



Vilnius Gediminas Technical University

Aistė Miliūtė

**DEVELOPMENT OF SCIENCE AND
TECHNOLOGY PARKS:
MANAGEMENT MODELS**

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Scientific Supervisor:

Prof Dr Habil Borisas MELNIKAS (Vilnius Gediminas Technical University, Social Sciences, Management and Administration – 03S)

The dissertation is defended at the Council of Scientific Field of Management and Administration at Vilnius Gediminas Technical University:

Chairman:

Prof Dr Habil Romualdas GINEVIČIUS (Vilnius Gediminas Technical University, Social Sciences, Management and Administration – 03S)

Members:

Prof Dr Habil Petras BARŠAUSKAS (International School of Management, Social Sciences, Management and Administration – 03S)

Prof Dr Habil Artūras KAKLAUSKAS (Vilnius Gediminas Technical University, Technological Sciences, Civil Engineering – 02T)

Prof Dr Habil Albinas MARČINSKAS (Vilnius University, Social Sciences, Management and Administration – 03S)

Assoc Prof Dr Eugenijus CHLIVICKAS (Vilnius Gediminas Technical University, Social Sciences, Management and Administration – 03S)

Opponents:

Prof Dr Habil Juozas BIVAINIS (Vilnius Gediminas Technical University, Social Sciences, Management and Administration – 03S)

Prof Dr Regina VIRVILAITĖ (Kaunas University of Technology, Social Sciences, Management and Administration – 03S)

The dissertation will be defended at the public meeting of the Council of Scientific Field of Management and Administration in the Senate Hall of Vilnius Gediminas Technical University at 3 p.m. on December 21, 2004.

Address: Saulėtekio av. 11, 10223 Vilnius - 40, Lithuania

Tel.: +370 5 274 49 52, +370 5 274 49 56; fax +370 5 270 01 12;

e-mail doktor@adm.vtu.lt

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Aistė Miliūtė

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PLĖTRA:
VADYBOS MODELIAI**

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Mokslinis vadovas

prof. habil. dr. Borisas MELNIKAS (Vilniaus Gedimino technikos universitetas, socialiniai mokslai, vadyba ir administravimas – 03S).

Disertacija ginama Vilniaus Gedimino technikos universiteto Vadybos ir administravimo mokslo krypties taryboje:

Pirmininkas

prof. habil. dr. Romualdas GINEVIČIUS (Vilniaus Gedimino technikos universitetas, socialiniai mokslai, vadyba ir administravimas – 03S).

Nariai:

prof. habil. dr. Petras BARŠAUSKAS (Tarptautinė aukštoji vadybos mokykla (ISM), socialiniai mokslai, vadyba ir administravimas – 03S),

prof. habil. dr. Artūras KAKLAUSKAS (Vilniaus Gedimino technikos universitetas, technologijos mokslai, statybos inžinerija – 02T),

prof. habil. dr. Albinas MARČINSKAS (Vilniaus universitetas, socialiniai mokslai, vadyba ir administravimas – 03S),

doc. dr. Eugenijus CHLIVICKAS (Vilniaus Gedimino technikos universitetas, socialiniai mokslai, vadyba ir administravimas – 03S).

Oponentai:

prof. habil. dr. Juozas BIVAINIS (Vilniaus Gedimino technikos universitetas, socialiniai mokslai, vadyba ir administravimas – 03S),

prof. dr. Regina VIRVILAITĖ (Kauno technologijos universitetas, socialiniai mokslai, vadyba ir administravimas – 03S).

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Adresas: Saulėtekio al. 11, 10223 Vilnius - 40, Lietuva

Tel.: +370 5 274 49 52; +370 5 274 49 56; faksas +370 5 270 01 12;

el. p. doktor@adm.vtu.lt

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INTRODUCTION

Science and Technology Parks are one of organizational forms, designed for development of innovations, coordination of science research, studies, technology creation and implementation activity, and initiative of new businesses. In addition to Science and Technology Parks, the organizations of the same purpose could be various Business Incubators, Innovation Centers, Technology Parks etc., however, precisely Science and Technology Parks, as organizational forms, distinguish for their efficiency and development prospects.

Science and Technology Parks and development of their networks are necessary because of new challenges and problems, ascendant globalization, European Union expansion, knowledge and informational development. For this reason it is very *relevant* to examine and estimate the creation and development influence for economic growth of Science and Technology Parks and their networks, as well as parallel organizations, taking into account an international experience.

