsledkom diplomovej práce je návrh stratégie, ktoré by malo Slovensko implementovať do svojich politík, aby sa stalo rozvinutou ekonomickou založenou na znalostiach.

Kľúčové slová:

Znalostná ekonomika; Izrael; Technologické inkubátory; Inovácie; Start-upy; Podnikanie; Rozvoj ľudského kapitálu.

Contents

LIST OF GRAPHS, FIGURES, PICTURES AND TABLES

LIST OF ABBREVIATIONS

OECD	Organization for Economic Co-operation and Development
ICT	Information and communication technology (I.C.T.)
KBE	Knowledge-based economy
KBI	Knowledge-based industry
APEC	Asia Pacific economies
FDI	Foreign direct investments
ADB	Asian Development Bank
GDP	Gross Domestic Products
GNP	Gross National Product
SME	Small and Middle-sized Enterprise
OCS	Office of the Chief Scientist in the Ministry of Industry and Trade in Israel
PTIP	The Public Technological incubator Program
R&D	Research and Development
IDF	Israel Defense Forces
SAEF	Slovak-American Entrepreneurs Fund
SLOVCA	Slovak Venture Capital and Private Equity Association

INTRODUCTION

Statement of the Problem

Since the 19th century the world has been dramatically changing. Firstly, it was the industrial revolution that brought rapid economic growth and increase in quality of people´s lives. Secondly, the invention of computer and network technologies such as the Internet completely changed the speed of information flow and they become another driving force changing the form of the economy of a nation. New technologies enable collaboration in additional modes. However, these processes make the actors increasingly interdependent in terms of the information exchange. We live in a "post-industrial" society, where the system is no longer local, but global and based on knowledge.

The knowledge is now recognized as the driver of productivity and economic growth, leading to a new focus on the role of information, technology and learning in economic performance. There are huge differences between the old industrial economy and new knowledge economy. The development of markets in old industrial economy was steady and linear, quite predictable, while in knowledge economy it´s volatile – extremely fast changing, fast and unpredictable. Economy drivers are innovative entrepreneurial knowledge-based firms, while in industrial economy this role had large industrial firms. Financial capital was the scarcest resource in the old industry economy. Employees must have been skilled in one task and must have filled in a standardized system. In the knowledge-based economy (KBE), the scarcest resource is human capital and organizations are opportunity-driven with dynamic strategy. Employees must be able of self-leadership, must be flexible, multi-skilled and able to continuously learn. The innovation process must be continues. In industrial economy the competitive advantage was access to raw materials, cost reduction through economies of scale and cheap labor. In knowledge economy it is distinctive capabilities, institutional excellence, moving with speed, human resources and customer partnerships.

Each and every country that wants to grow and compete in the international market must be knowledge based and move towards fully developed KBE. The process of change from industrial economy to KBE economy can be speed up in sufficient environment that supports innovations and entrepreneurship. Government plays an important role in the process of transformation of the national economy. Therefore the economic policies of the state must be wisely set up and implemented.

I chose this topic because I have passion for innovations, change and I love to see improvements. I love the country I was born in and I see huge potential in Slovakia which is not fully used and the development of KBE in Slovakia could be better if just few thinks will change. According to EU Innovation Scoreboard, Slovakia belongs to moderate innovators and was on 21st place in 2014 behind Hungary and Czech Republic.[1] Slovakia is internationally known as a country with strong automotive industry and relatively cheap and skilled work force. However, with the changing global environment, Slovakia needs to find new ways how to compete on international markets and accelerate its knowledge potential.

I was really excited when I read about Israel and its achievements regarding to KBE. Israel is as small country as Slovakia, has many enemies and can rely only on its own. The progression Israel made in last 20 years is spectacular. Slovakia is a similar case as Israel. It has been many times underestimated because of its small size and few people. We Slovaks often see ourselves as deficient and meaningless in the EU. However, also a small nation can achieve huge things. Slovak economic growth is one of the highest within the last years in the EU and there are several Slovak entrepreneurs who has achieved on the international markets. In the times when the EU is shaking and it is not clear what will happen with "less-prominent" countries, Slovakia should step up and take its destiny into its own hands. Therefore this master thesis is analyzing successful policies that were implemented in Israel and tries to propose a brief strategy that could Slovakia implement in order to move more efficiently towards the KBE.

[1] EUROPEAN COMMISSION. European Innovation Scoreboard. [online]. 2014. [cit. 2015.04.06] at: http://ec.europa.eu/enterprise/policies/innovation/files/ius/ius-2014_en.pdf.

PART I: ACTUAL STATUS OF SOLVED ISSUES

1 SCOPE AND DEFINITION OF KNOWLEDGE BASED ECONOMY

Over the past several decades the leading edge industries within developed countries has become driven by technologies based on knowledge and information production. It is neither the physical inputs nor natural resources the economy depends on. The key component of the economy is a greater reliance on intellectual capabilities.

Since the word *knowledge-based economy* also cited as a *knowledge economy* is rather a broad and complex term and needs a deep explanation. The OECD defines the knowledge-based economy as following: "*The knowledge based economy is an expression coined to describe trends in advanced economies towards greater dependence on knowledge, information and high skill levels, and the increasing need for ready access to all of these by the business and public sectors*".[2] This definition is quite broad and some of the critics, for example Keith Smith[3] argue, that the definition is rhetorical rather than practical. The literature does not even give a clear explanation what *knowledge* is. At one extreme, knowledge requires a transformative internalizing of some new principle, and at the other it simply involves accessing an intelligible account of how to do something.[4]

Smith defined four basic views about the changed significance of knowledge:

- Knowledge is quantitatively and in some sense also qualitatively more important than before as an input,
- Knowledge is in some way more important as a product (trading knowledge products),
- Codified knowledge is in some ways more significant as component of economically relevant knowledge bases,

[2] OECD, 2005, "The Measurement of Scientific and Technological Activities: Guidelines for Collecting and Interpreting Innovation Data: Oslo Manual, Third Edition" prepared by the Working Party of National Experts on Scientific and Technology Indicators, OECD, Paris, pp. 71.

[3] **Dr Smith** is Senior Research Fellow at Imperial Colledge London. Dr. Smith conduct research focus mainly on innovation, low-tech industries, innovation policies and indicators.

[4] SMITH, K. 2002. What is the „Knowledge Economy"? Knowledge Intesity and Distributed Knowledge Bases. UNUPINTECH Discussion Papers. 2002-06. ISSN 1564-8370.

- The knowledge economy rests on technological changes in information and communications technology.

Some other definitions refer to KBE as following:

"*The knowledge society is a larger concept that just an increased commitment to R&D. It covers every aspect of the contemporary economy where knowledge is at the heart of value added – from high tech manufacturing and ICTs through knowledge intensive services to the overtly creative industries such as media and architecture*"(Kok Report, 2004).

"*Economic success is increasingly based on upon the effective utilization of intangible assets such as knowledge, skills and innovative potential as the key resource for competitive advantage. The term "knowledge economy" is used to describe this emerging economic structure*" (ESRC, 2005).

To summarize, KBE is characterized by high and growing intensity of ICT usage by well-educated workers. It is present in all sectors of economy and consists of innovating organizations.

1.1 MEASURING OF KNOWLEDGE-BASED ECONOMY

The definitions of KBE has been criticized for many years because of it abstractness. There have been intrinsic difficulties in quantifying knowledge and lack of indicators a country can be benchmarked. This has led to many methodological concerns regarding the measurement of KBE. Almost every international institution has proposed different measurement framework.

In 1996 the OECD introduced so called "Main Science and Technology Indicators".[5] This methodology is based on several indicators that need to be measured:

- *Measuring* knowledge *inputs*

The knowledge inputs standardized by the OECD are: 1) expenditures on research and development, 2) employment of engineers and technical personnel, 3) patents and 4) international balances of payments for technology.

[5] OECD. The Knowledge Based Economy. [online]. 1996. [cit. 2015.01.06] at: http://www.zeromillion.-com/entrepreneurship/developing-nations.html.

- *Measuring knowledge stocks and flows*

Knowledge flows don´t always involve money at all. That makes the measuring really challenging. It can be measured by embodied or disembodied diffusion, introduction into production process of machinery, incorporate new technology, technical expertise or technology in the form of patents, know-how. Stock of knowledge capital (R&D*)* can be estimated on annual increases in researchers in particular field.

- *Measuring knowledge outputs*

Rough indicators have been developed which translate certain knowledge inputs into knowledge outputs. For example, maintaining a classification of high-technology, medium-technology and low-technology manufacturing sectors based on their relative R&D expenditures.

- *Measuring knowledge networks*

The ability of countries and systems to distribute knowledge among different actors and institutions. Such indicators of knowledge creation and distribution are proceeding at the level of the individual firm through the vehicle of innovation surveys.

- *Measuring knowledge and learning*

Reflects the efficiency and equity of education and training. The impact of education expenditure and attainment levels in society at large on economic growth is measured. Close attention is also paid to changes in human skills and competencies at the individual or firm level.

Because measurement of all these indicators would be too challenging, the OECD released the two-year Growth Project report, *The New Economy: beyond the Hype*,[6] was released in middle 2001. The report emphasized the importance of a stable and open macro-economic environment with effectively functioning markets; the diffusion of ICT; fostering innovation; investing in human capital; and stimulating firm creation.

The Asia Pacific Economies (APEC) countries developed mythical economy called *Nikuda.*[7] It represents fully developed and idealized KBE and examines the economies

[6] OECD. The New Economy: beyond the Hype. [online]. 2001. [cit. 2015.01.07] at: http://www.oecd.org/economy/growth/2380634.pdf.

[7] APEC. Towards Knowledge-Based Economis in Apec. [online]. 2000. [cit. 2015.01.06] at: http://publications.apec.org/publication-detail.php?pub_id=675.

within four dimensions (Human resource development, Innovation system, ICT infrastructure and Business environment).

The European Commission introduced the European Innovation Scoreboard.[8] It provides a comparative assessment of the research and innovation performance of the EU Member States and the relative strengths and weaknesses of their research and innovation systems.

The World Bank Institute launched in 1999 a project called Knowledge for Development (K4D). Its aim is to raise awareness among policymakers about the effect of knowledge. The World Bank proposed the *Knowledge Assessment Methodology*[9] (KAM) for measuring the knowledge development.

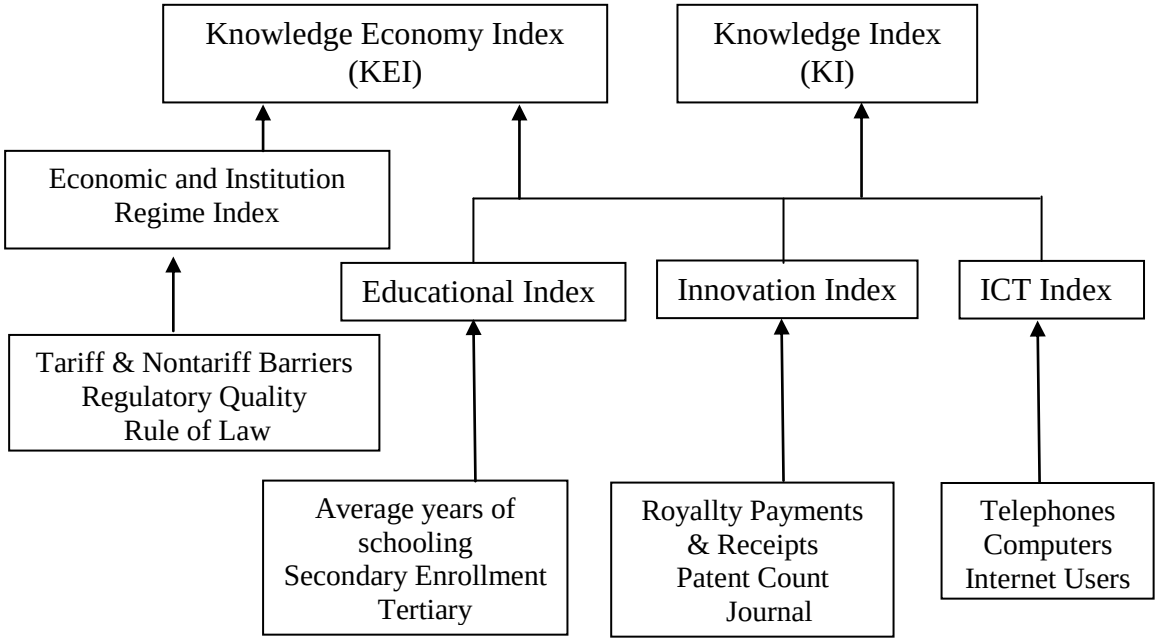
The KAM consist of 148 structural and qualitative variables for 146 countries to measure theirs performance on the four Knowledge Economy pillars: 1) Economic Incentive and Institutional, 2) Education, 3) Innovation and 4) Information and Communications Technologies.

The KAM Knowledge Index measures a country's ability to generate, adopt and diffuse knowledge. This is an indication of the overall potential for knowledge development in a given country. Methodologically, the KI is the simple average of the normalized performance scores of a country or region on the key variables in three of the knowledge economy pillars – education and human resources, the innovation system and ICT. The Knowledge Economy Index takes into account whether the environment is conducive for knowledge to be used effectively for economic development. It is an aggregate index that represents the overall level of development of a country or region in relation to the knowledge economy.

[8] EUROPEAN COMMISSION. European Innovation Scoreboard. [online]. 2014. [cit. 2015.01.06] at: http://ec.europa.eu/enterprise/policies/innovation/policy/innovation-scoreboard/index_en.htm.

[9] WORLD BANK. Knowledge Economy Index. [online]. 2012. [cit. 2015.01.06] at: http://info.worldbank.org/etools/kam2/KAM_page5.asp.

Figure 1: Knowledge Economy Index (KEI) and the Knowledge Index (KI)



Source: www.worldbank.sk

1.2 PILLARS OF KNOWLEDGE-BASED ECONOMY[10]

When describing pillar of KBE, we can refer either to APEC, OECD or to the World Bank´s pillars. At the end, all methodologies share the same pillars, although different methodologies use different terms: 1) Business environment, 2) human capital, 3) innovation system and 4) information and connection technology infrastructure.

Business environment – economic and institution regime

The KBE can flourish only in suitable economic environment with an appropriate leadership that supports enterprises, innovation and new ideas. The government plays very important role and requires new mindset. The role of government is to adapt to the needs of the new economy. That means to provide the essential economic and institutional framework and encourage investments in knowledge, innovation, and new technologies with appropriate incentives.

Experiences in developed countries show a strong correlation between state governing and per capita income. Economic incentives in form of good tax laws, financial

[10] APEC. 2000. Towards knowledge-Based Economies in APEC. [online]. 2014. [cit. 2015.01.10.] at:http://publications.apec.org/filedownload.php?filename=00_ec_knowledgebased.pdf&id=675.

initiatives and flexible intellectual property regulative creates a more *competitive business environment* and is important for creation and accumulation of new knowledge. Competitive business environment makes pressure to create new products and services and incorporate knowledge to beat the competitors. Important role of government is also encouraging interaction and cooperation among researchers in different institutions, disciplines and industries. The business environment should also *attract investments* that mainly go into the knowledge base and the associated infrastructure. That requires fair regulatory policies for business, transparency of government, accepted rule of law, low inflation and interest rates.

Knowledge-based Industries

Within the KBE all industries are to some extend knowledge-based industries (KBI). A substantial proportion of its total costs of production lie in research and development and design. Most primary and conventional industries such as agriculture, mining, ceramics, textiles, and electronics must become strongly knowledge-based. It is natural that some of the "high technology" industries are more essential to a KBE than others. However, essentiality of ICT services as part of the infrastructure of a KBI has been repeatedly emphasized.

