# FUNCTIONING OF THE LOCAL PRODUCTION SYSTEMS IN BULGARIA, POLAND AND RUSSIA

## THEORETICAL AND ECONOMIC POLICY ISSUES

WYDAWNICTWO
UNIWERSYTETU
ŁÓDZKIEGO

# FUNCTIONING OF THE LOCAL PRODUCTION SYSTEMS IN BULGARIA, POLAND AND RUSSIA

## THEORETICAL AND ECONOMIC POLICY ISSUES

Edited by
Aleksandra Nowakowska

WYDAWNICTWO
UNIWERSYTETU
ŁÓDZKIEGO

ŁÓDŹ 2015

Aleksandra Nowakowska – University of Łódź, Faculty of Economics and Sociology
Institute of Spatial Economics, Department of Regional Economy and Environment
90-214 Łódź, 36 Rewolucji 1905 St.

REVIEWER
*Artur Ochojski*

PUBLISHING EDITOR
*Danuta Bąk*

TYPESETTING
*AGENT PR*

COVER DESIGN
*Stämpfli Polska Sp. z o.o.*
Cover photo: © Shutterstock.com

Monograph financed under a contract of execution of the international scientific project within 7th Framework Programme of the European Union, co-financed by Polish Ministry of Science and Higher Education (title: "Functioning of the Local Production Systems in the Conditions of Economic Crisis (Comparative Analysis and Benchmarking for the EU and Beyond"))

Monografia sfinansowana w oparciu o umowę o wykonanie projektu międzynarodowego w ramach 7. Programu Ramowego UE, współfinansowanego ze środków Ministerstwa Nauki i Szkolnictwa Wyższego (tytuł projektu: „Funkcjonowanie lokalnych systemów produkcyjnych w warunkach kryzysu gospodarczego (analiza porównawcza i benchmarking w wybranych krajach UE oraz krajach trzecich"))



Published by Łódź University Press
First Edition. W.06758.14.0.K
Ark. wyd. 8,7; ark. druk. 11,125

ISBN 978-83-7969-488-4 (P)
ISBN 978-83-7969-489-1 (E)

Łódź University Press
90-131 Łódź, Lindleya no 8
www.wydawnictwo.uni.lodz.pl
e-mail: ksiegarnia@uni.lodz.pl
phone (42) 665 58 63, fax (42) 665 58 62

Print and setting: Quick Druk

# CONTENTS

**Mariia Lyzun***

# TECHNOLOGY PARKS AS AN ELEMENT OF LOCAL PRODUCTION SYSTEMS' FORMATION[1]

## 1. Introduction

The competitiveness of the national economy which is based on the increasing role of innovation becomes of strategic importance under conditions of the globalization process. Innovations are one of the determinants of the effective production of goods and services, and thus provide a stable competitive advantage at the market. In the developed countries, technology parks are main elements of the infrastructure providing the innovative model of the national economy. They form a core infrastructure for the scientific and technological activities, fulfilling the function of the propulsive force for the innovation development.

* Assistant professor, PhD, Department of International Economics, Ternopil National Economic University, Ukraine.

[1] This article was prepared as part of the 7th Framework Programme FP7-PEOPLE-2011-IRSES Project No. 295050 FOLPSEC – Functioning of the local production systems in the conditions of economic crisis (comparative analysis and benchmarking for the EU and beyond).

In world practice, the variety of terms is introduced to define the technology parks. Among them: science park, high-tech (industrial) park, research park, cyber park, innovation center, R&D park, technological incubator, etc. appear. Despite such a wide diversity of terms, there are minor differences between some of them. However, the common approach is to define such terms as equivalent. The use of the different terms depends primarily on the country: in Germany – technology park, in the UK– science park, in the USA – research park, in France and Japan – technopoles, etc.

Creation of technology parks is based on the idea of a comprehensive high-tech industry under the creation of the new technologies. The important conditions for technoparks' development are the existing R&D technology potential, the availability of the skilled labor and venture capital market.

## 2. Some theoretical backgrounds of technology parks

The International Association of Technology Parks defines the technology parks as an organization managed by professionals whose primary purpose is to improve the welfare of the community by promoting the culture of innovation and competition among the innovative businesses and research organizations.[2] To achieve this, technoparks stimulates and manages the flow of knowledge and technology between the universities, research institutes, companies and markets.