Science and Technology Parks development in up-to-date territory and practice is very often considered to be an influential factor of economic growth, however, an international practice shows that up to now there has not been an integrated evaluation of economic growth influence of *Science and Technology Parks or other parallel organizations and their network creation and activity*. The lack of such evaluations and methodology can be treated as a very important problem, which could be formulated as *an absence or inadequacy of quantitative evaluations of economic growth influence of Science and Technology Parks or other parallel organizations and their network creation, development and activity*.

Scientific problem. A necessity to constantly guaranty Science and Technology Parks and their development management *adequacy to the modern requirements* let us assume that *an inadequacy of management models, applied in real practice of Science and Technology Parks and their development management, to the modern challenges and requirements of science and technology progress and social economic development*, which is caused by up-to-date globalization, the European Union expansion, new forms of competition in international markets, formation of knowledge and informational society is considered to be a very important problem of *social sciences, and especially management and administration*.

The science problem indicated is *very important* because of several reasons:

First, the science solution of this problem is oriented to *the acceleration of Science and Technology Parks progress in general*, because the purpose of Science and Technology Parks is to assure *integration* of science research and their results practical application and propagation, *singleness of science research and more strict orientation to the increasing requirements of practical application*; also *more efficient application of intellectual and other resources* to be involved into science research and creation of new technologies.

Second, Science and Technology Parks are *complex organizations*, supposed to be *very innovative*, capable to *generate creatively* not only *new ideas*, but also *be able to spread these ideas and to apply them in practice*. Management of such organizations requires *exclusively innovative and highly individualized management models*, which preparation and application is reasoned by *unconventional and unique decisions*.

Third, Science and Technology Parks are considered to be very important *thread of new quality human recourses training*. It should be integrated into the whole *science and “study and improve all life long” system*. This requires *harmonizing* Science and Technology Parks management with considerably wider field of human resources management.

Fourth, the formation of *Science and Technology Parks networks* under the conditions of globalization and market internationalization is inevitable in both countries/regions and *internationally*. It means that management designed for Science and Technology Parks and their development, inevitably has *to be expanded to large networks (including international) and their development management field*.

The problems of Science and Technology Parks management haven't been analyzed in such or some other aspects or, it was done *insufficiently*, according to the newest circumstances, influenced by the processes, typical for the European Union expansion, and situation in particular countries or different economic sectors.

Research object – international experience of development and management improvement of Science and Technology Parks, as organization functioning on progress of science and technologies, as well as opportunities of this experience application in Lithuania, especially in respect of tendencies of the European Union expansion.

Research object devoted to solve the problem described is very *manifold*, and may be described as *Science and Technology Parks and analogous organizations, their networks*, as well as *Science and Technology Parks and processes of their networks expansion*. *Subject of research* may be

perceived as management of *Science and Technology Parks and of their expansion processes*.

Goal and tasks of the work. Research goal - development tendencies of *Science and Technology Parks, as organizations, settled under international practice, to evaluate new needs for expansion of these organizations, and improvement of their activities, also to foresee the opportunities to make the development and activities of Science and Technology Parks more effective by means of management development, also to accelerate purposefully their further expansion*. Of course, goal of research perceived in such a way, also has to be adapted to *Lithuanian situation*, considering the fact, that in the course of such research, *the opportunities to make the development and activities of Science and Technology Parks in Lithuania more effective by the means of management* have to be determined, *expand international relations of these Parks, stimulate their integration into unified space under the process of formation of European studies, science and technologies*, at the same time directly making a positive influence to the progress of science and technologies, and social economic development in Lithuania.

To solve the defined problem the research designed are characterized by the plenty and variety of the *tasks*. There are some of the tasks that can be distinguished:

- to define the Science and Technology Parks as the *integrated organized structure*, that operates on the base of *the priority of the integrative principle*, to generalize the used experience of models that are being designed for the *management* of Science and Technology Parks implemented in international practice;
- to highlight the evolution tendencies in Lithuania of the Science and Technology Parks and analogous to them organizations, to evaluate these tendencies *in the more general context of tendencies highlighted in the international practice*;
- to highlight the topical design problems while creating, working and developing the Science and Technology Parks and their networks, to forecast the possibilities of solving these problems by the help of *management* means considering the peculiarities of the situation in Lithuania as well as to the challenges that are conditioned by the development of the European Union;
- to evaluate the influence of the Science and Technology Parks and analogous to them organizations and their networks over the economic growth by using the experience accumulated in the international practice as well as to discover the new possibilities of the development of

Science and Technology Parks in Lithuania on the ground of this evaluation.