Openness

Good ideas doesn´t know boarders. It is essential for KBE to be open to new ideas, especially from outside. That means also openness to new people – immigrants and "outsiders". Experiences shows that multicultural companies with diverse staff are more innovative and don´t stuck in their routine. Each KBE economy aims to build international networks of complementary skills, analogous to those between firms, with an emphasis on communication and knowledge transfer rather than simply on price competitiveness. Foreign direct investment (FDI) can be an indicator of openness and confidence in the capacity of an economy to produce a return on investment. However, while FDI may bring in new technology and knowledge, the presence of FDI does not necessarily imply a KBE. The FDI must be accelerator to modern economy. An indicator of economic prosperity and openness is trade proportions of its GDP. Openness to trade in both directions tends to be associated with the openness to new ideas, innovations and implementation of technologies.

Human capital – Education

Without skilled and capable people, the knowledge will not be fully assimilated. Therefore the human capital is ranked as the most important in KBE. The knowledge base in KBE is much wider than simply scientific and technological information. For big organization and corporations is very essential knowledge about the human aspects of an organization – good management practice, leadership. There is a need not only for hard science, but also the "social science". Language skills are obviously necessary for working in international environment.

Lifelong Learning

KBE requires process of lifelong learning. Because of innovation, development and new technologies it is necessary for each person to educate themselves all the time. The formal education focuses not only on basic proficiencies of reading, writing and arithmetic but also on ICT, modern technologies and computers. The purpose of education has also changed. Facts are no longer the key form of knowledge – not least because new knowledge is continually arising. The key forms of knowledge for a person in a KBE are knowing how to access what information one needs for a particular task, where to find it, knowing how to do so and most importantly knowing how to use the information to solve complex problems. There is also increase in the importance of informal education, as online courses, informal institutions courses. That cause knowledge does not depend on formal educational institutions.

Knowledge Workers

Knowledge workers are workers whose main capital is knowledge. Typical examples may include software engineers, doctors, architects, engineers, scientists, public accountants, lawyers, and academics, whose job is to "think for a living".[11] In a fully developed KBE, the proportion of workers primarily engaged in information work would be well over 50%.

Since for most economies, the national knowledge base is the key to sustaining its national wealth. Therefore investment in learning through schooling, initial post-secondary

[11] Thomas H. (2005). Thinking For A Living: How to Get Better Performance and Results From Knowledge Workers. Boston: Harvard Business School Press. ISBN 1-59139-423-6.

education, and subsequent lifelong learning mechanisms is a precondition for a KBE. A major responsibility of government is to ensure that such services are in place.

Innovation system

The capitalist system has been characterized by numerous economist and business analysts as a process of creative destruction, in which new improved products continually supersede the older versions. In a competitive market environment the competitor firms always strive to take over one´s market, create new products or whole new markets.

It is difficult to find a common definition of word innovation. Joseph Schumpeter defined economic innovation in "The Theory of Economic Development" (1912)[12] as following:

- The *introduction* of a new good — that is one with which consumers are not yet familiar — or of a new quality of a good.
- The introduction of an improved or better method of production, which need by no means be founded upon a discovery scientifically new, and can also exist in a better way of handling a commodity commercially.
- The opening of a new market that is a market into which the particular branch of manufacture of the country in question has not previously entered, whether or not this market has existed before.
- The conquest of a new source of supply of raw materials or half-manufactured goods, again irrespective of whether this source already exists or whether it has first to be created.
- The carrying out of the better organization of any industry, like the creation of a monopoly position or the breaking up of a monopoly position

However, since the beginning of 20th century the view on the innovation has changed. The OECD notes that innovation does not refer only to new goods production and new markets and goes far beyond R&D. In 1994 was innovation defined in by three authors Carmel Maguire; Edward J. Kazlauskas; Anthony D. Weir in their publication called „Information Services for Innovative Organizations“. They refer to innovation as *the application in any organization of ideas new to it, whether they are embodied in products,*

[12] SCHUMPETER, J.A. 1934, Theory of economic development: an inquiry into profits, capital, credit, interest and the business cycle, Harvard Economic Studies, Vol. 46, Harvard Colledge, Cambridge, MA.

processes, services, or in the systems of management and marketing through which the organization operates.[13] The Oslo Manual for measuring innovation[14] defines four types of innovation: *product* innovation, *process* innovation, *marketing* innovation and *organizational* innovation. Other publications define also *strategy* innovation, *technology* innovation, *process* innovation. The latest term connected to innovation is *social* innovation.[15]

Firms in KBE

Successful firms in a KBE have a culture that encourages knowledge-sharing within the firm, so that the different parts do not operate in isolation. Sometimes some of the best ideas come from customers and suppliers. The most successful firms in a KBE have systematically transformed themselves into "learning organizations". They have put in place structures that not only effectively gather and process codified information, but also tap the tacit knowledge, including the process, successful organizations, including the insights and intuitions, of workers.

Technology Diffusion

Knowledge cannot be held in isolated pocket, if the whole economy wants to benefit. In healthy KBE, much knowledge spread between firms, public research centers and firms, and across distance and disciplinary boundaries. The spillover of knowledge does not happen automatically. Often, the government uses research support to promote potentially beneficial linkages between scientific and engineering workers in different industries and in government, industry and academia.

ICT infrastructure

Communication is of the essence in the process of technology diffusion. The new ICT have the capacity to connect people all around the world and spread the knowledge –

[13] MaRGUIRE, KaZLAUSKAS, WEIR. 1994. Information Services for Innovative Organizations. Academic Press Inc. 1994. 336 pp. ISBN10:0124650309.
[14] EUROSTAT. 2005. Oslo manual: Guedelines for Collecting and Interpreting Innovation Data. European commission. 163 pp. ISBN: 978-92-64-01308-3.
[15] **Social innovations** are innovations that are social in both their ends and their means – new ideas (products, services and models) that simultaneously meet social needs (more effectively than alternatives) and create new social relationships or collaborations. They are innovations that are not only good for society but also enhance society's capacity to act. Social innovations take place across boundaries between the public sector, the private sector, the third sector and the household.

that is one of the most important reasons why the knowledge has been spread so fast during the last years. Thus a precondition for a KBE is an effective communications infrastructure, to which all citizens have access at reasonable cost.

It is standard that every information worker has a telephone and computer on his or her desk, capable of reliable, high-speed, external communication. And beyond that, every citizen has easy and cheap access to such facilities, for example, through communal facilities such as telecentres, access centres, or public libraries. Advanced information systems bring down the cost of information, facilitate access to wider pools of information, and promote the spread of ideas.

Another example of the power of ICT is electronic commerce (e-commerce). Electronic commerce provides additional tools for improving the efficiency and profitability of business transactions by making them through ICT networks. It enables new form of transactions to take place, formation of virtual firms and factories and new arrangements of work, production, shopping and education.

1.3 SUPPORT OF KNOWLEDGE-BASED ECONOMY

Countries all around the world realize they need to move forward KBE in order to increase their income and prosperity. The main responsibility of the government is to create an environment that supports innovations and knowledge-spreading. Different countries use different incentives in order to do so.

All OECD economies are in more or bigger extend developed KBEs. According to Steven White, the US became KBE in 1997 when 50.74 percent of all U.S. services exports consisted of knowledge-based services.[16] The USA had predisposition to be one of the first KBE thanks huge support of free market and competitiveness which accelerated development of new technologies, innovations and supported creativity among people.

The European Union launched in 2010 strategy Europe 2020. The main goal of this strategy is to deliver growth that is: *smart*, through more effective investments in education, research and innovation; *sustainable*, thanks to a decisive move towards a low-carbon economy; and *inclusive*, with a strong emphasis on job creation and poverty reduction.[17] The strategy focuses on five ambitious goals:[18]

[16] WHITE, S. The Foundation of the U.S. Knowledge-Based Economy. [online]. 2012. [cit. 2015.01.10.] at: http://dstevenwhite.com/2012/05/28/the-foundation-of-the-u-s-knowledge-based-economy/.
[17]EUROPEAN COMMISSION: Europe 2020. [online]. 2010. [cit. 2015.01.10.] at: http://ec.europa.eu/europe2020/index_en.htm.

- *Employment* – 75% of the 20 – 64 year-olds to be employed,
- *R&D* – 3% of the EU´s GDP to be invested in R&D
- *Climate change and energy sustainability* – 20% of energy from renewables, 20% increase in energy efficiency and greenhouse gas emissions 20% lower than in 1990,
- *Education* – at least 40% of 30 – 34 years-olds completing third level education and reducing the rates of early school leaving below 10%,
- *Fighting poverty and social exclusion* – at least 20 million fewer people in or at risk of poverty and social exclusion.

To fulfill these targets, the European Commission announced main initiatives that are support by the EU budget. The member states are obligated to meet their goals and promote the agenda within the country.

In 2013 Australia launched new Economic reform[19] focused on more competitive and productive Australia. The reform priorities should help to build a KBE on its four principles.

Also countries which are not part of OECD group work toward more innovative and knowledge-based approaches in their economy. Asian development Bank encourages their member states to advance their policies toward more developed KBE in a study called *Innovative Asia: Advancing the Knowledge-Based Economy.*[20] United Arab Emirates launched in 2010 Vision 2021. One of its priorities is more competitive knowledge economy.[21] The strategy focuses on development of non-oil real GDP growth, support of SMEs, innovation, knowledge workers etc.

2 ISRAEL AND SLOVAKIA COMPARISION

For purposes of this master thesis we chose Israel as a model country to show how a backward economy can successfully move towards KBE within two decades and take a lead in the innovation industry around the world. According to Bloomberg, Israel is the 5th

[18] EUROPEAN COMMISSION.. A strategy for smart, sustainable and inclusive growth. [online]. 2010. [cit. 2015.01.10.] at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF.
[19] CPA AUSTRALIA: [online]. 2010. [cit. 2015.01.10.] at: Australias economic reform priorities. http://www.cpaaustralia.com.au/documents/reformpriorities.pdf..
[20] ASIAN DEVELOPMENT BANK. Innovative Asia: advancing the Knowledge-Based Economy. [online]. 2010. [cit. 2015.01.10.] at: http://adb.org/sites/default/files/pub/2014/innovative-asia-knowledge-based-economy.pdf.
[21] VISION 2021. [online]. 2010. [cit. 2015.01.10.] at: http://www.vision2021.ae/en/national-priority-areas/competitive-knowledge-economy.

most Innovating country in the world in 2015[22]. There are many countries that are ranked higher by World Bank´s KAM index as Israel.[23] However the main purpose of this thesis is neither to describe the best working KBEs in the world, nor to focus on economies that have significantly different background than Slovak economy. We chose Israel because of its similar demographic and macroeconomic characteristics to Slovakia. To strengthen the arguments about the choice of the country, we would like to highlight the commons between Slovak republic and Israel. Firstly, we are comparing their geographic and macroeconomic environments and macroeconomic characteristics to see their similarities. Secondly we are comparing the performance in KBE pillars in order to examine development of their KBE.

2.1 MACROECONOMY

Historic Facts

Israel and Slovakia are *relatively young countries* – on 14th May 1948 Israel proclaimed its independence and in 1979 gained all the territories owned today. Slovak republic was born on 1st of January 1993. Both countries had to *deal with devastated economy* – in 1948 when the Israeli state was proclaimed, no infrastructure, economy sectors, or functioning agriculture existed. Everything must have been built from the beginning. Because the country was born by difficult political and economic circumstances, Israeli government centralized all the power in their hands. The Israeli economy was centralized, closed with high government spending. Slovakia was similar case regarding centralization. For half century together with Czech Republic, Czechoslovakia was part of Soviet Union. The move forward market oriented economy started with the born of the Slovak state. The economic reorientation happened quite suddenly and Slovakia lost almost all of its export markets and started from beginning.

Demography

Both countries are comparable in terms of size and also population: Israel with population of 8.2 mil. and area 20.770 km^2, Slovakia with population of 5.4 mil. and area 49.036 km^2. However, comparing the life expectancy, there is 6 years difference between

[22]BLOOMBERG. The Bloomberg Innovation Index. http://www.bloomberg.com/graphics/2015-innovative-countries/.
[23] In 2012 Israel was ranked 25th and Slovakia 33rd in KEI index.

the countries (82 years in Israel and 76 years in Slovakia, the OECD average is 79.7 years).[24] In this indicator, Israel is performing better.

Accession to international organizations

Both countries are members of the United Nations, The International Monetary Fund, The World Bank, The World Trade Organization. Slovakia accessed the OECD in 2000, Israel in 2010. Slovakia is moreover member of the European Union (2004), Schengen Area (2007) and Eurozone (2009).

Export oriented

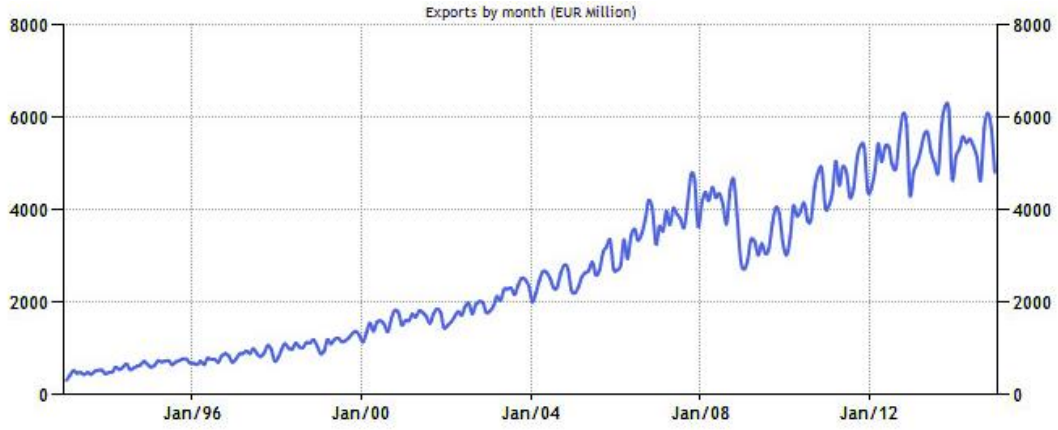
Both economies are strongly export oriented. There are several reasons for that: Firstly, as we have already mentioned, Israel and Slovakia are small-sized economies. Their domestic demand is not able to absorb all the supply. Therefore, if the production should be optimized and effective they need external demand. Secondly, the natural resources of both countries are limited. Because of that both countries needed to find their comparative advantage in other than natural resources when trading with the world. Thirdly, there is a high number of foreign investors in both countries. In Slovakia, strong inflow of FDI was marked between 2001 and 2008. The FDI inflow into new green-field projects was dominantly export oriented: the massive investments did not come to Slovakia in order to sell on its domestic market, but to utilize Slovakia´s advantages, especially its location and the good qualifications-to-cost ratio of the labor force, for the establishment of the new export-oriented facilities.[25]

Case of Israel is quite similar. The FDI inflows are caused mainly by manpower, but rather highly qualified manpower, particularly in engineering.[26] Slovakia´s main export commodities are: machinery and electrical equipment, cars, base metals and minerals. Main export partners are Germany 22.4%, Czech Republic 14.6%, Poland 8.6%, Hungary 7.8%, Austria 7.1%, France 5.6%. The value of Slovak export in 2013 represented EUR 55.03 mld.[27] Israeli exports comprise machinery and equipment, software, cut diamonds,

[24] World Bank Statistics, 2012.
[25] Liptakova, J. Exports are key to economic growth. Slovak SPECTATOR. 2014. http://spectator.sme.sk/c/20049697/exports-are-key-to-economic-growth.html.
[26]SANTANDER Israel: foreign investments. https://en.santandertrade.com/establish-overseas/israel/foreign-investment.
[27]INDEX MUNDI. Slovak Republic Profile. [online]. 2015. [cit. 2015.02.15] at: http://www.indexmundi.com/slovakia/economy_profile.html.