Under the Law of Ukraine "On Special Regime of Innovation in Technology Parks", technology park (technopark) – is a legal entity or group of entities which act under the joint venture agreement without creation of the new legal entity and without joining of deposits in order to create an organizational basis for the introduction of the developed high-tech projects in manufacture of the globally competitive products.[3]

[2] C. Wessner, *Understanding Research, Science and Technology Parks: Global Best Practice*, Committee on Comparative Innovation Policy: Best Practice for the 21st Century; National Research Council: Report of a Symposium, 2009.

[3] Закон України "Про спеціальний режим інноваційної діяльності технологічних парків", від 16.07.1999, № 991-XIV.

The modern technology park is regarded as a territorial integration of science, education and production in the form of a union of scientific organizations, design bureaus, educational institutions, manufacturing companies or their divisions to accelerate the development and usage of the scientific, technological and technical advances.

The activity of all technology parks occurs under the following three basic models: American (the USA, the UK), Japanese and mixed (France).[4]

The American model of technology park is based less on public funding and uses more variety of the private investment. In the Western Europe the bulk of funding for the technology parks is carried out by the state: the United Kingdom – 62% Germany – 78%, France – 74%, the Netherlands – 70%, Belgium – almost 100%.[5] In the USA and the UK there are three types of technology parks:

– science parks;

– research parks, developing innovations only to the stage of the technical prototype;

– incubators (in the U.S.) and innovation centers (in the UK and the Western Europe) within the frames of which the universities rent out the land, premises, equipment for the startup companies.

The American concept of the technology parks is widely used as the base model of the creation of technology parks worldwide, but local features should be also taken into account.

The Japanese model of technology parks is based on the public support and associations of commercial companies. According to this model, the construction of the new cities is predicted – so-called technopoles. The first of such projects appeared in 1982, when 19 areas were selected, equally spaced on the four islands of the country.[6] Technopole has a clear list of "parameters": the location in a 30-minute drive from the parent city (with a population at least 200 thousand people) and within 1-day drive from Tokyo, Nagoya or Osaka; the area should not exceed 500 square miles; the modern enterprises, universities and research centers are combined with living area; the harmony with the local traditions and natural conditions. Technopole

[4] *Під парасолькою технопарків*, http://www.madein.dp.ua

[5] І. Чудаєва, *Технопарки світу: основні моделі та типи*, "Вісник Східноєвропейського університету економіки і менеджменту" 2010, Випуск 2 (8).

[6] *Ibidem*.

has its own binding statute. The creation of technopoles is funded mainly at the regional level – by means of the local taxes, fees, grants of corporations and various incentives provided by the central government. The core for a number of technopoles (Hiroshima, Kagoshima) is the construction of the scientific towns like Tsukuba. But still some of them are based just on the expansion of the scientific and engineering faculties of the local universities. The majority of universities create centers of "frontier technologies" – joint research incubators and venture capital.

The mixed model of scientific parks represents French "Sophia Antipolis" – the largest of them is located on the Riviera on the area of over 2 000 hectares, employing about 6 000 people.[7]

As of today, more than 2 000 technology parks and business incubators function throughout the world. The bulk of them are concentrated in the U.S., China, Russia, the UK, Germany and others. The first technological parks were an American phenomenon, which emerged in the 1950s to meet the needs of the entrepreneur researchers. Particularly the first technological park was based on Stanford University and being known latterly as the Silicon Valley.[8]

In general, the development of the technology parks in the world can be divided into 2 stages:

1. 1950 – the first industrial parks in the United States and its embryonic forms in Europe;
2. 1980 – the second wave of the technology parks creation in the U.S. and Europe and the emergence of technology parks in Japan and other Asian countries.[9]

The first technology parks in Ukraine have been established in 2000 for combining the science and the production activities at Paton Institute for Electric Welding, Institute for Single Crystals and Lashkariov Institute for Semiconductors and Physics.[10]

---

[7] *Під парасолькою технопарків*, http://www.madein.dp.ua

[8] Т. Черницька, *Регіональні виміри міжнародного науково-технічного співробітництва*, "Міжнародна економічна політика" 2013, № 1 (18), p. 105−127.

