

The Effect of Foreign Direct Investments on Innovation and Technology Transfer

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Abstract

The aim of the paper is to study impact of foreign direct investment on the innovation and technology transfer. Foreign direct investment is a major driver of globalization, economic growth and industrialization. FDI has a particular impact on technological development, productivity and growth, and the acquisition and improvement of new knowledge or skills. FDI inflows would increase countries' R&D and innovation activities.

For the purpose of the study, the paper analyzes the positive and negative impact of foreign direct investment on the development of the country, draw special attention to the role of foreign direct investment in innovation and high technology transfer in transition economy countries. The paper examines the dynamics of foreign direct investment in Georgia. The Government investment policy is presented, which is related to the attraction of quality investments in the real sector of the economy, the implementation of investments in high-tech sectors and the transfer of knowledge and technologies. The authors investigated technology and innovation and linked it with Global Innovation Index.

Key Words: Foreign Direct Investment, Innovation, Technology Transfer, Global Innovation Index.

Introduction

Foreign direct investment (FDI) play an important role in transferring technology from home country into a host country. Technology transfer (TT) refers to any process by which a party in one country gains access to technical information of a foreign party and successfully absorbs it into its production process.

Literature Review

The literature on how FDI affects the innovative behaviour of firms in the host countries mostly based on the studies investigating the impact of FDI on growth, productivity, or wages in the host economies. Similarly, existing research that investigates whether FDI poses a negative or a positive externality on the production of new ideas or innovation is limited. This is of concern as innovation has been recognized as the engine of growth, and in growth models, such as those of Grossman and Helpman (1991) and Romer (1990); growth rate is modelled specifically as the function of the production of new ideas. In view of the fact that innovation plays a vital role in

fostering growth and productivity, it is intriguing to investigate how innovation responds to the increasing FDI inflows since the latter is also supposed to be an ingredient of economic growth.

The new trade theory, introduced by Samuelson (1939) pays attention to competitive advantage. According to the theory, new or differentiated goods, markets separated into sections, changes in technology and economies of scale have become most important issues to obtain more competitive power in the global market (Porter, 1998).

Today, the new trade theory raised by Krugman (1979), Dixit and Stiglitz (1979) and strengthened by Melitz (2003) argues that the international trade is no longer carried out by the state, but MNCs producing new high technology which make them more competitive in the global market. However, for developing countries, even they have rich natural resources; it is too difficult to catch the level of technology up in developed countries. However even if, they cannot produce different and high-tech products; they can transfer/import them via FDI.

FDI contributes to production of high quality/high-tech and value-added export products in the host country. MNCs tend to increase expenditures on their R&D activities which help to create the new ideas, increase stock of knowledge that stimulates innovation and new technologies, production process and more high-tech goods within low cost local investment environment in the host country. Tang and Caroliner, (2012) told that Chinese National Innovation System (NIS), is composed of two complementary building blocks: FDI-based innovation system and indigenous innovation system. They suggest that, NIS must be able to improve the absorption and innovation capability of domestic firms and to strengthen university-enterprise interactions.

Lin (2010) examined the global welfare effects of international technology transfer or diffusion from forerunner economies to follower ones via FDI on international trade in intermediate goods, licensing, and imitative activities. He set up a dynamic general-equilibrium model of three countries (North, Middle, and South) to analyze how the Middle's refraining South-bound FDI affects international technology diffusion, international wage gaps, and international welfare.

The developing countries are trying to attract more FDI, to import high-technology from developed economies via spill over channels such as reverse engineering, skilled labour turnovers, demonstration effects, and supplier–customer relationships (Cheung and Lin, 2004). For economic units (countries or firms) the ability to absorb, internalize and utilize the knowledge which potentially made available to them by FDI inflows, are significant and necessary conditions (Ito et. al., 2012).

However, the absorption capacity of domestic corporations depends on their technology/efficiency level and skilled workers/human capital (Gorodnichenko et al., 2014). Zhang (2014) has investigated effects of FDI, on the Chinese industry by estimating several specifications. He used a large panel data for 21 manufacturing sectors and 31 regions covering the period of 2005–2010. He constructed the multidimensional index, to measure industrial performance. He used total share and per capita industrial output by FDI as independent variables which seem to be more

suitable in capturing effects of FDI on Chinese industrial capabilities. He suggests that FDI has become a driving force for industrial performance as increased Chinese *Industrial Competitiveness* (IC) - ability to produce, competitive export manufactured goods, enhanced low-tech manufacturing and contributed interaction with local human capital during 2005–2010 period. The "*transfer of technology and managerial knowhow*" to host country are considered to be positive spillover effects on the economy. These effects may be remarkable by means of labour turnovers of skilled workers which enable local firms to internalize the technological know-how obtained from MNCs and make it become part of their attitude or way of production.