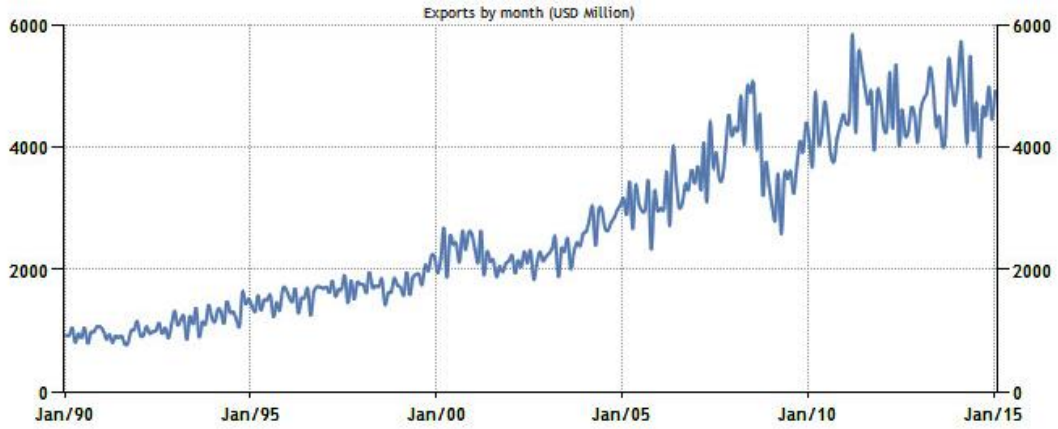
agricultural products, chemicals and textiles and goes mainly to US 27.8%, Hong Kong 7.7%, UK 5.7%, Belgium 4.6%, China 4.3%. The total value of Israeli export in 2013 was $60.67 mld. On the chart below, we can see progress in export in both countries from the beginning of 90s. We can see that during the last 20 years, the countries have significantly opened their economy to the world.

Graph 1: Slovak export



Source: www.tradingeconomics.com

Graph 2: Israeli export



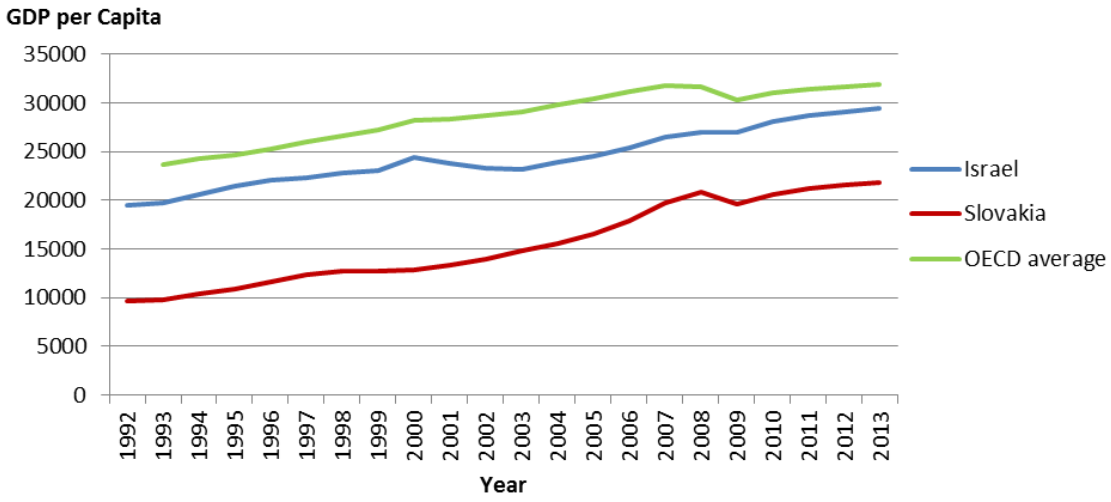
Source: www.tradingeconomics.com

Gross Domestic Product

Gross Domestic Product (GDP) is considered as the most important macroeconomic characteristic when comparing two countries. Even though Israel´s GDP per capita (USD 32,524.7 in 2013) rate is higher than Slovak GDP per capita (USD

26,498.5 in 2013), both countries are steadily growing. From the chart we can observe that Israel was performing better than Slovakia during the financial crisis.

Graph 3: GDP per capita in Slovakia and Israel
(in USD)



Source: www.stats.oecd.org

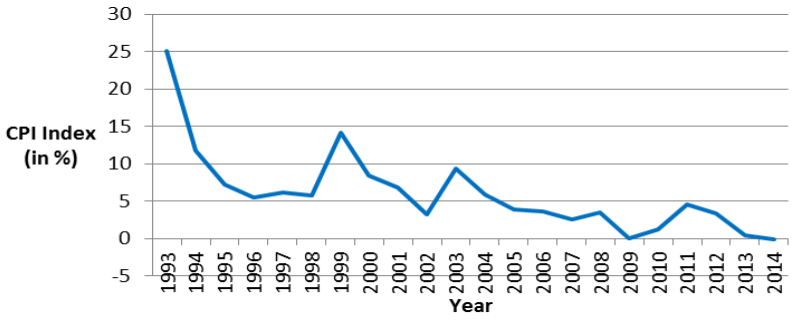
There are two main reasons cited to explain Israel´s good position during the crises:[28] 1) *Conservative banking sector and strong monetary policy* – Bank of Israel implemented policy that was very close to a classic Keynesian spending policy – cutting its deficit during the good times before the meltdown, and then letting it grow when the economy went south.[29] The important fact is also that the Israeli banks are not widely engaged in cross border business. Overseas assets and liabilities amount to 10% and 14% of total output respectively.[30] 2) *Labor´s market elasticity* - Major players in the labor market and labor federations understood the need of the early short-term pay cuts and rise of unemployment during the early stages of the crisis. As the economy recuperated over the course of 2009, wages and employment quickly returned to their previous levels.

[28] ISRAEL MINISTRY OF FOREIGN AFFAIRS. 2010. Facts About Israel. Jerusalem: Israel Government Printer. 2010. 361 p. www.mfa.gov.il.
[29] WEISSMANN, J. It´s Not (Just) the Culture, Stupid: 4 Reasons Why Israel´s Economy is So Strong. [online]. 2012. [cit. 2015.01.31.] http://www.theatlantic.com/business/archive/2012/08/its-not-just-the-culture-stupid-4-reasons-why-israels-economy-is-so-strong/260610/.
[30] BRUMMER, A. Israel Weathers Financial Crisis. [online]. 2012. [cit. 2015.01.31.] http://www.thejc.com/business/alex-brummer-business/68032/israel-weathers-financial-crisis.

Inflation

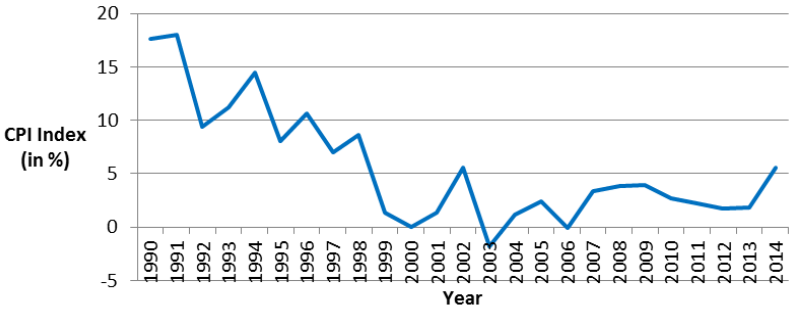
Regarding inflation, both countries fought with very high inflation rates in the 1990s. Israel had had even bigger problems with inflation earlier in 1984, when the inflation rate reached its peak 400%. Today, Slovakia is banded by the Eurozone 3% fiscal rule. In case of Israel, it has managed to hold the inflation under 5% during the last 12 years.

Graph 4: CPI Slovakia



Source: www.stats.oecd.org

Graph 5: CPI Israel

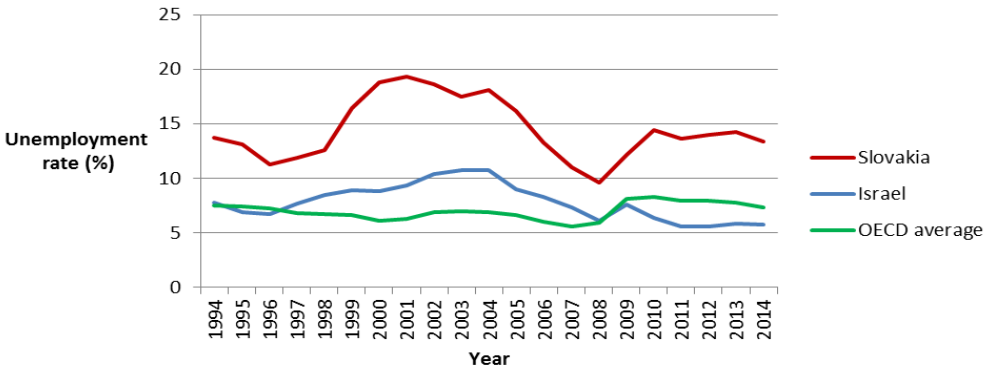


Source: www.stats.oecd.org

Unemployment

When comparing unemployment, we can see that Israel is performing significantly better than Slovakia. For many macroeconomists it´s question how it is possible that Israel keeps relatively low inflation rate (5.6%) and also unemployment rate (5.7%). In Slovakia, unemployment rate is quite high (13.4%). Especially problematic is long-term unemployment. Some categories of people are excluded from the labor market, are not able to retrain and find a job.

Graph 6: Unemployment rate in Slovakia and Israel



Source: www.stats.oecd.org

Macroeconomic policies

Both countries, Israel and Slovakia, had strongly centralized economic background. They needed to implement several policies in order to open their markets to the world. The way toward liberalization required financial and structural reforms and full liberalization of the foreign exchange market via a gradual reduction of government intervention in domestic financial and money markets. In both countries, the transition to full developed market economy take about 20-year and proceeded along a number of channels simultaneously. In Israel it was mainly:

- Establishment of strong macroeconomic discipline to consolidate the credence given to the economy by investors (which is also a condition for the development of financial markets and reforms);
- Strengthening of the stability of the local banking system;
- Development of financial instruments to manage foreign exchange risks and to increase activity in the local economy.[31]

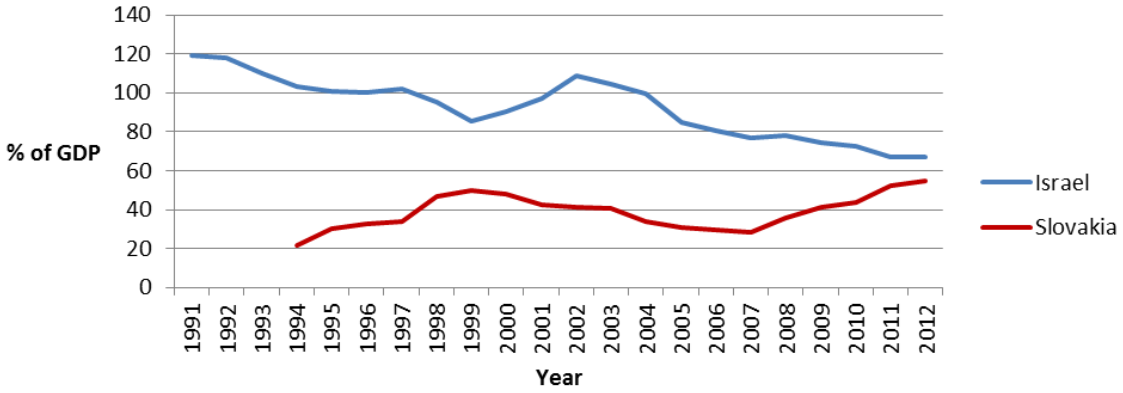
In Slovakia, main economic reforms were focus on the standards of EU and its requirements:

- Increasing the level of economic freedom (by decreasing tax and redistributing level),
- Decreasing public finance deficit and setting up long-term sustainable status,
- Improving business environment[32].

[31] ECKSTEIN, RAMOT-NYSKA. Twenty years of financial liberalisation in Israel: 1987 – 2007. [online]. 2008. [cit. 2015.01.28.] http://www.bis.org/publ/bppdf/bispap44o.pdf.

Both countries adopted also fiscal rules. Israel adopted the fiscal rule in 1992 together with deficit rule. Israeli government made first steps to fiscal stabilization in 1985 when the Stabilization plan was implemented. In 1985 the Israeli economy had almost collapsed because of enormously high government deficit and hyper-inflation. The Stabilization plan involved cutting in government spending, raising taxes and abolishing subsidies. However in 1992 there was again need to strengthen the fiscal policy rules. Government set up multiyear deficit targets and wrote in into the law for the long-term consolidation, so the new government was banded by the rules. Even though the new government did not fully meet the goals, there was a set guideline to policy. In 2005 the Israeli government set up also expenditure rule and expenditure ceiling. Slovakia adopted the fiscal rule in 2002 and the inflation targeting rule in 2005. Adoption of these rules was necessary for country´s admission to the Eurozone. Looking at the Graph number 7, we can observe steadily decrease of public debt in Israel, while the Slovak public debt has significantly increased especially since 2010. Both countries are approaching the 60% line, Israel from the top and Slovakia from the ground.

Graph 7: Public debt in Slovakia and Israel



Source: www.stats.oecd.org

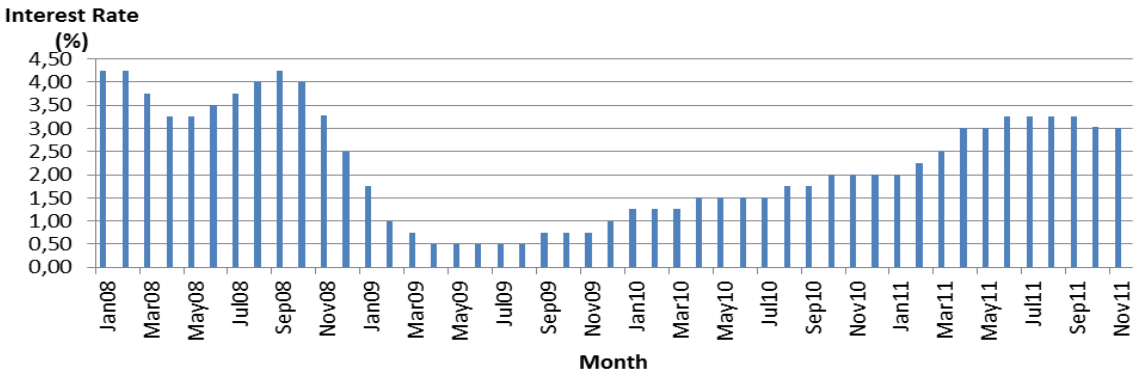
Regarding the monetary policy, Slovak monetary policy is managed by the European Central Bank. On one hand, it ensures protection to the country and euro currency strengthens its position in the Europe and world. On the other hand, Slovak republic cannot use the monetary policy on its own and regulate its own needs. ECB

[32] Mikloš, I. SLOVAKIA: A STORY OF REFORMS. 2010. [online]. 2010. [cit. 2015.01.28.] http://www.upms.sk/media/Slovakia_A_story_of_reforms.pdf.

regulates the interest rates according the needs of the Eurozone as a whole which may not always be in the best interests of Slovakia.

Israel has a free hand in monetary policy and used it very well during the Great recession. The Bank of Israel took interest rates to unheard of low (from 4.25% in September 2008 to 0.50% in April 2009) and then raised them as the crises waned. As the Israeli market is heavily dependent on revenues from exports, the expansionary monetary policy also served to curb the shekel's strength relative to many of the globally weaker currencies to assist the competitiveness of Israeli products internationally. In August 2009, the Bank of Israel was the first central bank to start raising short-term lending rates again, in line with the continuous recovery of the Israeli economy while maintaining inflation within the range of 1% to 3%. The aggressive monetary policy allowed the government to steer clear of heavy deficit spending.

Graph 8: Interest rate published by the Bank of Israel



Source: Bank of Israel

2.2 KNOWLEDGE DETERMINANTS

In this analysis we are examining the Israeli and Slovak economy environment according to the aspects of World Bank´s Knowledge Economy Index, which includes economic, and institution regime, human capital, innovations and development of ICT.