Four complementary researches were carried out while analyzing the theoretical problem:

- the analysis of the Science and Technology Parks and analogous to them organizations international evolution;
- the analysis of the Science and Technology Parks and analogous to them organizations evolution in Lithuania;
- the analysis of the Science and Technology Parks and analogous to them organizations influence over the economic growth;
- the analysis of the Science and Technology Parks and analogous to them organizations determined perspectives management development.

These **research methods** were appealed:

- science literature analysis, giving the basic attention to the theoretical and empirical knowledge research to the development of Science and Technology Parks and links with the management of innovations, release of technologies and the human resources management spheres, also various economic and other information sources analysis;
- special technique, fit to classify the various countries in the world, considering their economical level and development level of Science and Technology Parks;
- correlation-regression analysis, designed to process the information about GNP (gross national product) as well as about the spread of Science and Technology Parks;
- summarizing the results and information of science research made earlier, setting logical links, using the modern technique and methods of science research, integrating the inquiry into the formal methods. The results achieved are processed by statistical data processing computer program SSPS v.10.

Theoretical research and inquiries were made:

- on the ground of World Bank and Science Park and Innovation Center Experts Group (SPICE) statistical data;
- on the ground of statistical data working in economy subjects of Lithuanian Science and Technology Parks and analogous to them organizations;
- during the science probations:
- Stralsunder Innovations - und Grunderzentrum, Stralsund, Germany, 2000;

- Aberday Dundee university, Dundee, Great Britain, 2002;
- under the project od Leonardo da Vinci No. LT/99/1/088105/PI/I.1.1.b/FPC Training Network of Business Incubators, 2001;
- by questionnaire and abyssal interview.

Preparing the task referred to:

- the works of Lithuanian an foreign authors, designed for business management and economics, Science and Technology Parks, general innovation activity, technology transmission problems (the main attention was taken to the sources in which the impact of Science and Technology Parks activity to transmission of technologies, development of regions and general rate of economic growth was revealed);
- the practical experience and theoretical models in the sphere of Science and Technology Parks of Lithuanian, EU, USA and other countries;
- the various sources of statistical data.

Theoretical work results:

- the conclusions about the Science and Technology Parks and analogous to them organizations spread significance in the countries of different economical development level, also recommendations about the use of these conclusions in the context of European Union development under the situation of Lithuania and other Central and East European countries;
- the theoretical management models offered or applied in the works of Lithuanian and foreign research were summarized, their application possibilities were evaluated in complex, integrating the main used technique peculiarities known in the international practice;
- according to the statistical research, the new conceptualized the network development perspective in Lithuania of Science and Technology Parks;
- considering the research carried out, the original theoretical work analysis indicator model was offered for Science and Technology Parks, it was recommended to be used in developing the work of these structures in Lithuania.

Practical results of research:

- it is very urgent to expand Science and Technology Parks in Lithuania;
- to assess the importance of Science and Technology Parks in the countries of different economical level, highlighting the aspects of development of Lithuanian Science and Technology Parks.

Research results of determination the prospects of management improvement of Science and Technology Parks and analogous organizations:

- determination of urgent problems;
- to highlight the urgency, prospects, and priorities of network expansion of Science and Technology Parks;
- recommendations how to improve management of Science and Technology Parks,
- how to stimulate development of Science and Technology Parks by means of government of state.

Science novelty of the work. Dissertation is the first managerial research, devoted for the development of Science and Technology Parks, considering current urgent problems of Lithuanian economy. The main features of science novelty characteristic to this research are the following:

- suggested and theoretically realized idea to assess Science and Technology Parks as organizations functioning on the integrity principle, which involve models of management control of handing over the technologies and human resources;
- management model of Science and Technology Parks suggested, which will allow to stimulate activities of the Parks by means of management.

SUMMARY

On purpose to implement the objective of this research the first chapter **“Development of Science and Technology Parks as a priority field of stimulating science and technology progress”** it was important to define Science and Technology Parks as an integration operating system.

One of the key principles implemented in developing of social, economical and technological advance is the principle of *integration*. This principle embodies systematic approach of progress development and it is based on the conception that progress in any field is possible only if potentiality of this progress is being associated with formation of *qualitative new systems*: integration of elements from different nature causes the combining of these elements into new systems as indivisible units which enables various forms of *synergetic effect* (entirety effect) and this way it is held as an assumption of progress development. That is to say, principle of integration embodies the *search of possibilities to gain synergetic effect* on the base of integration of elements from different nature and origin, including different organizational structures or processes.

