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## The Influence of Foreign Direct Investment on International Technology Transfer

### Summary

This paper examines international technology transfer – the processes of movement of technological knowledge within or between countries. The aim of the paper is to assess the influence of foreign direct investment made by transnational corporations on technology transfer in the contemporary global economy. Technology transfer has played an important role not only in the industrial growth of developing countries, but also in enhancing the competitiveness of their enterprises in the international market. The influence of foreign direct investment (FDI) is an important factor strengthening the R&D sector and one of the most effective channels of international technology transfer. In our investigation, we discovered that the most productive technology partners of Ukraine, considering geographical distances, are the EU countries (Austria, Poland, Italy, and Germany). Considering this, Ukraine should deepen integration with the European Union and create favourable investment climate and conditions for the European TNC to attract manufacturing technologies from the neighbouring partner countries. Overcoming negative tendencies in efficiency of international technology transfer will help to improve economic efficiency in Ukraine. The article is of the research nature.

**Key words:** international trade, FDI, international technology transfer.

**JEL codes:** F15, F21, O40

### Introduction

One of the key challenges for any country is to ensure high rates of economic growth. Given experience of recent decades, in fact knowledge and new ideas provide a competitive, intelligent and necessary products on the market that are the main factors of economic growth leading countries. Financial capital and means of production recede into the background.

The beginning of the XXI century is characterized by the development of processes that have changed the mainstream of world economic growth and formed a new type - the innovation economy. Innovation economy involves reducing the role of raw materials and low-technology sectors and priority support high-tech and innovative industries.

The ability to create new technology and high-tech products, reflecting technological lead over competitors becomes a major competitive advantage. The relationship between science and technology is embedded in a number of schemes. Ideal design «science - technological knowledge - technology» describes the process of transforming knowledge into

innovation. The second approach recognizes the possibility of technologies to become the basis for understanding fundamental patterns where science can not immediately explain the essence of processes. Using practical instruments to implement new theoretical discoveries reflects the essence of the third approach (Myhajlovska 2006).

International technology transfer is directly related to the innovative development of the national economy in the context of innovative advantages in global markets of high-tech goods and services. Competitiveness, as defined by experts, is an integral feature of many economic categories, in the broad sense appears as a concept that reflects the position of the country on domestic and foreign markets, due to economic, social and political factors, and in particular the ability of countries to confront international competition on its own market and other markets.

## Methods

The development of the modern economies is determined largely by movement of capital, especially in the form of foreign direct investment. Foreign direct investment (FDI) is one of the traditional forms of international technology transfer (Kochel 2012).

P. Krugman (1979) determines FDI as an international transfer of capital to establish a branch in another country, in order to gain control over it. Foreign direct investments often are being used by the TNCs.

TNCs have an extraordinary impact on changes in the global economy. This effect systematically increases and depends on international technology transfer, namely: knowledge, technology, know-how. An important characteristic of TNCs and their impact is not only substantial asset values, but that the impact on growth is through the transfer of technology in the form of direct investment.

However, the impact of FDI in country can have not only positive but also negative effects in the field of technology. One of these negative consequences may be the attraction so-called old technologies that are already outdated, capital-intensive and have a detrimental impact on the environment.

In terms of the theory of comparative advantage and factor theory TNC can use the benefits that are caused by differences economic, natural and social conditions of the country-based parent company and the countries in which there are branches and other subordinate structure.

Transnational corporations are the important players in the global technology market, because TNCs control over 60% of foreign trade of about 2/3 of the world technological exchange accounted for sharing internal corporate multinationals. Over 60% of license revenues in industrialized countries are internally collegiate revenues. Also the global technology market is being characterized by a significant level of monopolization, namely 80%. The degree of monopolization of the global technology market is higher than the world

market of goods. TNCs have focused in their possession scientific and technical research, thus contribute to the further monopolization of the market.

Among the key factors of the competitive advantages of TNCs should provide the ability to use organizational and economic effect of concentration, scale socialized production and create favorable conditions thanks to their management. After considerable potential for improving the economic performance of leading corporations associated with the possibility of reducing production costs due to higher volumes, great factor in batch. In effect large scale should be emphasized that the TNCs use it with the greatest efficiency.