Economic and Institutions regime

The economic and Institutions regime can be well expressed by the Index of Economic Freedom.[33] In overall rating, from 178 ranked countries, Israel is at 33rd position

[33] **Index of economic Freedom** is measured by Heritage Foundation for over twenty years.
Economic freedom: is the fundamental right of every human to control his or her own labor and property. In an economically free society, individuals are free to work, produce, consume, and invest in any way they

with 70.5 points, Slovakia stands at 50th position with 67.2 points. The freest country in the world is Hong Kong that scored 89.6 points. The Index of Economic Freedom consists of following pillars:

1. Open Markets

In this pillar both countries are performing almost the same. In trade freedom Slovakia scored 88.0 points, Israel 88.6 because of lower tariff rate (0.7 percent in Israel, 1.0 percent in EU). Both countries have very stable environment for FDI. In investment freedom both scored 80.0 and in financial freedom 70.0. The banking system is well developed and stable in both countries. Openness of the economy is one of the main assumptions for development of knowledge economy. We can see that both countries perform well in this category.

2. Limited Government

This indicator doesn´t have direct impact on knowledge development, it rather show us how government is involved in the market regulations. In government spending, both countries rank relatively low, Slovakia 55.1 points and Israel 47.8 points. Comparing the fiscal freedom, Slovaks taxes system is quite fair and the taxes are relatively low. Slovakia scored 80.8 points while Israel only 61.8 points. The main reason for high tax rates and government spending in Israel is the huge military spending.

3. Regulatory efficiency

Business, labor and monetary freedom directly influence development of knowledge economy. Israel scored in all of these indicators better than Slovakia, in labor freedom even more than 10 points higher, in monetary freedom more than 6 points higher. That means there are still many social securities regarding the labor market and subsidizing. However, both countries can still improve the process of launching a business – Slovakia could reduce too many time-consuming requirements. Israeli process of incorporating a business takes only five procedures, but licensing requirements takes over 200 days on average.

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please. In economically free societies, governments allow labor, capital, and goods to move freely, and refrain from coercion or constraint of liberty beyond the extent necessary to protect and maintain liberty itself.

Scoreboard: 100-80 free, 79,9-70 mostly free, 69,9-60 moderately free, 59,9-50 mostly unfree, 49,9-0 repressed,

4. Rule of law

Property rights and freedom from corruption are significantly important factors in order to successfully implement the knowledge economy. Both countries haven´t scored very high on corruption measurement. However, the societal intolerance for graft and high-level corruption investigations, have led to an improvement of level of corruption in Israel. It scored 61.0 points while Slovakia scored only 47.0 points. Corruption is significant, notably in public procurement and health care in Slovakia. Many state-owned companies do not publish even basic information. That is a huge problem when implementing the knowledge-based economy. Other bad points for Slovakia are the property rights 50.0 points while Israel scored 75.0.

Table 1: KBE Indicators

KBE Indicators		Israel	Slovakia
Open markets	Trade	88.6	88.0
	Investment	80.0	80.0
	Finance	70.0	70.0
Regulatory Efficiency	Business	72.4	69.6
	Labor	67.1	56.5
	Monetary	81.6	75.5
Rule of Law	Property Rights	75.0	50.0
	Corruption	61.0	47.0
Summary		**74.46**	**67.07**

Source: Index of Economic Freedom, www.heritage.org/index

The Table 1 is summarizing only those indicators of Index of Economic Freedom that are relevant to development of KBE economy. We can see the differences between countries. Both countries have open markets and perform well in this category. Regarding to regulatory efficiency the difference between countries is bigger and Israel is performing slightly better. The biggest difference is in Rule of Law category. Slovakia is significantly behind Israel and its legal environment is less stable for development of KBE.

Human capital

As we have already mentioned, human capital is the comparative advantage of both countries. However, there is slight difference in the added value of the labor force between the countries. Slovakia is benefiting from good qualifications-to-cost ratio of the labor force – cheap skilled workers. Israel´s added value is highly qualified manpower, particularly in engineering (Israel has the highest concentration of engineers in the world—135 per 10,000 people, compared to 85 per 10,000 people in the United States. Sweden, Switzerland, Denmark, Korea, Germany, and Singapore round out the top ten).[34] Israel is also performing better in school enrolment and the Israeli universities are ranked higher than Slovak universities. The Weizmann Institute of Science was ranked 80th and the Hebrew University of Jerusalem was ranked as 122th in 2013 according to RUR ranking.[35] Only one Slovak university was ranked at 544th place and it was Comenius University in Bratislava.

Table 2: School enrollment in Israel and Slovakia

	Israel	Slovakia
Mean years of schooling [2013]	12,5	11,6
Secondary enrollment [2012]	97,95%[36]	•
Tertiary enrollment [2012]	66%	55%

Source: www.worldbank.sk, www.hdr.undp.org

Innovations

Measuring innovations is very a complex task. There are many kinds of innovations (economic, technical, IT, social…), so the complex analyzes of all innovations would be too time demanding. Global Innovation Index[37] ranked Israel 15th out of 140 countries with 55.5 scores and Slovakia 37th with 41.9 scores. Innovations can be measured also as patents per capita. Israel is on the 5th place, following the USA, Japan, Switzerland and Finland in patent activity. Israel is also ranked at fourth place in Global Technology Index

[34]Forida. R. The world´s Leading Nations for Innovation and Technology. 2011. [online]. 2010. [cit. 2015.01.28.] http://www.citylab.com/tech/2011/10/worlds-leading-nations-innovation-and-technology/224/.
[35] ROUNDRANKING. [online]. 2013. [cit. 2015.03.06] at: http://roundranking.com/en/rur-overal-2013.html.
[36] Ranked 5th in the world.
[37]Global Innovation Index. [online]. 2013. [cit. 2015.03.06] at https://www.globalinnovationindex.org/content.aspx?page=data-analysis.

and its approach is unique in his strategy based on launching innovative firms. In the Eco-innovation Scoreboard of the EU, Slovakia scored only 47.00 fourth from the end.

ICT infrastructure

ICT infrastructure can be measured by internet penetration, usage of computers, telephones. According to the World Bank statistics, in Slovak Republic internet is used by 77.9% of population, which is 7% more than in Israel (70.8%).[38] Internet penetration is good developed in both countries. Number of computers per household is 1.93 in both countries.[39] Measuring mobile cellular subscriptions (subscriptions to a public mobile telephone services using technology, which provide access to the public switched telephone network), both countries perform well. Slovakia has 114 subscriptions per 100 people and Israel 123 in 2013.[40]

2.3 SUMMARY

To summarize the main points we can conclude following: Israel and Slovakia are firstly comparable in demographic characteristics. They belong to small-sized countries with less than 10 million inhabitants. Both are also relatively young and must have overcome strong opposition. Israel is surrounded only by its enemies and constantly in security threat. Slovakia´s security is not directly threatened, but at the times of its foundation not everybody wish its success. It has been many times underestimated by outside world, but also by its own people. Both countries experienced centralized economic regime and needed open their economies to the world. The macroeconomic environment and institutional regime has a similar base in both countries. Both countries adopted similar macroeconomic policies and made a huge progress in liberalization of their economies in the last 20 years. Both have very strong export bases and are mainly export oriented. Development of ICT infrastructure and internet penetration is ranked really high and both countries perform well in this category.

[38]WORLD BANK. It net Users. [online]. 2013. [cit. 2015.03.08] at: http://data.worldbank.org/indicator/IT.NET.USER.P2.
[39]GENERATOR RESEARCH. Personal Computer per Household. [online]. 2013. [cit. 2015.03.08] at http://www.generatorresearch.com/tekcarta/databank/personal-computers-per-household/.
[40]WORLD BANK. IT Cel Sets. [online]. 2013. [cit. 2015.03.08] at: http://data.worldbank.org/indicator/IT.CEL.SETS.P2.

The differences between countries occur especially in the regulatory efficiency and rule of law efficiency, human capital development and innovations performance. All of these three categories are especially important for successful implementation of KBE and Israel is performing better in all of these categories than Slovakia. That has impact on the GDP per capita performance which was USD 6,026.2 higher in Israel than in Slovakia, and unemployment - Slovakia has high unemployment (13.4%) while Israeli unemployment is low only 5.6%. The huge difference is also in the salaries. In 2014 the average salary in Slovakia was EUR 858[41] while in Israel it was EUR 2,222[42]. We can see the quality of life in Israel is higher. Therefore, in the next part of the thesis we are looking for the answer why is Israel performing better in the characteristics mentioned above, what Israel has done to improve its situation and what may Slovakia adopt from the Israeli example.

PART II: GOAL OF THESIS AND METHODOLOGY

Main purpose of this master thesis is to show how successfully implemented policies can help a country to became successful knowledge-based economy. As a model country was chosen Israel.

The master thesis has two sub-objectives. The first, theoretical objective is to define what the knowledge-economy is and determinate the main pillars of KBE. The further analysis of Israeli KBE is based on these pillars. The second, application objective is to describe what kind of policies were crucial in process of development of knowledge-based economy in Israel and briefly propose what kind of strategies Slovakia may implement in its own environment in order to achieve similar results.

To achieve the main goal of the master thesis we have used several methods of economic theory. Firstly our approach to the topic was theoretical, describing the definition of the KBE, measurement according to the OECD indicators, World Bank methodology and the European Innovation Scoreboard. Then the pillars of KBE were described according to the World Bank´s Knowledge Economy Index.

Substantive part of the master thesis is based on the comparative method. The thesis compares Slovak and Israeli economies. The macroeconomic comparison is based on macroeconomic indicators as GDP, unemployment, inflation, export, public debt.

[41] Statistic Bureau of Slovakia.
[42] The Bureau of Statistics, Israel.

Comparison of knowledge determinants is mainly based on Index of Economic Freedom developed by Heritage foundation that clearly compares regulatory efficiency, rule of law and openness of markets in the country economy. The data about countries were collected mainly from the OECD and World Bank databanks.

The largest part of the master thesis analyzes the policies of Israel. The data and information about the policies were collected from different Israeli ministries and institutions. Because of the huge amount of data regarding this topic, we used abstraction method to focus only on the relevant characteristics and data and leave the not relevant data.

Induction and deduction methods as well as synthesis methods helped us in the last part of the thesis – application of the policies for Slovakia. In this part of the master thesis we use the findings from the analyzes of Israeli policies and we implicate the relevant policies to Slovak environment.

PART III: RESULTS AND DISCUSSION

In the first part of the thesis we have described what is understood as KBE and what the main pillars of KBE are. Then we compared the Israeli and Slovak economic environment and KBE determinants. We have seen that both economies are comparable and very similar in some characteristics, but Israel is performing better regarding the knowledge criteria. In this part of the thesis we are examination Israeli policies toward the KBE and possible implication for Slovakia.

3 SPECIFITIES OF ISRAEL AND KBE POLICIES

The process of moving from industrial to knowledge-based economy is a long-term process. Israel is specific in its top-down approach to strengthen the KBE development. The government decided to focus its policies on long-term development of entrepreneurship and human capital. Within the last twenty years it has become leading country in start-ups and innovations. Main policies regarding to development of KBE were main in these areas: corruption and rule of law, support of entrepreneurs, development of human capital and innovation performance.

3.1 CORRUPTION AND RULE OF LAW

As we have already mentioned limited corruption is a very important assumption for development of KBE. We have already noted that Israel is performing better in limiting corruption than Slovakia. Even though, its corruption ranking could have been higher. Israel ranks 37th of 175 nations[43] in terms of corruption, according to Transparency International. Comparing to other 34 OECD nations, Israel ranks 24th. However, Israel is trying to fight the corruption and improve its position. Israel based its fight against corruption on following measures:

- *Intolerance of corruption in the Israeli society*

Even though Israeli corruption ranking is not very pleasant, Israel ranks among the highest on measures of willingness to challenge corruption. Overwhelming 98% of Israelis surveyed express a willingness to get involved in anti-corruption activities, with over 90% endorsing the option of signing an anti-corruption petition. Moreover, despite pessimism about government responsiveness, over 90% of Israelis say that they would be willing to report an incident of corruption – a figure on par with Germany, Canada and Switzerland.[44] The public intolerance to corruption and confidence to report it are key determinants in order to fight the corruption. Israelis are committed to take 2 or 3 years mandatory military service and therefore are more deeply involved in state affairs than inhabitants of other countries. Also, the taxes in Israel are relatively high. The Israeli Corporate tax is fixed at the rate of 26.5%. Israel has progressive income tax for individuals depending on annual income starting with 10% to 50%[45]. The value added tax is 18% for all products excepts vegetables and fruit. High involvement makes very strong connections for them with their country and also involvement to fight against any injustice and fraud.

- *Independent media*

There are dozens of newspapers, magazines, radio stations and televisions, which play an important role by the press in political, social and cultural life. Censorship is relatively low compared to other countries, but may be exercised only when it is certain

[43]FISHER. I. Israel ranks 37th in world corruption index. Haaretz news. [online]. 2014. [cit. 2015.03.09.] http://www.haaretz.com/news/national/1.629851.
[44]LIPSON, J. Israel among most corrupt of OECD countries. Jpost News. [online]. 2014. [cit. 2015.03.09.] http://www.jpost.com/National-News/Israel-among-most-corrupt-of-OECD-countries-319315.
[45]WORLDWIDE-TAX. Israel Income Taxes and Tax Laws. [online]. 2014. [cit. 2015.03.09.] http://www.worldwide-tax.com/israel/israel_tax.asp.

that publication of the item would harm public safety. Israel is considered to be free regarding freedom of the press. In 2014 scored 30 points according to Freedom House and ranked 62nd overall.[46] In fight against corruption it is very important that journalists don´t fear to write against high-level people and their right of expression is fully protected.

- *Punishments for responsible*

Several high-level people (former President Moshe Katsav, Finance Minister Avraham Hirchson, Interior Minister Aryeh Deri, Labor and Welfare Minister Shlomo Benizri and a large number of mayors) were sent to jail after discovering they were involved in corruption activities. Israel has a strong judiciary system that is not connected to government and has a power to act. On July 2008, the Israeli Penal Law of Article 291A[47] was introduced. According to the article, it is prohibited to offer or pay a bribe to a foreign public official for the purpose of obtaining business activity or obtaining a direct advantage. An Israeli businessman, including exporter, or an Israeli company, offering bribe of a foreign public official, even through intermediaries, run the risk of criminal prosecution in Israeli courts, as well as criminal proceedings in the foreign public official's home state. The maximum penalty set for the offence of bribery of a foreign public official is seven years imprisonment and/or a fine. Natural persons can now be fined up to about 1.13 million ILS (approximately 221,000 EUR) - a fivefold increase of the previous applicable fine, or four times the benefit intended or obtained - whichever is higher. While Legal persons can be fined up to about 2.26 million ILS (approximately 443,000 EUR) - a tenfold increase of the previous fine, or four times.

- *Independent organization to fight national crimes and corruption*

Lahav 433 is an Israeli crime-fighting umbrella organization within the Israel Police, created on January 1, 2008. Known as the "Israeli FBI", the unit is the merger of five law enforcement offices into one. It was established as initiative of Minister for Public Security and the Head of Police's Investigations Branch. It is tasked with investigating national crimes and corruption.[48] In 2014 the Israel Police, the Public Security Ministry,

[46] FREEDOM HOUSE. Press Freedom Ranking. [online]. 2014. [cit. 2015.03.10.] https://freedomhouse.org/report/freedom-press-2014/press-freedom-rankings#.VTC-dyG8PGd.
[47] MINSTRY OF JUSTICE: Israel Strengthens the Battle against Bribery and Corruption. [online]. 2014. [cit. 2015.03.09.] http://index.justice.gov.il/En/about/mankal/BattleBriberyCorruption/Pages/InIsrael.aspx.
[48] WIKIPEDIA. Lahav 433. [cit. 2015.03.02.] http://en.wikipedia.org/wiki/Lahav_433.

the Finance Ministry and the Government Companies Authority have agreed to establish a dedicated investigatory unit inside the top police investigative unit, in an effort to fight fraud in the public sector more effectively.