Principle of integration is based on the idea that the basis of progress in all spheres of social, economical and technological evolution is formation of

new quality and ability to implement the potential of this new quality in practice. Therefore the efforts to develop progress must be always directed towards search of possibilities to gain synergetic effect and towards better use of these possibilities. The implication is that while striving for social, economical and technological progress, different links must be connected into solid systems: on one hand different links perform different functions when developing and promoting progress and on the other hand they complement each other and may function in one common system that realizes common objectives and produces common products.

Problems in developing and internationalizing networks of Science and Technology Parks express the necessity of integrating Science and Technology Parks and their activities into gross systems which on the base of partnership and cooperation could act in international markets and make higher impact on our common social, economical and technological evolution promoting and developing the progress of science and technology.

The above-mentioned priorities are the most important ones and therefore they must be regarded when creating and developing Science and Technology Parks and their networks and also when looking for methods to activate social, economical and technological progress on this base.

The second chapter of dissertation is named “**Theoretical approach of Science and Technology Parks development**”. Various theories that summarize cumulated practice in developing and promoting science and technology progress all over the world are described in this part. These theories include both most of modern social sciences like management, administration, economics and law and fields of modern fundamental and applied sciences.

Different science research works analyze development of Science and Technology Parks. They summarize evolution experience and further development opportunities of these Parks that happened in various countries through many years. Science works and studies on this topic may be classified by various approaches giving the priority to these work groups:

- Science studies of Science and Technology Parks evolution, including their development from simple small enterprises with the functions of business promotion and infrastructure to Science and Technology Parks and clusters operating in today’s global market.
- Science studies of developing innovative activities; consequently they are studies of various means for establishing and developing Science and Technology Parks.
- Science studies of activating intellectual and creative performance and improving of management by employing new forms of technology evolution and progress promotion.

- Science studies of regional development on the basis of science and technology progress' means.

Currently the concept of Science and Technology Park is not unambiguously defined. Various theories produce different attitudes towards Science and Technology Parks.

Variety of studies assigned to these groups is characteristic because of many different attitudes towards Science and Technology Parks' concept in publications about Science and Technology Parks.

Meeting today's problems of Science and Technology Parks' expansion and promoting development of Science and Technology Parks as well, some kind of model is required. We suggest using a further given definition of Science and Technology Parks.

Science and Technology Park is a system of economics individuals that implements science and technology priorities and enables actively promote science and technology development through business and science integration.

System of economics individuals implementing priorities of science and technology is entirety of economics individuals that performs functions of fundamental, applied research, planning, constructing, experimental manufacturing, and human resource education, training and other.

Science and Technology Parks as entirety of economics individuals performing various functions may be organized in different ways and take different shapes. Science and Technology Parks may have different legal status. That can be legal entity functioning as a special enterprise or it can be association of separate or independent business individuals. Common feature in all cases is that in Science and Technology Park there must be *individuals creating intellectual products* and high education body.

Individuals that operate in Science and Technology Parks have conditions to experiment with lower expenditures and bigger investments may be delayed until there are more success guarantees of implementing the innovation (it is more expensive to perform for far and vertically integrated individuals). There is a big positive influence on implementing innovations inside organization: "pressure" from competitors, colleagues and constant comparison with others (Porter, 1998).

Development of Science and Technology Parks is a sophisticated and multiple processes, reflecting the evolution of modern society. When developing Science and Technology Parks it is necessary to use this experience which is summarized in theories of individuals describing evolution of Science and Technology Parks' functions. It is possible to classify theories this way:

- experience of creating and implementing innovations;

- individuals' experience in creation and implementation.

The key difference of single models is presented by the way of how creative potential of human resource is employed in innovative performance and what methods and principles are used to select the human resource for this activity.

Developing of Science and Technology Parks is related to some activity aspects that occur in all countries but not all of them have the same rates or structural names. Currently there is a big terminology problem because the same formations with the same or similar functions are called differently in different states.

Business support is executed in the same phases: Innovation and Business Consulting centers overgrow into Business Incubators, which come together with Science and Technology Parks and other larger combinations of them, for example, technopolies, and then they cooperate for knowledge and industry clusters.

Theories of innovations and their employment when developing Science and Technology Parks and their networks were studied in these ways:

- theoretical models for managing innovative performance;
- theoretical models for innovative planning;
- theoretical models for knowledge and technology transfer and diffusion.