Indeed, this organizational form of business most clearly realized in widely known economic theory in the publication of the works of Smith's "Inquiry into the Nature and Causes of the Wealth of Nations" principle of economy of scale. Potential output growth and ensure big series production within TNCs makes it possible to fully use the potential for improving the indicators of economic and business activities and to reduce the unit cost per unit of output. Economy of scale is important in terms of ensuring high competitive potential TNCs. It should be noted that the increase in production of goods (with the involvement of other factors, including advanced technology and maneuver capital resources) creates additional opportunities to improve production and technological characteristics of the product that comes to market.

## Results

Further we studied technology transfer to Ukraine by analyzing relationship between levels of accumulated FDI in Ukraine from different countries and labor productivities in these countries, in order to find out, whether Ukraine attracts technologies from the most productive countries. We estimated productivity of labor by the indicator of GDP per person employed (data from the World Bank, 2014).

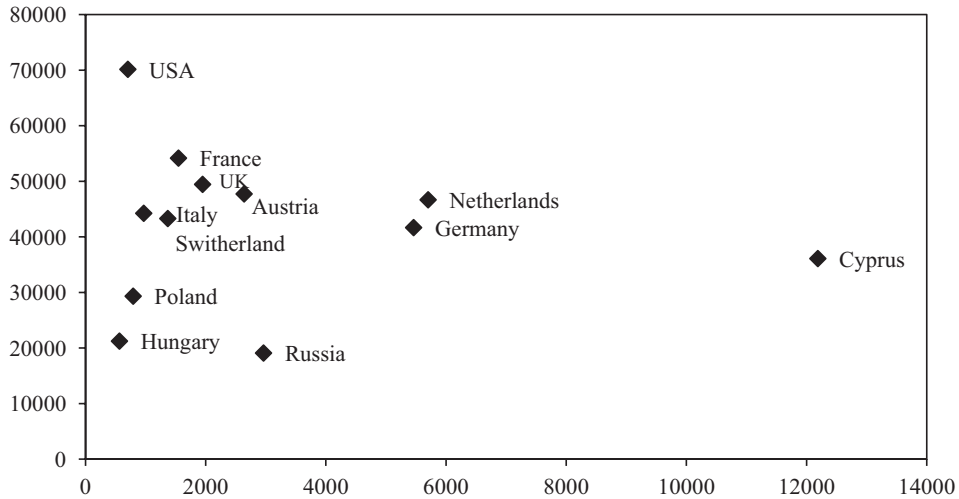
The figure 1 shows that the largest amounts of FDI have flowed into Ukrainian economy from Cyprus (since Cyprus has earned the fame of an offshore zone), Netherlands and Germany, while amounts of FDI from the most productive country in our sample (USA) are not very high. Moreover, high amounts of FDI have flowed from not productivity leaders, but countries, which are geographically located close to Ukraine (Russia, Hungary and Poland).

To consider the factor of distance between Ukraine and countries of FDI origin, we corrected the indicator of productivity, dividing it by the distance between Ukraine and respective country (data from <http://www.distancefromto.net/countries.php>).

Graph 2 shows that the most productive partners of Ukraine (considering geographical distances) are the EU countries (Austria, Poland, Italy and Germany), so, transfer of technologies from these countries seems to be the most reasonable, while the least productive partners (considering geographical distances) are Russia and the USA.

**Figure 1**

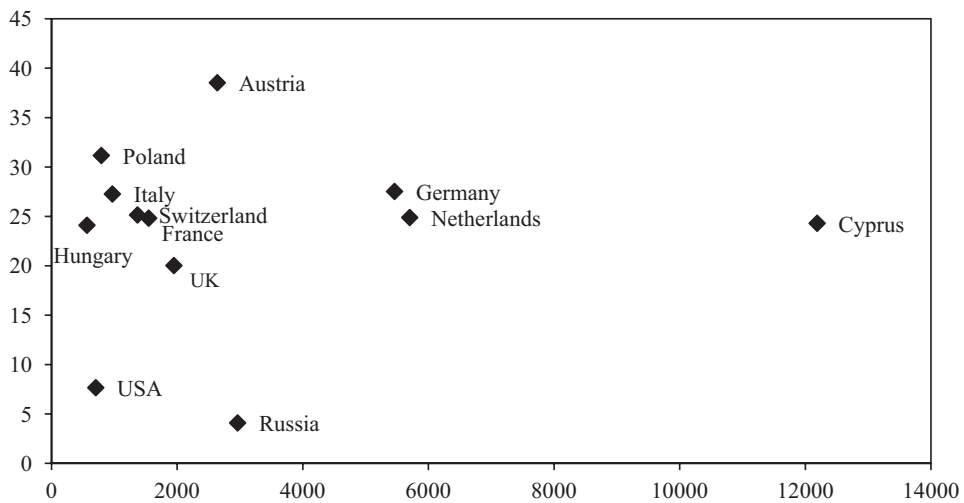
**Relationship between the labor productivity (in constant 1990 PPP USD, Y axis) and the level of accumulated FDI in the Ukrainian economy (million USD, X axis)**