3.2 ENTREPRENEURS SUPPORT

Israel is very specific in the entrepreneurship support, especially start-ups comparing to other countries. In proportion to its population, Israel has the largest number of startup companies in the world. In absolute terms, Israel has the largest number of startup companies than any other country in the world, except the U.S. (3,500 companies mostly in hi-tech). With more than 3,000 high-tech companies and startups, Israel has the highest concentration of hi-tech companies in the world - apart from the Silicon Valley, U. S.[49]

There are two main conditions that need to be fulfilled in order to develop strong enterprises:

- *Supportive environment* – internal motivation of the individual and support from the outside is inevitable for building new business. In Israel there are many individuals who want to be entrepreneurs. People are not afraid to follow their ambitions nor are they afraid to fail. Failure is an option in entrepreneurship and all parties involved in entrepreneurship seem to be aware of this. The Israeli society sees failure as a part of success. Moreover government and also private support for new entrepreneurs is more than necessary.
- *Venture capital* – starting entrepreneurs need investors in order to start or scale their businesses. Concentration of Venture capital in Israel is really high. Israel is ranked Number 2 in the world for venture capital funds right behind the U. S.

A. GOVERNMENTAL SUPPORT FOR STARTING ENTREPRENEURS:

1. TNUFA

Tnufa is one of the smallest programs targeted at individual inventors or groups of entrepreneurs who are at the very first stages of commercializing technological ideas. The program provides relatively small grants intended to build prototypes, register intellectual property or commission market surveys. In accordance to the very different needs of different potential start-ups, Tnufa offers help in a broad range of subjects ranging from

[49]USA DOJO.COM. Intersting statistics about Israel. [online]. 2014. [cit. 2015.03.09.] http://www.usadojo.com/articles/israel-statistics.htm.

legal fees to register patents to building a prototype, paying consultants, showing products in trade fairs or finding investors. The total allowable budget per one project is EUR 40,000 of which the government pays up to 85%.[50] The funding is provided by grants. The grants are subject to royalties if the project succeeds. The procedure is simple and friendly.

TNUFA qualified 120 projects each year. 20% reach the next stage of financing and create 20 million USD added value for the Israeli economy annually.[51]

2. Technological Incubators

Israel is rated second in the world (after Silicon Valley) in creating technology start-ups and that´s mainly because of large government support. The idea of the technological incubator program emanated from the desire to encourage and support innovative technological ideas, that are too risky and in too early stage for private investments, into viable startup companies that after the incubator term are capable to raise money from the private sector and operate on their own. The Public Technological incubator Program (PTIP) was initiated by the Office of the Chief Scientist (OCS) in the Ministry of Industry and Trade in Israel. Between 1990 and 1993, 28 incubators were established.[52]

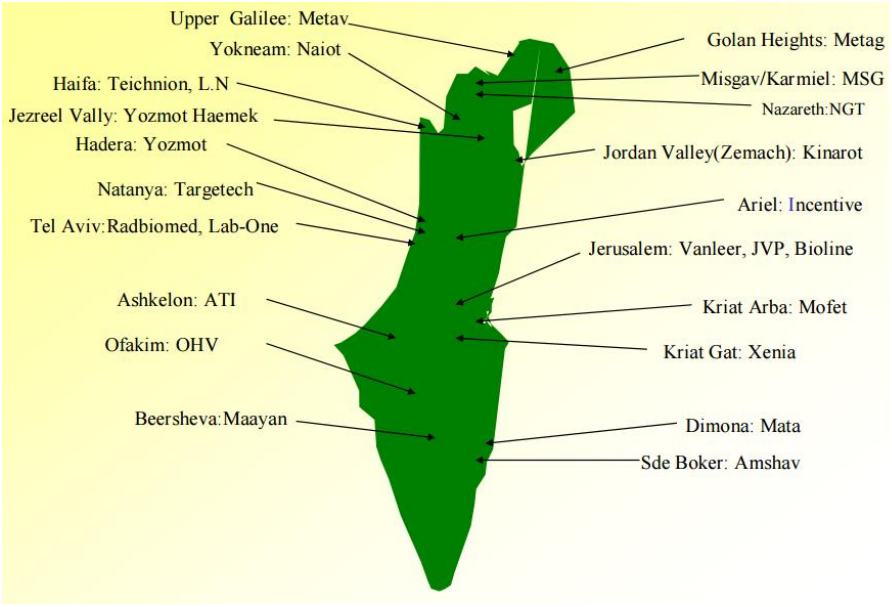
Currently there are 24 incubators in Israel, out of which 22 are technological incubators, one is a technology based industrial incubator and one is a designated biotech incubator. The incubators are spread all across Israel including 8 that are located in peripheral areas. There are approximately 180 companies in various stages of R&D that operate in the incubators at any given time.

[50]ERAWATCH. Platform on Research and Innovative policies. [online]. 2014. [cit. 2015.03.09.] http://erawatch.jrc.ec.europa.eu-/erawatch/opencms/information/country_pages/il/supportmeasure/support-_0021.

[51]Fisher, J. Tnufa Program. State of Israel. [online]. 2014. [cit. 2015.03.09.] http://surveys.sni.technion.ac.il/files/events/INDIA-ISRAEL/Tnufa%20presentation%20in%20english1.pdf.

[52] Frenkel, Shefer, Miller. Public vs. Private Technological Incubator Programs. [online]. 2014. [cit. 2015.03.15.] file:///C:/Users/Katar%C3%ADna%20Min%C3%A1rikov%C3%A1/Downloads/ste-26%20(1).pdf.

Picture 1: Incubators Location



Source: www.incubators.org.il

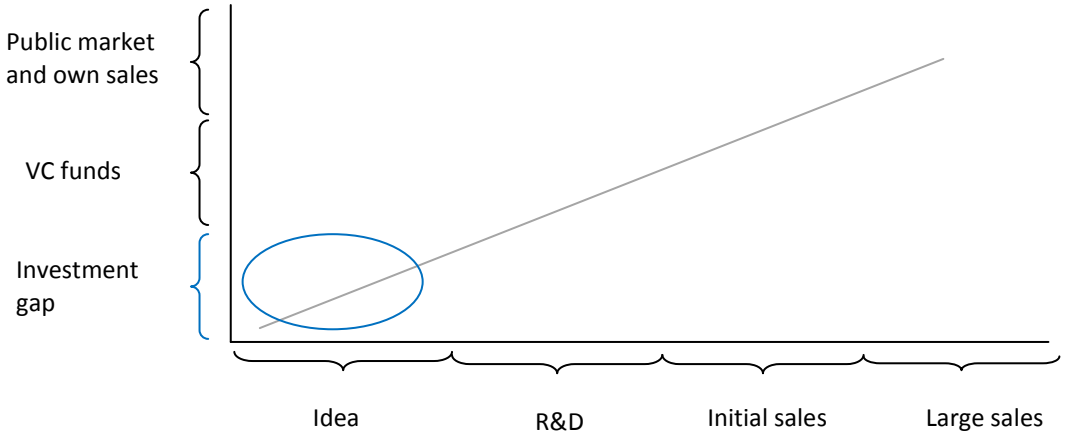
How Incubators work

Incubator organization is and independent legal entity leaded by skilled and experienced general manager. All government support, for both the incubators management and the projects, is transferred to the incubators through the OCS. This commits the incubators´ management to be the state´s trustee in operating the incubator projects and holds the management of the incubators responsible for professional and efficient management of the projects, including project budgeting and commercialization. The board of directors in Incubator are skilled professionals from industry, business sector and research institutes. The incubation term of a project in a technological incubator is approximately 2 years. During this period, the project receive financing, management assistance, professional guidance, business direction, assistance in commercialization, has access to central administrative services as accounting, legal services, acquisition, and secretarial services. The new projects are connected to Incubator´s infrastructure and also Incubator´s R&D facilities. During the stay in the incubator, abstract ideas need to be turned into products of prove feasibility, novelty, advantages, and necessity in the international marketplace. There should be also a prototype or working model and an orderly business plan. Each incubator is structured to handle 10 to 15 projects simultaneously, with around 3 to 8 new projects absorbed every year. Biotech Projects may receive an additional third year in the incubator.

The total budget for the two years term ranges between $ US 500,000 to $ US 800,000, depending on the field of activity of the project (in addition, projects in peripheral incubators are entitled for an extra budget of $ US 125,000). Incubator can invest 15% of the approved budget of a new project and receives up to 50% of the shares of the new company. Up to 85% of the total budget is financed by the government as a grant, that will be paid back only upon success. The company will pay the government 3% - 5% royalties from revenue generated, until the full amount of grant (plus interest) is paid back. That means, government is taking risk for the failing projects. If the project is successful, government will get all the money back.

Any initiative by VC funds and other commercial investors to finance the projects from the earliest stage of business development was always welcomed by the Program´s administration. But most private investors were not willing to take such a high risk. Therefore, the Incubator Program was committed to develop innovative technological ideas into start-ups, and lead them towards first round investment by private investors.

Figure 2: Role of Government in Investment Gap



Source: "Incubators of the World: USA, Israel, France, Switzerland, China and Japan"

The role of government is to fill the investment gap, where the highest risk lies. The concept at the base of program was that Israel cannot afford disappearing of good technological ideas because they are not given enough chance to prove themselves. This concept led to the OCS´s policy of taking the risk of supporting as many projects as possible and enabling them to prove themselves and raise their first significant private money.

Privatization of Incubators

In 2002 was launched Privatization Program aimed to achieve better results for the incubation program. The process started with the entry of private investors as partners in government incubators, and continued when the program took the official step of inviting venture capital funds and private companies to undertake the responsibility and ownership of incubators. Incubators attracted new partners including VC funds, private investors, investment companies, high-tech enterprises, local authorities and universities. The private owners are expected to finance the Incubators administration expenses, invest the supplementary financing in projects, further invest in incubator graduates and undertake the responsibility to pay back the government loan granted to the start-up companies.

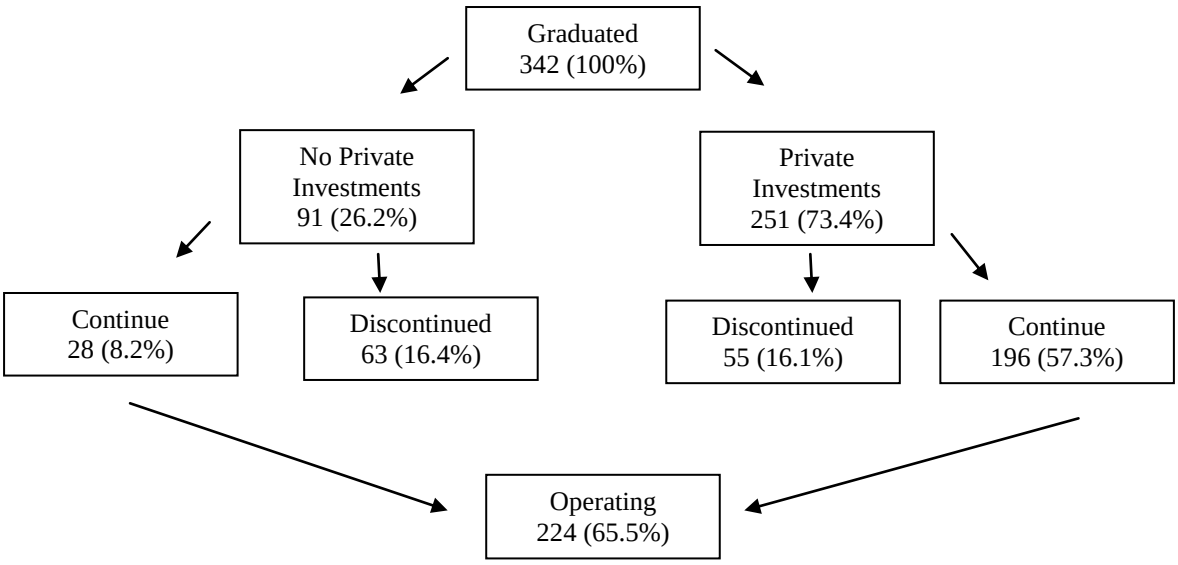
Some of the privatized incubators decided to become specialize in certain fields – software, life sciences, medical devices, water, IT and communication, etc. The reason for specialization is to address unique requirements of each technological field, need for unique infrastructure and specialized management and incubator staff. Also the legal structure has changed. Prior to the launch of the privatization program, incubators were structured as non for profit organizations, now they are for-profit commercial organizations. The incubator´s initial holding in each of its portfolio company post-privatization is between 30 – 70%. The incubator staff provides to the start-up companies business mentoring, operational assistance, fund raising assistance and connect them to strategic partners and channels. The aim of the incubator is to succeed with the start-up on international market and maximize the profit. That is reason why their commitment to start-ups is so high. Through the incubator initiatives the government aims to bridge the funding gap present at the early, risky stage of the realization of promising ideas. The annual budget allocated to 24 incubators spread throughout the country increased from USD 1 million at the program´s inception in 1991 to USD 50 million in 2009.[53]

Each public incubator is granted around USD 200,000 per year for its operations by the state. Incubators located in peripheral areas can be granted an additional USD 120,000 annually. Thanks to the privatization process, government has decreased its financial support to the incubators. Government does not provide financial support for the incubators´ operations. Despite the privatization, the government continues to bear most of the risks involved in the pursuit of R&D and to support the project companies operating

[53]Rouach, D. Louzoun, S. Deneux, F. 2010. Incubators of the World: Best Practices form Top Leaders UsA, Israel, France, Switzerland, China and Japan. Pearson Education France. ISBN: 978-2-7440-6459-3.

within the framework of the private incubators. The loan amounts from government to private incubators are from USD 400,000 to USD 500,000 for two years. The Private Incubator needs to repaid the loan within 6 years only when the granted company achieves commercial success.

Figure 3: Status of graduated projects from 2004 to 2008



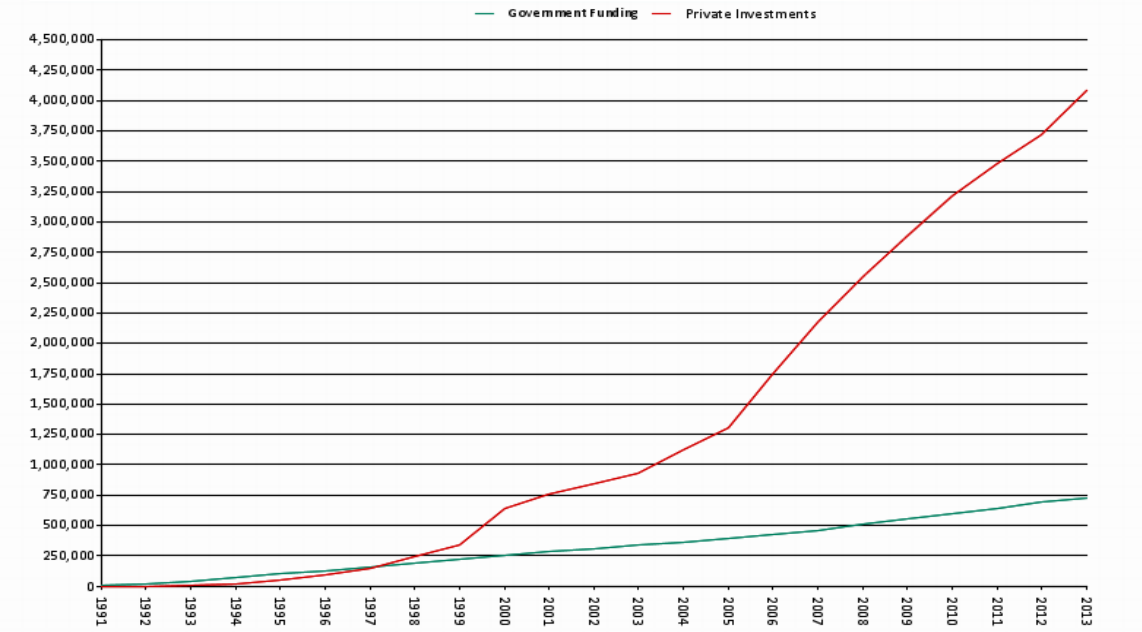
Source: www.incubators.org.il

Impact of the Incubator Program

The incubators program positioned itself as the primary manufacturer of startups in Israel, establishing 70- 80 new startups every year. Since 1991 to the end of 2013, the government founded over 1,800 companies with a total cumulative government investment of over 730 Million Dollars. Over 1,500 companies had matured and left the incubators. Of these graduates, 60% have successfully attracted private investments. The total cumulative private investment in 1,530 graduated incubator companies reached over 34.5 Billion Dollars. This means that on every Dollar the government invested in an incubator company, the company raised an additional 5 – 6 Dollars from the private sector.[54] Over 50% of Incubator graduates continue their operation at least 3 years after graduation.