Theoretical models for managing innovative performance. The activity of every single Innovation Development Center in the Branch must include the major part of country's science, manufacturing, economical and other potential. The mean of *Innovation Development Model in the Branch* is that on the base of their functioning and further development extra synergetic potential can be formed and used for promoting innovations.

Branch Innovation Development Centers that are discussed in science literature usually correspond to the definition of Science and Technology Parks but if there is no high school in the territory or other traditional component of Science and Technology Parks, this function may be implemented by other organization that carries functions of science and technology evolution.

Investigations show that in Lithuania by now there is no such system that could relate creating and implementing of innovations in certain economy branch. If service spectrum of Business Incubators were expanded, they could become Innovation Development Centers of this kind. Due to small market and extent of carried science research, the expediency of creating such centers according to economy branch is questionable. Of course, if ability occurs it is necessary to establish structures that satisfy needs of certain branch, for example, biotechnology, laser technique, etc.

Forming such integrated system, main principles must be taken into account that assures tendency, complexity, effectiveness and flexibility of the.

Theoretical models for innovative planning. Ideology of Science and Technology Parks is based on implementation of new ideas; therefore science studies for analysis of theoretical innovative planning allow better understanding of activity related risk which new individuals may face when beginning their activity in Science and Technology Parks. Beside that, managers and engineers that work in economical entities understand innovation planning processes better; they may avoid mistakes and optimize the performance process. Science research is not elemental or uncontrolled process in the end of which unexpected objects originate; that is well-organized process, the results of which are to foresee, simulate and sometimes to be even greater than expected.

In the common case risk can be defined as possibility of lost, originating from organization's innovation activity funds used for producing new products and services, creating new technique and technology, introducing management innovations when market demand and the activity effects are not of the same size as expected.

The forming of new ideas raises new risk: risk and its expression is a natural attribute of innovations and their planning as well. That is the reason why having situation of Science and Technology Parks it is necessary to refer to innovation planning theories giving the special attention for evaluating risk of innovation processes.

That means that theoretical models for innovation planning are very important because they allow systematizing various risks that may appear in situation of Science and Technology Parks development. These kinds of risk are widely studied in many science works.

Risk is a natural point in various processes of Science and Technology Parks' activities, especially in research process.

Theoretical models for knowledge and technology transfer and diffusion. Science and Technology Park is a system that operates using integration principle. One of its tasks is stimulate and optimize processes of knowledge and technology transfer.

Technology transfer from science into practice is a relevant problem even for economically developed countries. Seeking to understand process of technology transfer and its importance to country's economics; and to highlight the factors that determine its development, a model should be constructed which could reflect the main singularities of the process.

The main singularities of the technology transfer process are:

- the separate fact of technology transfer into particular practice may be treated as a process when certain difficulties or barriers have to be overcome;
- frequency of such transfer processes depends on favour of investment environment in the country.

Technology transfer is a part of large innovation process. Innovation process usually defines development level of different states. At the end of eighties scientists came to single opinion that solving innovation problems is related with investments not only in implementing science results but also in creating qualitative system for management of science technology structure. This structure should be created in business environment.

Another element of Science and Technology Park treated as a system operating on integration principle is *human resource* and especially the *theoretical models of stimulation of intellectual activities and it's applications in development of science and technology parks*.

The quality of intellectual activity often is not strongly regulated and it has no minimum requirements. Productivity of an intellectual worker's activity can be pointed towards quality, which is described not as regulated or minimum, but optimal and maximum in the best situation.

Methods and principles of how to motivate people for active performance are the core of *social – physical management* theories:

- activity and behavior measuring (behavioral) theory ;
- general management participation (participative) theory.

Analysis of various motivation mechanisms, reasoning and systemization are made in all kind of research. As distinct from organization management theories, socio- psychological theories partly solve issues on organization and society relationship. Studying organization as a separate object was an important step in management science evolution.

Regional development theories and possibilities of employing them in Science and Technology Parks' development.

When making development plans and creating regional expansion politics it is important to know if Science and Technology Parks may be effective in stimulating regional economics. Until now little attention is paid to studies that analyze results of regional development, role of Science and Technology Parks in this development and factors that influence results of development.

Theories of regional development may be categorized as follows:

- theories that stress diffusion of growing and innovation, for example, from center to outside;

- theories that stress advantages of locality that stimulates creativeness and dynamics of region excluding no process of clear space diffusion.

From all diffusion theories the doctrine of growing pole/ growing center widely presents development of Science and Technology Parks. Science and Technology Parks could be growing centers which determine the growth of local economy based on high concentration of science research.