The internationalization of industries and research and development (R&D) activity by MNCs are significant factors for sustained economic growth and development of product or process innovation (Gorodnichenko et al., 2014). Cheung and Lin (2004), find empirical evidence about positive spillover effects of FDI on domestic patent applications, in China. Ito et al. (2012) examined the impact of R&D by foreign MNCs, on Total Factor Productivity (TFP) and patent application in Chinese domestic industry. They found substantial intra-industry spillover effects which were mostly stem from foreign MNCs' R&D activities that promote patent application and TFP. Sandu and Ciocanel Bogdan, (2014), confirmed that FDI are increasing production capacity of high-tech products, the number of patent applications and also are improving the national intellectual capital via R&D by the innovative foreign enterprises. Despite both private and public R&D expenditure have a positive effect on the medium and high-tech products export; private R&D expenditures, have a shorter term effect.

Gheribi E. and Voytovych N. investigated the impact of foreign direct investment on economically developed and developing countries and transition economy countries as far as technology transfer is concerned. The results show a significant foreign direct investment influence on the economic growth of developing countries and transition economy countries. FDI allows technology transfer from developed countries to further extract surplus from the developing countries and transition countries (GHERIBI E., VOYTOVYCH N., 2018)

Empirical Analysis

Turkish economists Faruk Guersoy and Hüseyin Kalonçou, investigated impact of foreign direct investment on GDP growth in Georgia, according the research the connection between foreign direct investment and GDP growth in Georgia is strong. empirical studies ("Foreign Direct investment and Growth Relationship in Georgia", International Journal of Economics and Financial Issues 2, 2012). The research is based and analysis 1997–2010 period. Positive relationship, statistically significant between GDP per capita and public expenditure on education found in study based on research the period 2000–2017. The paper suggests that education is contributing factor of per capita GDP (L. Totladze, 2020).

According National Statistic Agency of Georgia major economic sector for foreign direct investment is financial sector (42,4%). Energy sector 12,3%, manufacturing 12,1% and mining sector 10,3%, real estate 6,8% and communication 4,9%.

Foreign Direct Investment in 2012 - 2020

	2012	2013	2014	2015	2016	2017	2018	2019	2020 Preliminary data
FDI Million GEL	1048,2	1039,2	1837,0	1728,8	1652,6	1978,3	1306,3	1310,8	719

Source: www.geostat.ge

In 2016 was founded Georgia's Innovation and Technology Agency (GITA). Agency's mission is a formation of an ecosystem which improves all kinds of innovations and technologies, to promote a commercialization of knowledge and innovations, to stimulate using them in all fields of economy, to create an environment for the growth of innovations and high-tech products and developing high-speed internet nationwide. To achieve these goals Agency is planning to develop its own infrastructural zoom to improve innovations and technologies, to provide their powerful commercialization mechanisms according to country's innovation and technology development priorities; Facilitate the growth of venture capital and even private companies' participation in the process of researches and commercialization of innovations, creating effective mechanisms for increasing competitiveness, including the active enrichments of distance learning tools. For the effective implementation of these missions Agency specifies the priority directions to invest in the development of the infrastructure for innovations, which will be expressed in opening technological parks, innovation centers and industrial laboratories. Agency also cares about forming an innovative and technological commercialization support instrument, to reach a high level internet access across the country, also frequently conducting quality and deficient in a labor market trainings due to growth competitiveness, including for trainers, as well; The Agency initiates legislative packages to stimulate innovations and technology development and availability of financing mechanisms.

According GITA's information by Agency attracted 5 190 00Mln GEL FDI for innovation activity and additional 3 039 000 Mln Gel foreign direct investment attracted by start up companies.

For evaluate innovation activity and technological development different indicators are used. One of them is The Global Innovation Index (GII) co-published by Cornell University, INSEAD and the World Intellectual Property Organization (WIPO, a specialized agency of the United Nations).

The GII is a source of insight into the multidimensional facets of innovation-driven growth. Each year the GII presents a thematic component that tracks global innovation. The GII is based on 80 indicators including money spent on R&D as well as the number of international patent and trademark applications and other factors. The Global Innovation Index (GII) rests upon two sub-indices, the Innovation Input Sub-Index and the Innovation Output Sub-Index, each built around pillars.