[54] OCS, Ministry of Economy Israel: Technological Incubators Program. About us. [online]. 2014. [cit. 2015.03.20.] http://www.incubators.org.il/article.aspx?id=1703.

Graph 9: Government Funding vs. Private Investments in USD



Source: Office of the Chief Scientist

The Israeli state allocates around USD 40 million to the incubator program annually. 30% – 40% of the budget is derived from royalty payments from companies that initially received government support through its grant program. Project companies that continue operating employ around 6,000 – 7,000 workers directly and create another 25,000 – 30,000 jobs for service providers.

The incubator program plays also a major role in times of economic crisis. Between 2004 and 2008, an average of 500 high-tech companies were established per year in Israel, including the 75 – 85 start-ups initiated in the technological incubators. In 2009, in times of economic crisis, only 400 start-up companies were established, while the number of start-ups initiated at the incubators remained constant. At the times of crisis, decreasing venture capital funds are more focused on reinvestment in their current portfolio companies. Because of that new investment projects are lacking money. However, government funds were not cut in this period and technological incubators could work also in the times of crisis.

3. Heznek Program

The main objective of this program is to support new start-up companies that are engage in R&D activities. The program is based on the government matching an investment in a start-up company, proportional to the investment of an investing entity.

The government investment will not exceed 50% of the investment necessary for operation of a start-up company for a period of two years.[55] The investor will be given an option to purchase the government shares in the start-up company at the initial price. The program was launched in 2002 and is targeting only small and middle-size enterprises.

B. VENTURE CAPITAL POLICIES

The Start-up companies cannot develop themselves without capital and strong investors. Therefore the Israeli government launched policies not only for developing entrepreneurs, but also venture capital market. Today, compared to other OECD countries, Israel have the highest level of venture capital (all stages) as a share of GDP. The venture capital investments in Israel in 2013 were 28.76 % of GDP for early stage ventures and 1.96 % of GDP for later stage ventures. Israel is far ahead before its OECD partners.

Israeli government started to support the development of VC markets mainly by financing hybrid (public/private) venture capital funds to leverage private capital from foreign investor. The government confronted the lack of venture capital in the early 1990s by establishing the YOZMA group.[56] YOZMA have invested in Israeli start-ups and created a number of hybrid public/private funds building on US investments. YOZMA would provide up to 40% of the capital raised by the fund with a clause to be bought out within the first seven years at the initial value plus interest. Investment decisions regarding where and how to invest were mainly taken by the international partners.[57] When YOZMA completed its task of catalyzing the establishment of the venture capital industry, it was privatized and sold. Since inception the Group has managed more than $220 million in its three funds: Yozma I, Yozma II and Yozma III and made direct investments in about 50 portfolio companies.[58] The Group helped a significant number of its portfolio companies go public on major stock exchanges in the US and Europe.

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[55] ERAWATCH. Platform on Research and Innovations policies and systems. online [cit. 2015.03.15.] http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/il/supportmeasure/support_mig_0017.

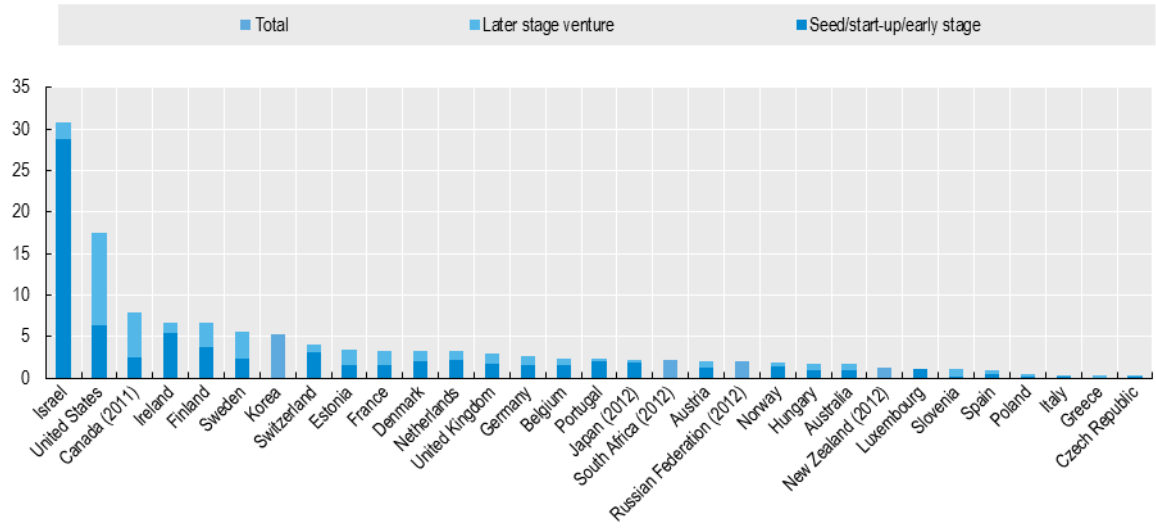
[56] **Yozma** has earned worldwide recognition as the creator of the Israeli venture capital industry. Yozma makes equity investments in technology companies engaged in fields where Israel has demonstrated world leadership. The Group targets high-growth companies in the sectors of Communications, Information Technologies and Life Sciences. www.yozma.com.

[57] BAYGAN, G. (2003), "Venture Capital Policies in Israel", OECD Science, Technology and Industry Working Papers, 2003/03, OECD Publishing. http://dx.doi.org/10.1787/585780028400.

[58] THE YOZMA GROUP. About. [online]. 2014. [cit. 2015.03.21.] www.yozma.com/about.

Graph 10: Venture Capital Investments as a Percentage of GDP

Percentage, 2013



Source: OECD Ilibrary

Israeli government stood up in a role of risk taker also in supporting VC market. In 1991 created an equity guarantee scheme INBAL Program, to encourage investment in venture capital. INBAL provided 70% guarantees to investors in local venture capital funds. Even though the INBAL program was phased out over the years, it helped the formation of around six publicly-traded Israeli venture capital funds, each with USD 15 million to USD 20 million in capital.[51] In order to attract VC investors, government decided to also tax incentives policies.

In July 2002, government approved tax reform that guaranteed foreign investors an exemption from capital gains tax on investments in local venture capital funds and in high technology start-ups.

Policies mentioned above made Israel country where concentration of innovation and entrepreneurship is one of the highest in the world. Israel has the most start-ups per capita, and according to 2008 figures, raised 2.5 times as much global venture capital as the US, 30 times more than Europe, 80 times more than India, and 350 times more than China.

3.3 HUMAN CAPITAL DEVELOPMENT

Developed human capital is a basic component of KBE. It provides the resources for the development and cultivation of other areas of intellectual assets and is the most

important link in the process of value creation. Israel has good base for excellent human resources because of highly educated workforce and multilingual population with cultural, historic and business ties to almost every other nation.

Educational system

The formal structure of Israeli educational system is similar to the Slovak one. It is largely centralized and publicly funded, with a standard national curriculum. Obligatory education begins at the last year of kindergarten and lasts until the 12th grade. In the K-12 grades there are nearly 2 million pupils and 130,000 teachers (as of 2008). The school system is organized into three levels: elementary school (ages 6-12), middle-school (ages 12-15) and high-school (ages 15-18). Class size generally ranges from 25 to 40 pupils.[59] Israel is ranked as the 4th most educated nation according to OECD report in 2014. The ranking is based on the percentage of the population engaged in tertiary education, either at universities, colleges, technical institutions or the like. Over 46 percent of Israelis possess or are in the process of obtaining post-secondary degrees.[60] Having a high level of education is of the most importance in the Israeli employment market. As of 2012, the employment rates for adults aged 25-64 with higher education was 85%, compared with 47% among those without an academic degree. Israel has 140 scientists and technicians per 10,000 employees, more than any other developed country. Israel has 135 engineers per 10,000 employees, which is the most concentrated number of engineers in the world.[61]

Israeli government sees the human capital as a comparative advantage of Israel. Therefore, Israel spend a lot on education - total expenditure on education as a percentage of GDP has the fifth highest rate (7.3%) in comparison with other OECD countries in 2011. That is higher than the OECD average 6.1 %. Regarding to salaries for teachers, Israel is below the OECD average, but the rate is increasing during the time. In upper secondary education average 15 years' salary in Israel is 21,316, comparing to 41,656 OECD average.[62]

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[59]CoReflect. The Israeli educational system. [online]. 2015. [cit. 2015.03.25.] http://www.coreflect.org/nqcontent.cfm?a_id=4438.

[60] Israel Today. Israel Still 4th Most Educated Nation, But Losing Ranking. [online]. 2014. [cit. 2015.03.25.] http://www.israeltoday.co.il/Default.aspx?tabid=178&nid=25345.

[61]Ministry of Industry, Trade and Labor. The Intellectual Capital of The State of Israel. [online]. 2007. . [cit. 2015.03.25.] http://www.moital.gov.il/NR/rdonlyres/94A44BDD-F78D-410E-9E28F17C1E0BE6BD/0/intellectualcapitalnew.pdf.

[62]OECD. Teachers salaries. [online]. 2015. [cit. 2015.03.25.] http://www.oecd-ilibrary.org/education/teachers-salaries_teachsal-table-en.

During the last few years, Israel made some policy reforms to improve the educational system. The main reform was called New Horizon and was launched in 2007, primarily focused on elementary and high schools. The reform included four main, complementary, targets: boosting the status of teachers and raising their salaries; providing equal opportunities to every student and raising student achievements; improving the school climate, and empowering and expanding the authority of the school principal[63]. The reform included increase in full-time teacher´s work week to 36 hours (from 24) in order to increase individual hours with students, improvement in teachers´ professional development and conditions for teachers. The starting salary for new teachers nearly doubles, while for veteran teachers pay increases by about one quarter. One of the main results of the education reforms during the last years is huge improvement of Israeli students´ performance in the PISA (The Program for International Student Assessment) test. Average performance in mathematics improved from 442 points in PISA 2006 to 466 points in PISA 2012, and reading performance improved from 452 points in 2000 to 486 points in 2012.[64] Such a huge development in the PISA test is explained mainly by the individual programs and individual approach of teachers to students with different needs.

Necessary component of implementing KBE is lifelong learning. The emphasis and value of education is strongly embedded in Jewish culture. Due to Judaism's heavy emphasis on Torah study, many have commented that Judaism is characterized by "lifelong learning" that extends to adults as much as it does to children. Therefore also secular Israelis tend to educate themselves their whole lives. That proves also statistics about reading. More than 90% of Israeli adults read a newspaper at least once a week. Israelis are also avid book readers. Israel has the second highest publication of new books per capita. Seven million Israelis buy 12 million books every year making them one of the highest consumers of books in the world.

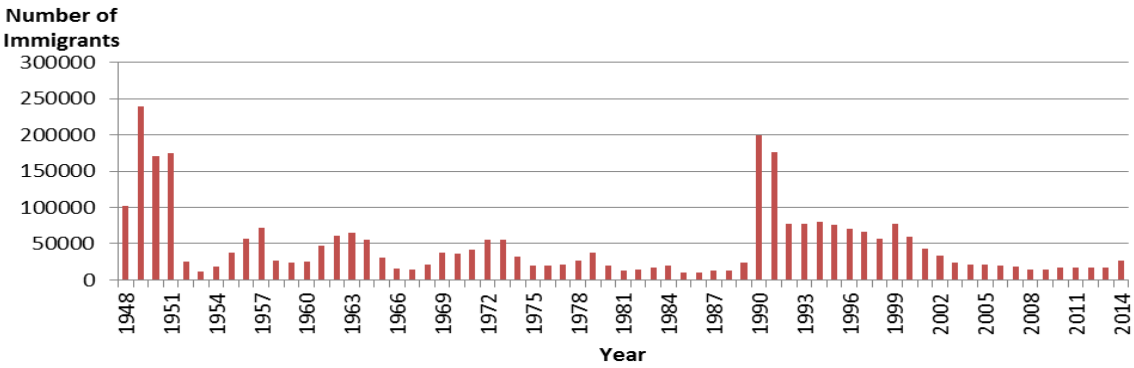
Immigration

One of the specifies of Israel is its immigration law and its immigration policy. Israel is a country build of immigrants. In 1950 the Knesset (Israeli Parliament) has passed

[63] The Ministry of Education. Evaluation of the New Horizon Reform in Elementary and Junior High Education at the End of Three Years of Implementation.
[64] Rubin. C. M. The Global Search for Education: What Israel did. 2014. http://www.huffingtonpost.com/c-m-rubin/the-global-search-for-edu_b_4797810.html.

The Law of Return[65] that allows every Jew around the world to come and live in Israel. During the years, there have been many immigration waves of immigrants coming to Israel from Europe, Russia, United States, Africa and other parts of the world. Israeli economy has both, benefit and also suffered by the huge immigration to the country. The new immigrants needed accommodation and jobs. However, at the end, the positive consequences overcome the minuses. New immigrants coming to Israel are usually highly skilled workers, doctors, lawyers, etc. Paul Rivlin, author of book The Israeli Economy from the Foundation of the State through the 21st Century argues that the rapid increase in the population, largely the result of immigration, has been a major factor driving economic growth. Changes in the ethnic makeup of the Jewish population have had significant effects on Israeli politics and the values that dominate life in Israel.[66] New immigrants bring new skills, know-how, and multicultural aspect to the country. They are strongly motivated, have passion, are willing to risk and are looking for new opportunities and solutions. Such a human nature supports innovations and entrepreneurship. New immigrants are also source of countless contact infrastructure, information and connections to the world which is also one of the most important aspects in the KBE.

Graph 11: Immigration to Israel



Source: Jewish Virtual Library: www.jewishvirtuallibrary.org

Mandatory military service

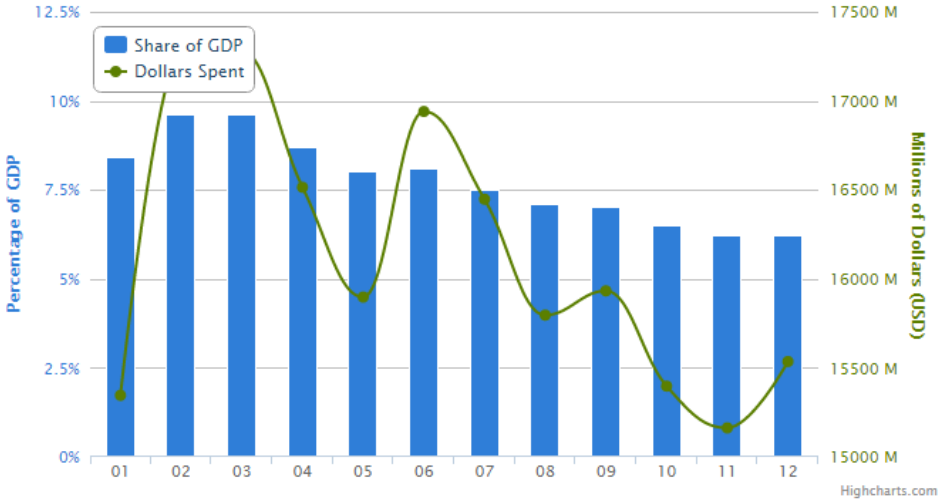
During its 70 years of existence, Israel has been involved in seven wars and eight military conflicts. The constant security threat rapidly increases defense expenditures and

[65] **The Law of Return**, granting every Jew in the world the right to settle in Israel, was passed by the Knesset on July 5, 1950, and published in Sefer HaChukkim (Book of Laws) No. 51, p. 159. Two amendments were later added on to the Law of Return - one passed August 23, 1954, and the other passed March 10, 1970.