Relationships between Science and Technology Park and business in a region may propose benefit for both sides. Innovation diffusion and technology transfer from individuals that operate in the Park to economy subjects that operate in the region may enlarge the productivity of the latter. The chance of technology transfer into the economy subjects of the region depends on how individuals in the region fit science research activities and on the type of economy individuals in the region: small and independent individuals will look for interregional technology transfer.

The third chapter of dissertation is named **“Research of Science and Technology Parks’ development”**.

Studying the international evolution of Science and Technology Parks and analog organizations, there were analyzed what tendencies and circumstances stimulated the establishment of Science and Technology Parks and analog organizations in foreign countries. It has been observed that processes running in Lithuania are closest to those in West Europe because when preparing the concept of Science and Technology Parks and establishing the first ones, consultations with West Europe Partners were held. The main difference is that in Lithuania there is no clear line between the concepts and structures of Science and Technology Park and Business Incubator. Reforming of these concepts and structures would help to stimulate science and technology progress in Lithuania. Lithuania does not stay behind with the carried processes from processes of Science and Technology Parks and analog organizations. Analog structures operating in the Baltic States have found an association; they exchange their practice and organize joint projects.

Development of Science and Technology Parks in CIS countries differs from the processes in Lithuania and other West Europe countries. First of all, the major part of initiatives to establish Science and Technology Parks and analog organizations come from governmental institutions and these ideas are “dropped” on business and science structures; therefore their development is rapid. Besides that, most of organizations named by Science and Technology Parks have been military objects and their performance is sensitive or totally secret.

Researching evolution of Science and Technology Parks and analog organizations in Lithuania, the main stress was laid on the fact, that increasing competitiveness is the key purpose of economy development politics in Lithuania: this is declared in many strategic documents of the country. National development and social welfare of the country which is small and poor in natural resources like Lithuania greatly depends on country's ability to produce competitive goods and services in the market; and the latter need rather high technology than raw materials. Seeking to create a competitive economy, its structure must be oriented towards need of qualified labour force and Science and Technology Parks based on high technology, science and knowledge, where complex and high value added products are produced.

The most important fields of competitiveness promoting activity are creation of favourable environment for innovation in Science and Technology Parks, providing of innovation service, investments in competence of labour force, enlargement of applied science research, stimulating of technology progress in economy subjects.

Common innovation environment in the country is not sufficiently steamed: there still are economical difficulties, imperfection of legal system, and shortage of informational supply, etc. Expenses for research and development in Lithuania like in most countries of East and Central Europe (do not exceed 1.5 % of GDP) are not high. In 2003 these expenses were 0.69 % of GDP.

From 1997 the Government of Lithuanian Republic financially supports establishment expenses of Business Incubators and Science and Technology Parks (resources of SME support fund were used). The first Business Incubator was established in June, 1998. On initiative of Economy department and Kaunas Technology University there was KTU Business Incubator established (in 2002 it became KTU Regional Business Incubator). The number of these structures has grown recently and now there are 7 Business Incubators (which operates in Alytus, KTU, Kazlų Rūda, Šiauliai, Telšiai, Vilnija, Visaginas) and 7 Science and Technology Parks (which operates in Kaunas, Klaipėda, LŽŪA, Šiauliai, Šiaurės miestelis, Vilnius, Visoriai).

Carrying the study on real and expected effectiveness of Science and Technology Parks' participators, the effectiveness was evaluated in various ways:

- as existing effectiveness;
- as expected effectiveness, especially when object of evaluation was the benefit of Science and Technology Parks that are being found.

Existing effectiveness is described in cumulating, processing and analyzing indexes which define the activity effectiveness of real time organizations that perform business promoting functions.

Expected effectiveness can be evaluated by the principle of *historical analogy* when information about more common organizations performing business promoting functions is cumulated and summarized: on the base of this information prognosis may be compiled in order to evaluate the benefit of Science and Technology Parks.

One of the methods to evaluate the effectiveness of Science and Technology Parks is evaluating the performance of the subjects operating in Science and Technology Park. Science and Technology Parks, currently operating in Lithuania, perform mostly the functions of Business Incubators; therefore willing to clear out the effectiveness of economical performance in such institutions, it has been attempted to analyze Regional Business Incubator of Kaunas Technology University and the results of economical individuals operating inside the Park.

The period of getting refund on government investments was analyzed. If refunding is understood as return of money into the Treasury in the way of individuals' taxes (corporation tax, road tax, etc.) and new workplaces, this is also understood that new employers pay direct (income tax, social insurance tax, etc.) and indirect taxes as higher income determines higher consumption.