Source: authors' calculations based on data from the World Bank (2014) and data from the State Committee of Statistics of Ukraine (01.10.2015).

**Figure 2**

**Relationship between corrected labor productivity (Y axis) and the level of accumulated FDI in the Ukrainian economy (X axis)**



Source: like in Figure 1.

Considering this, Ukraine should deepen integration with the European Union and create favorable investment climate and conditions for the European MNC to attract productive technologies from neighboring partner countries.

Innovation activity is a priority factors defining innovation in Ukrainian enterprises. Comparing the innovative activity of Ukrainian enterprises and enterprises in other countries, it can be argued that nowadays the level is low.

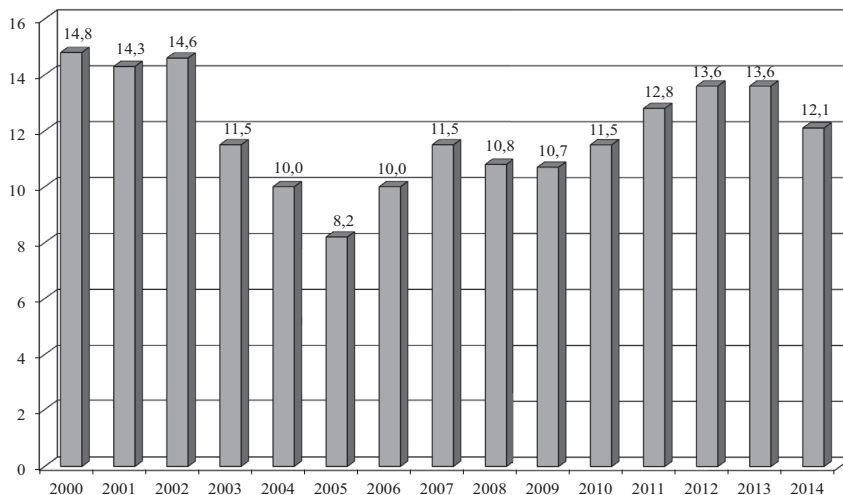
The dynamics of innovative activity in industrial enterprises in Ukraine by period 2000-2014 is shown in Figure 3.

Examining the dynamics of innovation in the enterprises, according to Figure 1, from 2000 to 2006 is a tendency to reduce innovative activity of industrial enterprises. Further there is a sharp increase in innovation activity from 11.2% in 2006 to 14.2% in 2007, but since the beginning of 2008 to the end of 2009 again observed decline in innovation activity since 2010 can be traced to a slight increase of 1%. The new rise accounted for 2011% when innovation activity was 16.2% in 2012 and 2013 can be observed increasing trend of innovative activity that is reduced by the end of 2014. In the 2014, the three-quarters of innovation active enterprises implemented industrial innovation (or 12.1%).

To sum up, the share of innovation-oriented domestic enterprises for the period from 2000 to 2014 decreased by 1.9%. In Ukraine for the past 14 years the number of industrial enterprises engaged in innovative activities and implemented innovations decreased.

**Figure 3**

**The dynamics of innovation technologies in industrial enterprises in Ukraine, 2000-2014\***



\* Since 2014 information has been presented excluding the temporarily occupied territory of the Crimea and the zone of the antiterrorist operation in the eastern Ukraine.

Source: based on data from the State Committee of Statistics of Ukraine (01.10.2015).

## Conclusions

In recent years Ukraine is trying to create a national investment policy for development and encourage innovation. Using the experience of advanced countries and the accumulation of financial and investment capital will introduce measures to strengthen the scientific and technological potential that can be used to increase the volume of financing of science, improvement of scientific and technical personnel, government support for innovation and the formation of innovative technological infrastructure. However, major changes are not observed.