[9] І. Чудаєва, *Технопарки світу…*.

[10] І. Дерид, *Сутність і функції технологічного парку як об'єкта інноваційної інфраструктури*, "Вісник Харківського національного університету ім. В. Н. Каразіна" 2008, № 802, p. 11−15.

The rapid development of the global process of technology parks creation reached the highest level in the second half of the 80s of the last century. At that time, 23.38% of the existing technology parks were created according to the International Association of the Science Parks.[11]

## 3. Technology parks in the context of LPS

Technology parks in the structure of the local production systems should be considered from the two perspectives:

– firstly, the local production systems need technology parks as sources of the new ideas, inventions and discoveries that have the potential to become innovations and launch the first stage of the product life cycle;

– secondly, the most industrial parks are the gravity centers that are able to initiate the powerful centripetal forces that lead to the formation of a new local production system within the technopark's radius of influence.

While the first aspect is adequately represented in the economic literature, the second one is not fully considered.

Indeed, the local production systems based on technological parks have a number of advantages, the main of which can be classified into three groups (Figure 1): generation of innovation, productivity growth, the creation of new start-ups.

The innovations generated by the technological parks are often not related to the main activity of the local production system, leading to the creation of the new technological departments or even companies. Newly established firms may have the form of joint ventures and belong to the parent company, but often they became the independent competitors towards their initiators.

The innovations affect the localization of production because they stimulate the economic and social growth. R. Florida argues that firms and workers tend to migrate to the centers of the knowledge creation.[12] There is also an inverse relationship – the localization due to the territorial

[11] Т. Черницька, *Регіональні виміри...*

[12] R. Florida, *The Rise of the Creative Class And How It's Transforming Work, Leisure, Community and Everyday Life*, Basic Books, New York 2002.

proximity of the cluster's members, creates the favorable conditions for the transfer of knowledge (close professional contacts, "kitchen effect" etc.) that influence on the innovation intensity.

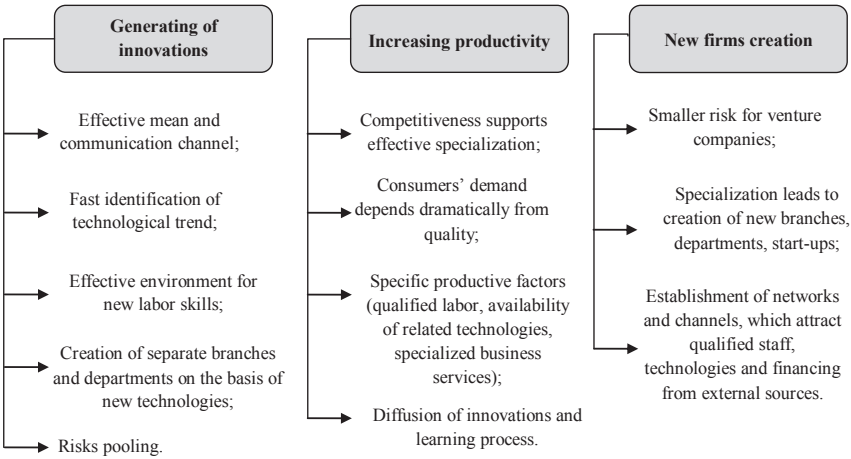


Figure 1. Advantages of LPS built on the technoparks' basis

Source: І. Ліщинський, *Агломераційні форми міжнародної та просторової економічної інтеграції України*, [in:] О. І. Амоша, С. С. Аптекар, М. Г. Білопольський, С. І. Юрій, *Структурні реформи економіки: світовий досвід, інститути, стратегії для України*, монографія, Економічна думка ТНЕУ, Тернопіль 2011, p. 591–605

The localization is a prerequisite for the further diversification by means of the economy of scale. In less populated areas there is usually a closer relationship between the social and economic elements resulting in the considerable homogeneity of the system. In contrast, the effect of the love of variety always attracts the new producers and consumers by expanding the boundaries of these local production systems.