[66] RIVLIN, P. 2011. The Israeli Eonomy from the Foundation of the State through the 21st Century. First publishing. Cambridge University Press. New York. ISBN 978-0-521-15020-0.

during the conflict causes decline of economic activity. Average military expenditures fluctuated around 6 percent of GDP within the last few years. According to the Central Intelligence Agency, Israel is ranked 4th in military expenditures as a percentage of GDP[67] in the world. From the age of 18 every Israeli male and female is required to serve three (men) and two years (women) of compulsory military service.

Graph 12: Military expenditures



Source: http://militarybudget.org/israel/

Military expenditures are a huge burden for Israeli economy. However, the compulsory military service is a life-time learning experience for the youngsters in Israel and has a huge impact on their development and maturity. Israeli military is unique in its organization structure. The military pyramid is exceptionally narrow at the top. There are fewer senior officers to issue commanders[68] and that means more individual initiative at the lower ranks.[69] That means the young 23 years old commanders are in charge of one hundred soldiers and twenty officers and sergeants and quite huge amount of machine guns, bombs, mines, etc. They have huge responsibility and are under huge pressure. In the times of action they made the decisions. There are no better conditions for young people how to learn to make decisions and find the right solutions under pressure. Because Israeli

[67]CIA. The World Factbook. [online]. 2015. [cit. 2015.04.02.] https://www.cia.gov/library/publications/the-world-factbook/rankorder/2034rank.html.

[68]**Commander** in Israeli army is a soldier in charge of unit discipline who assists the unit Non Commisioned Officer in charge.

[69] SENOR. D, SINGER, 2011. S. Start-up Nation. The Story of Israel´s Economic Miracle. Twelve; Reprint edition. 336p. ISBN: 978-0-446-54146-6.

soldiers face the risk of attack on daily bases, whole system is based on trust and is strongly performance-oriented. Young commanders can even outvote the senior officer and choose another one – the one the soldiers trust. Also the civil hierarchy system is naturally diminished in army, because the taxi driver can command millionaires, twenty-three years olds can train their uncles, students their professors. The key for leadership is the soldiers´ confidence in their commander. Soldiers are pushed to argumentation, they are asked to express their doubts or propose solutions. After the military service, young people are coming back to civil life, but they are carrying everything what they learned in the army. Moreover they are using these skills in their civil lives and in their work as managers, entrepreneurs, scientist, etc. They are focused on performance, effectiveness, are used to trust and be trustful and always question every proposal and decision in companies. Such a human nature is supportive for innovation, gaining new knowledge and excellent work performance. The authors of book Start-up Nation describes characteristics of typical Israeli entrepreneur: "Assertiveness versus insolence; critical, independent thinking versus insubordination; ambition and vision versus arrogance – the words you choose depend on your perspective, but collectively they describe the typical Israeli entrepreneur." It has been examined, that young people after the military service improved their problem-solving capacity, had better ability to cope with physical difficulties and emotional tensions, enhanced independence, self-confidence, and a greater willingness to take responsibility.

Units in Israeli army play similar role as prestige universities around the world. Many Israelis are positioning themselves to be recruited by the Israel Defense Forces (IDF) elite units. The unit in which an applicant served tells prospective employers what kind of selection process the employee navigated, and what kind of skills and relevant experience he or she may already possess[62]. One of the biggest advantages being in army is the network, the young soldiers gain. They are serving two or three years with potential business men, entrepreneurs, venture capitalists, etc. The military units have large alumni groups that are in touch and meet regularly and the meetings are focused on business networking. Successful entrepreneurs give presentations at the reunion about their companies and industries. KBE is a concept of economy based on information and knowledge. To successfully implement the KBE, the interconnection between different industries, academic divisions and entrepreneurs is inevitably.

Equality and health

Israel tries to give equal opportunity to all its citizens. A full 46.54% of all employees in the Israeli economy are woman, according to the IMD Competitiveness Yearbook. This is really high rate compared to other countries such as the US (46.03%), Germany (44.57%), Japan (41.43%). This data shows the emphasis Israel places on integrating women into the labor market as part of an overarching policy of equality. The health status of Israel's population, as indicated by life expectancy at birth and the annual growth rate of the population, puts Israel in a respectable position compared to other countries of the industrialized western world. Life expectancy in Israel is 82 years, identical to the life expectancy in Canada and France. The high life expectancy in Israel is a result of a number factors including: the general infrastructure of high-standard health services, the high-quality of medical research and medical resources, an exceptionally well-developed hospital system, and a high number of physicians and medical specialists per capita in Israel. According to the Human Development Report, between 1990 and 2004, the number of physicians in Israel per 100,000 people was 382, placing Israel 7th out of 63 developed countries.

3.4 INNOVATION SYSTEM

The incentive to develop functioning innovation system in Israel came again from initiative of Israeli leaders. Moreover, they have initiated innovation process connected to commercialization and entrepreneurship. Therefore, since 1970s, government made huge effort in direct support for mostly small firms and industries in their research. Government launched also several other initiatives to support R&D and innovation process. For several years, Israel is ranked as number one country in investments in research and development in the world. According to the OECD data, Israel spends 4.36 % of GDP on R&D support in 2011. Israelis see the involvement of R&D specialist very important in every area of economy. Thus Israel workforce includes 138 R&D professionals per 10,000 employees – about three times the ration in the UK, for instance. Most government ministries have a chief scientist to encourage the commercialization of science and technology in their respective area of responsibility.

Policies towards innovation-based competitiveness

Innovation-based competitiveness is a multidimensional phenomenon for which knowledge generation is an important but insufficient condition for innovation-based growth. The innovation capacity of an economy depends not only on the supply of R&D but also on the capability to absorb and diffuse technology and on the demand for its generation and utilization. Because of the policies we have already mentioned in this part of our diploma thesis and of large government support for new entrepreneurs, start-ups and development of human capital, Israeli economy is prepared to absorb and implement new innovations. Moreover, there are also other policies that focus on generating R&D research and diffusion of innovation.

1. MAGNET Program

The MAGNET Program is an initiative of the Office of the Chief Scientist of the Ministry of Industry, Trade & Labor. The program sponsors innovative generic industry-oriented technologies in order to strengthen the country's technological expertise and enhance competitiveness. Main goal of the program is to allow companies to develop technologies in addition to all the other activities of the company. The program operates in four main tracks:[70]

1) Consortium – Generic Technology R&D Channel - is a pre-competitive R&D within a consortium that includes a number of commercial companies together with research personnel from at least one academic or research institution. The R&D focuses on new generic technologies that will lead to new generation advanced products. The industrial partners enjoy a grant amounting to 66% of approved R&D costs, whereas the academic partner will receive 80% of said costs. The Program period is 3 to 6 years.

2) Association – many existing technologies do not require redevelopment. They rather need more "users". Because of that members of the same industrial sector organize "users" association, so more companies can benefit from the latest know-how.

3) Magneton – Technology Transfer Channel - Distribution and Implementation Channel - This program is to further support an already existing relationship between industry and an academic institution. The grant in this case amount to 66% of the approved R&D costs. Duration is two years and grants up to USD 800 K.

[70] MAGNET. About Us. [online]. 2015. [cit. 2015.03.25.] http://www.magnet.org.il/article.aspx?id=847.

4) Nofar – From Basic Research to Applied Research – is a pure academic research program for basic and applied research. The goal for research is to attain a milestone that will enable an industrial company to access sufficient information for investing in and proceeding with R&D. A minimal requirement of this program is for a company or incubator to invest 10% of the development costs, at this stage, complementing the 90% grant given by the government.

2. MATIMOP – Israeli Industry Center for R&D

MATIMOP[71] is the government agency that generates and implements international cooperative industrial R&D programs between Israeli and foreign enterprises. Its main objective is to build industrial infrastructure, and nurturing industrial innovation and entrepreneurship. Such an agency is very helpful because of Israel´s distance from global markets. The Government of Israel has entered into more than 40 bilateral Industrial R&D Support Agreements all over the world and participates actively in 5 multinational European programs (EUREKA, Eurostars, CIP-eEN, Galileo, ERA-NET). All programs share common benefits for Israeli companies, as well as offer international companies access to Israeli industry's capacity for innovation. MATIMOP offers help to Israeli companies in searching for partners abroad, assist international companies find suitable Israeli partner companies to team up, promotes Israeli companies and provides assistance in developing strategic partnerships.

3. Ministry of Science, Technology and Space R&D programs

Israel is small export-oriented country. It is dependent on international cooperation and partnerships. R&D internationalization is no longer driven by adaptation to local conditions but by a variety of new push-and-pull factors and involves complex stages of R&D (UNCTAD, 2006). Therefor the Ministry is running several programs to ensure knowledge sharing and internationalization. First of all it is the Researchers Exchange program aimed at creating networks of scientists for the benefit of science promotion. The ministry is funding air travel tickets and living expenses of Israeli researchers visiting different research institutions in order to promote international cooperation in common research areas. Secondly, Israel is member in many international scientific organizations

[71] More about Matimop you can find on: http://www.matimop.org.il/about_matimop.html.

(OECD, UNESCO, ESRF, EU Programs). One of the programs Israel is involved is also ERA-MORE.[72] ERA-MORE network counts about 200 Mobility Centres and numerous local contact points in 32 different countries, providing personalised assistance to mobile researchers from inside and outside Europe. The purpose of the initiative is to create a more favourable environment for researchers´ career development. Moreover, Israeli government support also unusual programs as Israel Space Agency (ISA).[73] Its goals include advancing infrastructural research at academic and research institutions; supporting the development of innovative and unique space technologies by Israel Aerospace Industries; cultivating a new generation of space scientists through space education and community projects; and encouraging the expansion and growth of Israel's space industry.

Intellectual property rights

In KBE it is very important to insure the right balance between intellectual property rights and spreading of knowledge. Therefore the country does not maintain a cohesive national policy regarding technology protection and transfer, the attitudes and methods that exist are profoundly influenced by basic bond of Israeli Universities to Israeli government. Israeli universities recognize the conflict of interest that is likely to emerge owing to the collaboration between researchers from academia and those from industry and other commercial enterprises, nevertheless, all universities encourage such collaboration and most of them cherish the academic freedom of faculty members, above any other economic benefit that may ensue. It is for this reason that they protect the faculty´s right to publish – with restrictions, including the need to report to and receive clearance from the institution´s administration prior to the publication of a new discovery.[74]

The role of IDF

We have already explained the role of compulsory military service on the development of human capital. However, IDF is often recognized as a major contributor to the development of Israeli High-tech industry. Many entrepreneurs are retired soldiers and many start-ups are based on technical innovations that originated in the army. In most cases, the founders were directly involved with the particular technology during their

[72] More about ERA-MORE you can find on: http://ec.europa.eu/research/era/more-effective-national-research-systems_en.htm.
[73] More information here: http://most.gov.il/english/space/isa/Pages/default.aspx.
[74] Getz, D. SEGAl. V. The Israeli innovation system: An overview of national policy and cultural aspects. 2008. Israel Institute of Technology. Haifa. www.neaman.org.il.

military service. As a small country, Israel has always strived to maintain a strong military advantage over potential aggressors. Therefore the army regularly invests large amounts of money in research and development. Israel defense industry is focused on advanced system designed to be installed in acquired American or other platforms. The knowledge in defense industry can be easily transformed and used in producing civilian spin-offs in areas of security, developing antivirus software, internet security, electronics, etc.

4 IMPLICATION OF KNOWLEDGE BASED ECONOMY POLICIES IN SLOVAK ENVIRONEMENT

As we have already mentioned at the beginning of the master thesis, Slovakia is young country that has made huge progress in the last 20 years regarding to decentralization of the economy and building its market economy. Since 2010 Slovak economy has been growing much faster than the EU average - Slovak economy grew 2.4% while the EU grew only 1.3%[75] in the 2014. Slovakia has built developed industrial economy able to compete within the EU. However the 21st century is a century of knowledge and innovation. Therefore it is necessary for Slovakia to move towards KBE in order to compete on international markets in the future.

According to the analyzes of Israeli KBE policies we made in the previous part of the master thesis, we are proposing strategy that could be implemented by Slovak government in order to move towards developed KBE. The goal of this part of the thesis is not to propose detailed policies that could be implemented. It´s rather a proposal for the main strategies and way that could Slovakia take. The detailed description and implementation of the policies is a subject for further discussion.

4.1 The Role of Government

In Israel, government plays an important role in leading the nation towards KBE. The "top-down" approach has been implemented. Government decided to strengthen entrepreneurship, start-ups and innovations, and therefore focused its policies on long-term support of those areas. Israeli government decided country´s comparative advantage would be high-skilled (knowledge) workers and entrepreneurship, so it started to invest in R&D

[75]EUROSTAT. Real GDP Growth rate. [online]. 2015. [cit. 2015.04.05.] http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tec00115&plugin=1.

and programs related to innovations, investments and venture capital. Government was in the role of accelerator of change and stood up in a position of risk taker to prepare the way for private investors and entrepreneurs. On the other hand, the decision to leave the market for private players was made in the right time. When the market was prepared, Israeli government left the space for privatization and private players. Very important fact is that the policy changes haven´t lasted just one election period, but they were continuous. Therefore the policies have brought expected results. To achieve such a continuous policy there must have been set up long-term goals that were supported by wide public and majority of political parties.

Slovakia is young state and it seems like it´s still trying to find its way. Shifts between right-hand democrats and social democrats in governance have caused changes in priorities and amount of financial support for entrepreneurship. Slovakia´s comparative advantage is cheap skilled workforce. Therefore at the 1990s government supported inflow of big transnational companies that needed cheap qualified workers. At the end of 20th century was this step inevitable to decrease unemployment and start up market economy. However 20 years later it may not be the best strategy. Some Slovak governments have supported entrepreneurship more, some less. Strategic role plays not only the direct support of entrepreneurs but also cultivation of entrepreneurial environment. When the bureaucracy is too complicated and taxes too high, the willingness to start enterprise is decreasing. The long-term strategy of European Union is to support SMEs. There are several EU programs that afford financial support to these entrepreneurs. According to European Commission, more than 99% of all European businesses are SMEs. They provide two out of three of the private sector jobs and contribute to more than half of the total value-added created by businesses in the EU.[76]

Even though the EU strategy for SMEs is very favorable, since the social-democrats came to power in 2012, the situation for SMEs and entrepreneurs in Slovakia has worsened. The corporate tax has risen from 19% to 23%, the mandatory social and health insurance has increased and since 2014 firms must pay so called "tax license" even if they get loss (41,2% SMEs got zero or loss in 2014).[77] Because the tax increase by 4% didn´t bring expected amount of money in public finance government decided to decrease

[76] European Commission, Facts and Figures about EU´s Small and Middle-sized enterprises. [online]. 2015. [cit. 2015.04.05.] http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/index_en.htm.
[77] FINSTAT. Analýza a štatistiky dane z príjmu firiem za rok 2014. [online]. 2015. [cit. 2015.04.05.] http://www.finstat.sk/analyzy/statistika-dane-z-prijmu-firiem-2014.

the tax on 21%. It seems like the main goal of the government is to secure income to the public budget rather than cultivate environment for entrepreneurs. In Slovakia SMEs (also with self-employees) employed 59% of all employees in 2012.[78] There are also some very successful Slovak high-tech companies competing in world market (ESET, Sygic). Recently the aeromobile was developed and constructed by Slovak engineers. These examples prove there is a potential to develop innovative companies in Slovakia.