It is very important that an organization managed to generate enough cash flows out of its performance in order to keep open resource for investments in development of activity.

Another important aspect of economical reasoning is establishment of new workplaces; unfortunately, there is no research or practice carried in Lithuania in order to calculate the expenses of establishing and maintaining a workplace.

Proceeding *Research on impact of Science and Technology Parks and analog organizations on economical development*, there were these aspects taken into account:

- peculiarity of social, economical and cultural environment of the country;
- general economical welfare of the countries.

During the research attempts were made to clear out if any relationships exist between indexes that describe Science and Technology Parks (total number, working individuals, number of workplaces, etc.), index that represents the level of state's development – GDP pro capita and

demographical index – population. In order to create a clear view, data from year 2001 – 2003 were compared and their dynamics was studied.

Sorting the countries depending on their social, economical and cultural peculiarities, there were distinguished several groups: old members of EU, new members of EU, CIS, Asia.

Sorting the countries depending on their general economical welfare, there were four groups of states distinguished:

- I group – countries which's GDP pro capita range from 5 up to 10 thousand USD;
- II group – countries which's GDP pro capita range from 10 up to 15 thousand USD;
- III group – countries which's GDP pro capita range from 15 up to 25 thousand USD;
- IV group – countries which's GDP pro capita is over 25 thousand USD;

Summarizing the research on how Science and Technology Parks and analog organizations influence economical growth, the results are presented in Table 1:

Table 1. Summary of research results on economical impact of Science and Technology Parks and analog organizations

Group of countries	Correlation indexes	
	Number of operating Science and Technology Parks in proportion to GDP pro inhabitant	Number of workers in Science and Technology Parks in proportion to population
Groups depending on social, economical and cultural peculiarities of the environment		
Old members of EU	low cohesion	0.26
New members of EU	0.93	low cohesion
Total EU	0.62	0.31
CIS	0.53	0.93
Asia	low cohesion	0.99
Groups depending on general economical welfare of the countries		
GDP pro capita range from 5 up to 10 thousand USD	0.29	low cohesion
GDP pro capita range from 10 up to 15 thousand USD	0.89	low cohesion
GDP pro capita range from 15 up to 25 thousand USD	low cohesion	0.50
GDP pro capita is over 25 thousand USD	low cohesion	0.29

The data from table 1 shows that the strongest impact of Science and Technology Parks and analog organizations on economical growth is characteristic for the countries where GDP pro capita rates from 10 to 15 thousand USD. In the short run almost all countries from Central Europe, including Lithuania should come into this group. Therefore development of such organizations and their networks should be considered as a priority mean in stimulating further economical growth.

The research results also show that in the practice of Science and Technology Parks and analog organizations information technologies are implemented more widely; these organizations are completely oriented towards standards of knowledge society and therefore cohesion between number of workers in these organizations and population of the country is not strong. The latter consideration also shows that developing of Science and Technology Parks and their networks is an important presumption not only of creating but also of modernizing knowledge society in the future.

Executing *the Research on determining the perspectives of Science and Technology Parks' and analog organizations' management improving*, the questionnaire and the form of abyssal interview were compiled according to modern science research methodology and methods (K. Kardelis, 1997) by integrating the survey into formal methods. The results were processed with SPSS v.10 program which is designed for computing statistical data.

The main provisions compiling the questionnaire for establishing networks of Science and Technology Parks were statistical data from the Department of Statistics in Lithuania, reports of European Commission, official research accounts of World Bank and other worldwide organizations, various law papers valid in Lithuania and other official information.

The *object* of research interview was the situation of Science and Technology Parks and their establishment methods in Lithuania and the comparison with the methods applied in EU countries.

The *purpose* of the research was to select indexes describing performance of Science and Technology Parks and by using these indexes to evaluate the current situation of Science and Technology Parks, their potential in Lithuania and methods for stimulating their activity in comparison with EU countries; the purpose also was to analyze the structure of Science and Technology Parks' system in Lithuania, their legal and financial state and to summarize presumptions and methods for creating a possible network of Parks.

There were 80 questionnaires distributed among Science and Technology Parks, Business Incubators, economical subjects operating there, governmental and municipal authorities, existing and future businessmen.