Innovation Input Sub-Index: Five input pillars capture elements of the national economy that enable innovative activities:

1. Institutions (3 sub-pillars: Political environment, Regulatory environment, Business environment)
2. Human capital and research (3 sub-pillars: Education, Tertiary education, Research and development)
3. Infrastructure (3 sub-pillars: ICT, Energy, General infrastructure)
4. Market sophistication (3 sub-pillars: Credit, Investment, Trade and competition)
5. Business sophistication (3 sub-pillars: Knowledge workers, Innovation linkages, Knowledge absorption)

Innovation Output Sub-Index: Two output pillars capture actual evidence of innovation outputs:

1. Scientific outputs (3 sub-pillars: Knowledge creation, Knowledge impact, Knowledge diffusion)
2. Creative outputs (2 sub-pillars: Creative intangibles, Creative goods and services outputs)

The chart below indicate GII dynamic for Georgia

Global Innovation Index for Georgia 2012-2020

	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>
<i>Index Score/Value</i>	<i>34,3</i>	<i>35,6</i>	<i>34,5</i>	<i>33,8</i>	<i>33,9</i>	<i>34,4</i>	<i>35</i>	<i>37</i>	<i>31,8</i>
<i>Index Rank</i>	<i>71</i>	<i>73</i>	<i>74</i>	<i>73</i>	<i>64</i>	<i>68</i>	<i>59</i>	<i>48</i>	<i>63</i>

Source: <https://www.globalinnovationindex.org>

As can be seen from the analysis of the dynamics of this indicator, there has no substantial change in the country in terms of innovation. Judging by the current results, Georgia needs to encourage research and innovation, introduce innovative technologies in education, activate the private sector in the use, introduction and creation of innovations, and encourage the creation / production of innovative products.

Vertical FDI in Georgia outweigh the horizontal FDI, therefore, our problem in terms of investments is primarily in quality and the existing growing quantitative statistics do not clearly reflect the real changes. The introduction of technology in the country is virtually non-existent. It also has a less positive effect on increasing the FDI staff qualification level. For example, in technologically underdeveloped countries such as Cambodia or Bangladesh, vertical FDI can have a positive effect in terms of technology, because these countries are far behind in terms of technology. However, in Georgia, where the level of technology and industrial development experience is higher than in the above countries, the benefits from vertical FDI in these categories are almost non-existent, as investors have no reason to develop technologies and improve staff qualifications beyond cost as they optimize costs.

Conclusion

Attracting foreign direct investment is a vital necessity for Georgia. It can bring many positive effects to different sectors of its economy, both directly (vertical shear effect) and indirectly (horizontal shear effect). Georgia's place in the Global Innovation Index rankings means that there have been no turning points in the innovation development. The country has several important challenges that need to be addressed in order to make significant progress in the development of innovation. To make progress, effective steps need to be taken to develop education and research. The development of a high-tech cluster through foreign direct investment, priority sector and education policy in the context of Georgia is a highly interesting strategy. In the case of a high-tech development strategy, the main challenge is to introduce transfer of new technologies and productive knowledge.

ანოტაცია

ნაშრომი მიზნად ისახავს პირდაპირდაპირი უცხოური ინვესტიციების გავლენი შესწავლას ინოვაციების გავრცელებაში საქართველოში.

პირდაპირი უცხოური ინვესტიციები გლობალიზაციის, ეკონომიკური ზრდის და ინდუსტრიალიზაციის მთავარი მასტიმულირებელი ძალაა. პირდაპირ უცხოურ ინვესტიციებს (FDI) განსაკუთრებული გავლენა აქვს ტექნოლოგიურ განვითარებას, პროდუქტიულობის ზრდასა და ახალი ცოდნის თუ უნარების შეძენა-გაუმჯობესებაში.

კვლევის მიზნიდან გამომდინარე ნაშრომში გაანალიზებულია პირდაპირი უცხოური ინვესტიციების პოზიტიური და ნეგატიური გავლენა ქვეყნის განვითარებაზე, განსაკუთრებული ყურადღება აქვს დათმობილი პირდაპირი უცხოური ინვესტიციების როლს ინოვაციებისა და მაღალი ტექნოლოგიების ტრანზფერზე. მიმოხილულია ემპირიული კვლევები, რომლებიც ასახავს პირდაპირი უცხოური ინვესტიციების გავლენას ინოვაციებისა და ტექნოლოგიების ტრანზფერზე გარდამავალი ეკონომიკის ქვეყნებში.

ნაშრომში შესწავლილია საქართველოში პირდაპირი უცხოური ინვესტიციების დინამიკა. გადმოცემულია საქართველოს მთავრობის საინვესტიციო პოლიტიკა, რომელიც უკავშირდება ეკონომიკის რეალურ სექტორში ხარისხობრივი ინვესტიციების მოზიდვას, ინვესტიციების მაღალტექნოლოგიურ დარგებში განხორციელებასა და ცოდნისა და ტექნოლოგიების ტრანსფერს. საქართველოში ინოვაციების გავრცელების ტენდენციის შეფასებისათვის გამოყენებულია აგრეთვე გლობალური ინოვაციების ინდექსის (GII) დინამიკა. ზემოთაღნიშნული მიმართულებით განხორციელებული კვლევისა და ანალიზის საფუძველზე კი გაკეთებულია შესაბამისი დასკვნები.

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