J. Jacobs also notes that the diversification expands the range of the system components possible combinations.[13] The newly created combinations give an incentive to generate the social changes. This

[13] J. Jacobs, *The economy of cities*, Random House, NewYork 1969.

process is cumulative; it means that the diversity creates even the greater diversity. According to the Nemeth and Brown theory, the diversification prevents the group formulaic thinking which reduces the risks associated with the sudden changes in the environment.[14] There is also an inverse relationship between the innovation and the diversification. The creation of an innovative product or even a new industry is connected with the growth of specialization in production of each member of agglomeration within the existing sectors, leading ultimately to increased diversification of the overall system.

Thus, structures which are based on the technology parks forms linkages between different sectors and can become important centers of innovation and economic growth poles.

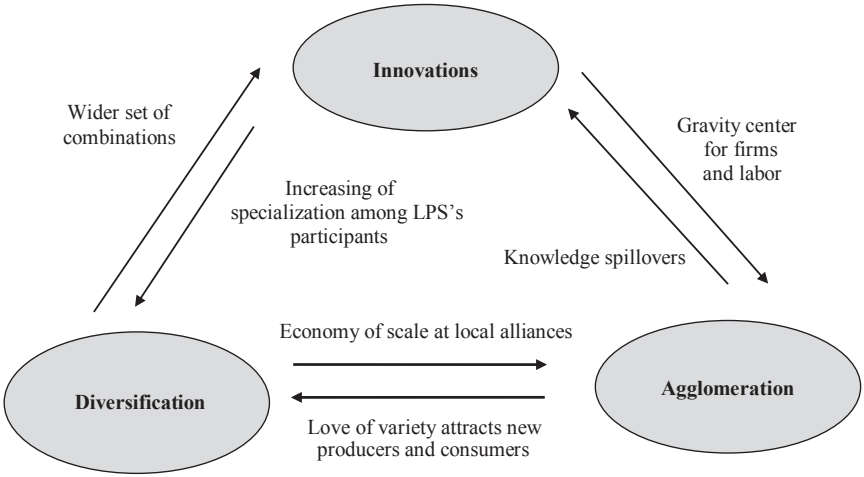


Figure 2. The relationship of innovations initiated by the technology parks, diversification and agglomeration among the members of the local production systems

Source: author's modification of: R. Florida, *The Rise of the Creative Class And How It's Transforming Work, Leisure, Community and Everyday Life*, Basic Books, New York 2002

[14] C. Nemeth, *Better than individuals? The potential benefits of dissent and diversity for group creativity*, [in:] B. Nemeth-Brown (eds.), Oxford University Press, Oxford 2003, p. 63−84.

Technoparks are the institutional basis for the local producers "nurturing" by forming an organic cooperative networks with the regional innovative institutions including industry, academic science, local self-governments, creating the strategies and plans which meet the special circumstances and characteristics of the region and by discovering the knowledge-based and small-but-technologically-capable businesses. Thus, the promotion of small business by technological parks may have the following forms:

– business supports: securing the state-of-the-art equipments and facilitate sharing them; support for production and prototyping; provision of office space, technical and managerial consulting service; support for local and global marketing; nurturing and supply of the capable workforce, etc.;

– business creation: discovering renowned technological businesses and support for business creation; technological transfer and commercialization of transferred technologies; securing high-tech businesses;

– technological innovation: discovering and promoting innovative technologies through industry-academy-research cooperation; vitalizations of the technological transfer and transaction; education and training of new technologies, etc.[15]

The influence of technology parks' formation on the regional competitiveness, revitalization of local authorities in order to strengthen the cooperation between the actors of the local production systems are presented in Figure 3.

Thus, under the current conditions, the economic growth at both regional and national levels requires creation of the appropriate conditions and mechanisms which encourage the innovation and application of its results in the economic practice. Worldwide experience shows that the process of the local production systems establishing is crucial for the regional development and the technology parks are catalysts that contribute to the formation of the knowledge-based industries and form the scientific and technical core of the entire economy. The innovative activity of the companies which are the parts of the local production systems, including the technology parks, is more intensive. Technological park is an effective form of the convergence of science and industry, which reduces to minimum the cycle "research-development-implementation". They concentrate highly qualified

[15] Korea Technopark Association, http://www.technopark.kr/eng/technopark/fnr.php?pn=1&sn=2/.

personnel of the various fields of activity – scientists, developers, researchers, analysts, engineers providing the possibility of inter-industry research. They are usually equipped with the unique facilities, data centers, labs creating the excellent conditions for the research and scientific experiments.