Unfortunately, in Ukraine can be seen a situation where is quite difficult to calculate the mass appearance of their own innovative technologies. First, the creation of significant new technologies is intensive process and is available mainly large technology companies. Secondly, for the creation of any new technology requires some previous gains technological platform. In Ukraine, these conditions have not been created yet.

It is important effective implementation and application of a wide range of measures that would help Ukraine successfully integrate into the global manufacturing community.

Technological lag, which is observed in Ukraine, due to the following factors (Kohut M. 2014):

- (a) The lack of a comprehensive strategy of innovative development models at national level;
- (b) Imperfect legal framework, even existing laws are not always carried out at the appropriate level;
- (c) Under-funding of innovation;
- (d) Low level of demand for technological development in the country;
- (e) Lack of competition in domestic markets, manufacturers and suppliers of new technologies.

Summarizing the results, we note that in a global competition in the first place there is focus on innovation that allows you to get the most use and integrate innovative potential in international cooperation. Therefore, studying the experience of advanced countries points the feasibility of innovative policy, in particular for the effect of commercialization and implementation of advanced technologies in the market. Thus, for successful development of the national innovation system it is necessary to merge the experience of foreign countries, create its own model and adapt it to the realities of present-day in Ukraine, buying modern equipment and enter into licensing agreements with countries producing technologies. Also extremely important for Ukraine is further EU integration and creating a favorable investment environment. It is important to step up investment process and increase the volume of investment, including using foreign capital. Foreign direct investment will make it possible to ensure the innovative development of the country.

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## Wpływ bezpośrednich inwestycji zagranicznych na międzynarodowy transfer technologii

### Streszczenie

Niniejszy artykuł badawczy stanowi opis międzynarodowego transferu technologii – procesów, w których wiedza technologiczna przemieszcza się w obrębie lub między krajami. Celem rozważań jest próba określenia wpływu bezpośrednich inwestycji zagranicznych dokonywanych przez korporacje transnarodowe na transfer technologii we współczesnej gospodarce. Transfer technologii odgrywa ważną rolę nie tylko w rozwoju przemysłu w krajach rozwijających się, ale także w poprawie konkurencyjności ich przedsiębiorstw na rynku międzynarodowym. Bezpośrednie inwestycje zagraniczne (BIZ) są ważnym czynnikiem dynamizacji sektora badawczo-rozwojowego i jednym z najbardziej skutecznych kanałów międzynarodowego transferu technologii. Z przeprowadzonych badań wynika, że najbardziej produktywnymi partnerami Ukrainy, uwzględniając kryterium odległości geograficznej, są kraje Unii Europejskiej (Austria, Polska, Włochy i Niemcy). Ukraina powinna pogłębiać integrację z Unią Europejską, stwarzać korzystny klimat inwestycyjny oraz warunki inwestycyjne dla europejskich korporacji transnarodowych do uzyskania technologii produkcyjnych z sąsiednich krajów partnerskich. Przewyciężanie negatywnych tendencji w zakresie efektywności transferu technologii międzynarodowego przyczyni się do poprawy koniunktury gospodarczej na Ukrainie. Artykuł ma charakter badawczy.

**Słowa kluczowe:** handel międzynarodowy, bezpośrednie inwestycje zagraniczne, międzynarodowy transfer technologii.

**Kody JEL:** F15, F21, O40

## Влияние прямых иностранных инвестиций на международный трансферт технологий

### Резюме

Эта статья рассматривает международный трансферт технологий – процессы, посредством которых технологические знания движутся в странах или

между странами. Целью данной работы является оценка влияния прямых иностранных инвестиций из транснациональных корпораций по передаче технологий в современной экономике. Передача технологий играет важную роль не только в промышленном росте развивающихся стран, но также в повышении конкурентоспособности своих предприятий на международном рынке. Влияние прямых иностранных инвестиций (ПИИ) является важным фактором динамизирования сектора НИР и одним из самых эффективных каналов международного трансферта технологий. В нашем исследовании мы обнаружили, что наиболее продуктивными партнерами Украины, рассматривая географические расстояния, являются страны ЕС (Австрия, Польша, Италия и Германия). Учитывая это, Украина должна углублять интеграцию с Европейским Союзом и создавать благоприятный инвестиционный климат и условия капиталовложений для европейских ТНК с целью получения производственных технологий из соседних стран-партнеров.

**Ключевые слова:** международная торговля, прямые иностранные инвестиции, международный трансферт технологий.

**Коды JEL:** F15, F21, O40

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