On the other hand, the government supports big transnational companies by giving them subsidies, state aid, and tax vacations. Just in 2012 got twelve big firms tax relief more than 120 mil euros.[79] These big firms are mainly heavy industry companies. There is a risk, that these transnational companies may leave Slovakia as soon as they find cheaper labor force in other countries. The problem regarding to development of KBE is that the biggest government support goes to manufacturing firms, not businesses focused on high-tech, innovations, and new trends.

If Slovakia would like to successfully move forward KBE, we see very important that Slovak government would keep these two approaches:

- *Long*-term i*mplementation of KBE policies* – we recommend also for Slovakia implementation of "top-down" approach where the government is taking the role of supporter of the KBE environment and risk taker. It is impossible to implement KBE during one election period; therefore these police must be publicly recognized as priority for Slovakia and be supported regardless on the governing party.
- *Smart combination of public and private money and control* – government plays a necessary role of implementation the KBE. However, very important is to know, when is the right time for the government to leave the space for private players and let them to lead the programs and initiatives. Well-developed private sector is usually more effective than the public.

Regarding the KBE policies we recommend focus on these four areas: 1) Entrepreneurship support, 2) Education reform, 3) Innovation support, 4) Fight against corruption and 5) Interconnections development. Some of the proposed policies can bring very nice results in short-term period. Some policies required long-term approach and patience.

[78] Big firms (250+) employed 2.,3%, public and non-profit sector employed 17.2% - Statistics Bureau of SR.
[79]TASR. Desať firiem dostane daňové úľavy vo výške viac ako 121,19 milióna eur. http://www.teraz.sk/ekonomika/desat-firiem-dostane-danove-ulavy-v/24983-clanok.html.

4.2 Entrepreneurship support

Entrepreneurial culture

The internal motivation of individual, "can do" approach and acceptance of failures in society are inevitable for development of strong entrepreneurial culture. Israelis are naturally very assertive, they are constantly looking for new opportunities, see problems as challenges and never give up. Slovak culture is not naturally like this. Communism has killed dreams, passion, freedom, self-confidence and willingness to take some risk. Therefore it is necessary to start to gradually build this culture. We see important to:

- *Use the media* - society should value and appreciate smart and skillful people who are representing Slovakia on the international markets. Their stories should be promoted in media. Media should share successful stories of Slovak businessman and accept also failures. Failures should be represented as an inevitable part of success.
- *Cooperate with successful Slovak businessman* – every student should have the opportunity to be taught by a person with entrepreneurial practice. Successful businessman should be asked to be involved in education process to share their knowledge and also contacts.
- *Progress report about Slovak entrepreneurship* – a yearly report made by government which will highlight the most successful entrepreneurs and innovative firms. The entrepreneurs should be awarded by the prime minister or president to feel the support from the government. The government should show Slovak entrepreneurs are valuable for the country and it should emphasize they are the future.
- *Incorporate entrepreneurship education into the educational system* – already in the primary school pupils should be encourage to critical thinking, to present their ideas. School should give the pupils and students space to realize their own ideas, so the students will have experience they can achieve and change things they are passionate about.

To change the culture of the nation is a long-term process and sometimes need one or two generations till it is fully implemented. Because of that it is necessary to start implementing these policies as soon as possible.

Stop emigration

The power of economic growth in Israel has been built on immigration of highly educated and skillful immigrants. Immigration is not really the case for Slovakia; however

Slovakia could stop emigration of young educated people from the country. The best Slovak capacities are studying at foreign universities or leaving Slovakia after studies. However Slovak people with experiences from abroad could be the accelerator of economic growth in Slovakia if they get opportunity to realization. Every public institution should have two or three positions where only Slovaks with experiences from abroad can work. They should also get a space to realize the ideas and should get a power to change something.

Not every Slovak living abroad will come back to Slovakia. These Slovaks are anyway great asset to Slovakia if they are good connected with Slovak enterprises, universities and public institutions. It is necessary that in a big metropolis such as London, New York, Paris and others where big Slovak communities are and many Slovak students live will be organized conferences to connect these people by the support of Slovak government. Slovak organizations will present opportunities for cooperation with the Students and experienced entrepreneurs or Slovak people at good working positions. Such a conference was already organized in October 2014 in London by private organizations with support of Slovak president. Connections are a necessary asset in the KBE economy and Slovaks living abroad are huge advantage for Slovakia. They should get also voting right and still feel welcomed in Slovakia. To organize conferences, safe two or three positions in public institutions for Slovaks with experiences from abroad and give Slovaks in abroad voting rights are cheap and quick solutions that can bring huge impact.

Establishment of Incubator Program

There already are some public programs that support entrepreneurs in Slovakia, for example the Slovak Business Agency[80] (offering microcredits, advices in tax and legal issues within Slovakia and EU), and the Ministry of Economy (provides some kinds of subsidies for chosen economic areas). However, also the indirect support of Slovak entrepreneurs could be stronger with the emphasis on long-term development of cultivation entrepreneurial environment. Slovakia is still missing programs for support starting entrepreneurs. There are some technological incubators in Slovakia operating mainly in

[80] **Slovak Business Agency** (till 28/2/2014 the National Agency for Development of SMEs) is crucial, and is the oldest specialized non-profit organization for the support of small and medium-sized enterprises (SMEs). Slovak Business Agency was founded in 1993 by a common initiative of the EU and the Government of the Slovak Republic. It is the unique platform of public and private sectors. http://www.sbagency.sk/.

cooperation with universities (University Technology Incubator of STU[81], VTP[82] Žilina, SPOT, Connect and others). However these incubators doesn´t provide such a complex services as the Israeli ones and do not invest in start-ups in such extend as Israelis. Moreover, government is not the guarantee of loans and the risk taker. There is a strong assumption according to Israeli Incubator model, that smart public investments could accelerate private investments and pay the invested money back in taxes of successful companies. The right combination of experienced entrepreneurs and experts who can coach and mentor starting entrepreneurs, and public financial support are necessary for building successful organizations. Government should be in position of risk-taker and developer of safe environment for entrepreneurship and new ideas development.

Because there already are some working incubators in Slovakia, government could start to support the existing incubators by the grants that will be paid back if the organization achieve in a long-term. Government could support two or three project each year in each Incubator. The support in next year will depend on the Incubator´s quality results from last year, so the money cannot be misused. This can be implemented quickly and can bring nice results.

Venture capital

Presence of venture capital is inevitable to build strong enterprises. Venture capital market in Slovakia is very small and backward. There are few funds that offer venture capital such as Slovak-American Entrepreneurs Fund (SAEF) and Slovak Venture Capital and Private Equity Association (SLOVCA) and also some private investors. Together with the development of entrepreneurial culture, also the venture capital market must be developed and it will be a long-term process. Government should step in the position of risk taker and guarantee the investments of investors to local venture capital funds or to starting Slovak businesses.

4.3 School reform

Human capital is one of the most valuable assets in KBE. As we have already mentioned, there are many foreign companies coming to Slovakia because of cheap skilled workforce. However, the goal of Slovak universities should be to prepare knowledge

[81] Univerzitný Technologický Inkubátor. About Us. [online]. 2015. [cit. 2015.04.05.] http://www.inqb.sk/en/.
[82] VTP Žilina. [online]. 2015. [cit. 2015.04.05.] http://www.vtpzilina.sk/#novinky.

students able to innovate and compete worldwide. Even though the number of students applicants to universities decreases each year (from 2007 till 2014 the number decreased from 85,000 to 60,000 per year), there is still 36 universities in Slovakia. Universities get subsidies from government according the number of students they have. The emphasis is on quantity, not on quality. The education system in Slovakia requires a huge reform. Here are some recommendations:

- *Increase the reputation and salaries of teachers* - huge problem in education are low salaries for teachers, especially in primary and secondary education. Slovakia pays the least from the OECD countries to teachers in upper secondary education.[83] Talented young people don´t want to become teachers because of low life standard and not favorable reputation of teachers. Therefore this profession is chosen usually by the weaker and less-motivated students and the quality of education decreases. The government spending on education must increase and the salaries must gradually rise.

- *Individual approach* – the studying system is based on general skills that must all students at primary and secondary school master. There is no space for activities pupils are more interested in or space for additional time for students who are weaker in some subjects. Therefore the system should take into account the individuality of each pupil and focus on subject the students enjoy. By the individual approach student can also improve their skills in subjects they are weaker at.

- *Improve the content of education* – there are three parts of education – knowledge development, skills development and experimentation. Nowadays the schools system is mainly focused on knowledge development. However in the internet age the education should focus more on skills and experimentation development. The key knowledge for a person is how to access relevant information one need for a particular task and know how to use this information for solving complex problems. Therefore the content of education should be focus more on soft-skills as argumentation, critical thinking, presentations skills, critical reading, writing etc. It is also important to find innovative ways of involving the scientific and business community in education, so the students are in touch with practice.

- *Universities reform* – the amount of students should decrease by relevant number, so the individual approach can be developed also at universities and only the best students will get on the universities. Nowadays there are many degree employers on positions

[83]OECD. Education Indicators in Focus. [online]. 2015. [cit. 2015.04.15.] http://www.oecd.org/education/skills-beyond-school/EDIF%202014--No21%20(eng).pdf.

where is no degree needed. These students are burden for public budget and don´t bring desired added value for economy. Universities should be paid by the quality of education, not by quantity of students and students should pay some amount of tuition for education. If students must pay for their education, they will choose high quality universities. That will increase the competition between universities and increase the quality. Students should be given space to freely choose subjects they are interested in. That will increase the pressure on teachers to increase the quality of subjects otherwise they won´t have any students.

4.4 Innovation support

Increase spending on R&D

Investments are necessary in order to achieve better results in future. There cannot be any improvement without giving up today´s consumption in order to bigger consumption in future. Investments, especially in R&D are inevitable for successful development of KBE. Slovakia spent only 0.83 % of GDP on R&D. Only Romania and Greece spend less from the EU countries. The R&D is therefore dependent on private spending. Research activities are not always successful and it takes a lot of time to test new ideas. Private companies invest in research only if there is high probability of return of investment. Professors and researchers are having hard time to finance their research if it is not directly connected to commercialization. From January 2015 government decided to indirectly support private R&D by entrepreneurs and firms, so they can use so called "super count out" on R&D costs and therefore decrease their taxes. However, Slovakia is still missing direct support for academic or commercial R&D activities similar to Magnet Program in Israel. Government should start to gradually increase the spending to R&D and support successful Slovak researchers and innovators.

Knowledge infrastructure

Slovakia as a small country is dependent on international cooperation and partnerships. R&D is no longer driven by adaptation to local conditions but by a variety of new push-and-pull factors and involves complex stages of R&D. Therefore it is necessary for government to run several programs to ensure knowledge sharing and internationalization. To such programs belong international exchange of scientists and researchers, membership in research networks as ERA-MORE and others. Conferences

focused on knowledge and innovation sharing for public and also private institutions to make interconnections is very important.

Commercialization of R&D

Research without commercialization does not bring desired results. Therefore the government should ensure that the R&D is connected to firms and entrepreneurs that may be interested. One of the options is establishment of chief scientist on each ministry to encourage the commercialization of science and technology in their respective area of responsibility. These people should be responsible also for building the knowledge infrastructure.

4.5 Fight against corruption

None of the policies mentioned above will be successfully implemented if the country is heavily corrupted. Slovakia has big troubles with corruption and justice system. Establishment of special unit that will fight against corruption, will be independent and have power to act may be the first step in order to defeat corruption. Also strict punishments for responsible ones must be enforced.

4.6 Interconnections

Neither R&D, nor big investment can bring success to Slovak economy on its own. Probably the most important aspect of KBE is the interconnection. R&D alone will not bring such results as when it is connected to commercialization and when it its results are shared by more players. New starting businesses not only need finance capital, but also good mentors, venture capital, tax incentives, etc. Therefore the KBE policies should be implemented as a whole not as an individual approaches of each ministry. Public sector, private sector, nongovernmental sector, universities and research centers need to find way how to stay in touch and cooperate together. Very important are also connections to international markets, foreign investors and researchers.

Slovakia should also use its unique location in the middle of Europe. Bratislava has already become the hosting place for the fifth top foreign and security conference in the world - Globsec. There are no doubts Bratislava couldn´t host world´s top conference about entrepreneurship, research and innovation. Bratislava should use its unique position near Vienna and Budapest and connect with these cities in research and business projects.

There are many ways how to connect people from different areas. One of them are alumni groups of students of different universities, programs or field of interests. Especially the interconnection between different economy sectors and fields is important.

CONCLUSION

Slovakia is a young post-communist country that made a huge progress in strengthening the market economy in the last 20 years. Slovakia is one of the fastest growing countries within the EU and has a big potential. Nowadays, the biggest challenge for Slovakia is to successfully move towards KBE. In the time of globalization, only the economies based on knowledge and innovations will enjoy growth and high quality of life standard. Therefore, it is inevitable for Slovakia to implement policies that support development of KBE and create such an environment that will boost the country´s innovation and entrepreneurial potential.

For a country to successfully move from industrial to knowledge-based economy is a long-term process that must affect every aspect of the economy. In this master thesis we have described the main policies Israel has implemented in order to move towards KBE and we made recommendation for policies that could Slovakia implement.

First of all the role of government is very important in the process of moving towards KBE. The government should have the role of protector, risk taker and environment builder. It should invest substantial amount of money in R&D, development of human capital and set up pro-KBE policies. On the example of Israel we have seen that the "top-down" approach can work very effectively if the government knows in what extend should be involved in the process and when it is time to leave the process for the market and have just the controlling and supporting position. In the policies recommendation we see importance for Slovakia to focus on these main areas:

Entrepreneurship support: In order to strengthen entrepreneurship and formation of innovative businesses that are able to compete on international markets there are two main conditions that need to be fulfilled: supportive environment and accessible venture capital. Slovakia needs to moreover develop entrepreneurial culture and government should be strong supporter of Slovak entrepreneurs. Other policies in order to stop emigration of young people, stronger support for starting entrepreneurs and guarantees for investors should be developed.

Development of human capital – Good educational system with life-long learning opportunities is necessary for development of knowledge human capital. In education reform, it´s necessary to boost the status of teachers and raise their salaries, so the profession is attractive for the best young people. The individual approach to students is

very important in the education process. The education should focus on developing soft skills, critical thinking, argumentation and skills that are needed for entrepreneurs. Students should be learned to question everything, present their opinions and ideas. It is important during the studying years emphasize the importance of life-long learning and motivate students to reading and self-educating. It is necessary to interconnect students from different field of studies, build alumni groups where new connections can be made across different industries.

Innovation performance – There won´t be any innovations without investing in R&D. Slovakia should invest substantial amount of money into research of public but also private institutions. Regarding to research, its commercialization is very important so the investment to R&D will be returned. Also in this case, the interconnection between universities and research centers, private companies and state is inevitable to achieve desirable results. Conferences and workshops where the new inventions can be shared are very important. Researchers must be in line with the international trends. Therefore the international exchange programs of researchers are very beneficial.

Fight against corruption – None of the policies mentioned above will be successfully implemented if the country is heavily corrupted. The law enforcement and high degree of justice must be ensured in country with KBE. Establishment of special unit that will fight the corruption and strict punishments for responsible ones may be good first steps.

Interconnections: KBE is economy of information flowing and knowledge sharing. The process of exchange of knowledge must be ensured and different sectors of economy must learn how to cooperate together.

Some of the policies can be implemented right now and will bring very nice results in a short term. However, most of the policies require long-term approach and will bring the results after few years. Therefore Slovakia need to be patient, have a clear strategy and set the development of KBE as its priority. We believe, that Slovakia can achieve great results regarding to development of KBE if the strategy mentioned above will be implemented.

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