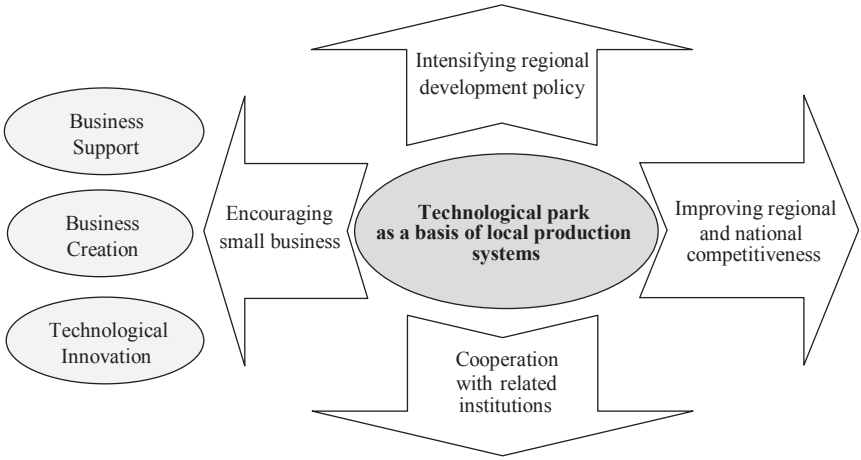


Figure 3.Technopark as a structural element of the local production systems

Source: author's modification of: http://www.technopark.kr/eng/technopark/fnr.php?pn=1&sn=2/

## 4. Conclusions

Thus, technology parks are the main propulsive force for the regional development proving their ability to attract and retain the intellectual resources and lead to the technological innovation and competitiveness increase.

However, it should be noted that no matter how large is technology park, its impact on the regional economy is limited. Therefore, local authorities should be interested in a complex approach creating local production systems of enterprises in the district as a whole.

It will provide spontaneous generation of range local chains of interrelated partner companies working together. Obviously, there are no ready recipes,

but it can be argued that the support of the regional structures on the base of technology parks could contribute to the consolidation of local business networking. Same as increasing the level of mutual trust between participants in the future cluster can initiates a gradual transition to a more risky projects.

## Bibliography

Florida R. (2002), *The Rise of the Creative Class. And How It's Transforming Work, Leisure, Community and Everyday Life*, Basic Books, New York.

Jacobs J. (1969), *The economy of cities*, Random House, New York.

Korea Technopark Association, http://www.technopark.kr/eng/technopark/fnr.php?pn=1&sn=2/.

Дерид І. (2008), *Сутність і функції технологічного парку як об'єкта інноваційної інфраструктури*, "Вісник Харківського національного університету ім. В. Н. Каразіна", № 802, p. 11−15.

Ліщинський І. (2011), *Агломераційні форми міжнародної та просторової економічної інтеграції України*, [in:] О. І. Амоша, С. С. Аптекар, М. Г. Білопольський, С. І. Юрій та ін., *Структурні реформи економіки: світовий досвід, інститути, стратегії для України*, монографія, Економічна думка ТНЕУ, Тернопіль, p. 591–605.

*Під парасолькою технопарків*, http://www.madein.dp.ua/.

Черницька Т. (2013), *Регіональні виміри міжнародного науково-технічного співробітництва*, "Міжнародна економічна політика", № 1 (18), p. 105−127.

Чудаєва І. (2010), *Технопарки світу: основні моделі та типи*, "Вісник Східноєвропейського університету економіки і менеджмент", № 2 (8).

## Abstract

Theoretical bases of technology parks and related terms are considered. American, Japanese and mixed models of technology park are researched. Advantages of local production systems based on technological parks are investigated. The relationship of innovations initiated by the technology parks, diversification and agglomeration among the members of the local production systems is depicted. The influence of technology parks' formation on the regional competitiveness is represented.

**Key words:** technology park, local production system, research and development, innovations.