There were 57 responses; the level of proposed answers is 71 %. Respondents were able to choose the most suitable answer from proposed ones in order to get more precise data that describes an existing situation of Science and Technology Parks in Lithuania and an optimal development direction of theirs. Dispersion of received answers is rather wide, but primary analysis shows that evaluating the existing situation there were two types of groups: the first group of answers was produced by direct representatives of Science and Technology Parks and Business Incubators, economy individuals and administration representatives; the second group of answers came from governmental and municipal authorities. Despite this fact, tendencies of future perspectives remained similar indifferently to respondents' relationships with Science and Technology Parks.

All respondents were aware of Science and Technology Parks' activity in Lithuania, its priorities and functions; a conclusion may be drawn that respondents know current situation and so their responses enable to compile real picture of existing situation, performance efficiency and perspectives.

Responses to the question have clearly formed two groups: representatives of governmental and municipal authorities and individuals operating in Science and Technology Parks or performing innovative activity elsewhere were of cardinaly different opinion. 59 % of respondents in governmental or municipal authorities from business development field answered that Science and Technology Parks operating in Lithuania fully satisfy the needs of target groups; 41 % thought that these needs are satisfied partly. 68 % of individuals operating or intending to do so in sphere of innovations and science research commercialization said that Parks satisfy their needs partly, and 32 % of economical individuals stated that the functions and priorities of these structures' activity do not fit their requirements.

There is impossible to define clear groups depending on answers into this question. Even 61 % of respondents thought that the most important orientation and priority is interaction between elements of science, education, manufacturing and infrastructure, excluding no Science and Technology Parks according to their products or carried types of fundamental research. Tight specialization Parks have perspectives in Lithuania; this activity was sustained mostly by administration of Ignalina Atomic Energy Plant's Regional Business Incubator and economic individuals operating there. 26 % of respondents think that Science and Technology Parks oriented on group of product have perspectives in Lithuania; as a comment, it was stated that in activity of Science and Technology Park it is advisable to consolidate relative divisions of different high schools. This should enable the strengthening of science potential, better use and optimizing of available resources of science

and manufacturing prototypes; consequently, this would stimulate processes of science and technology transfer.

The major part of respondents (31 %) said that it is necessary essentially reorganize the activity of Science and Technology Parks. Representatives of Science and Technology Parks' administration and individuals operating in these structures mostly chose this answer. The main blame on present system was that Science and Technology Parks perform only the functions of Business Incubators, consultancy and organization of Pictureions, but the main function of technology transfer is neglected. It is proposed to perform accreditation of all Science and Technology Parks and Business Incubators operating in Lithuania; when activity fields and functions would be reset, affirmation of activity programs would be newly fulfilled.

Other methods for stimulating the activity of Science and Technology Parks were indicated by 11 % of respondents:

- tax deduction for individuals operating in these structures;
- solid infrastructure for innovation support (Science and Technology Parks, Innovation Centers, Business Consultancy Centers, Patent Offices, etc.); creating of a system based on good practice experience;
- increasing qualification of Science and Technology Parks' administration personnel.

25% of respondents of the questionnaire and abyssal interview indicated the involvement of Venture Capital Funds into Science and Technology Parks' activities or at least involvement of these structures in technology transfer processes as one of possible methods for stimulating the performance of Science and Technology Parks. These funds could become an alternative or a measure of cofinancing when implementing fundamental research and commercializing their results.

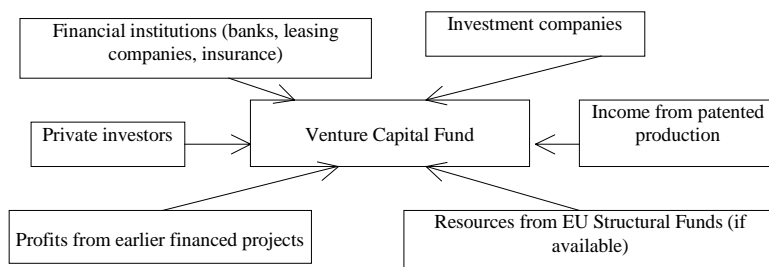


Fig. 1. Resource accumulation in Venture Capital Fund

The infrastructure of such service supply is not arranged in Lithuania yet. *Venture Capital Fund* is a profit organization which's aim is to take and minimize the financial risk of research customers and research implementers.

Various models of organizing and managing the activity of Science and Technology Park are available:

- it is possible clearly to defined territory of the Park;
- it isn't possible to clearly to defined territory of the Park.

If *it is possible clearly to defined territory* of the Science and Technology Park, the administration takes care of maintaining and exploiting Park's territory and buildings, security and quarter rent; administration provide organizational help, services of internet, telecommunications, copying and other to the companies established in the Park; administration promotes their cooperation, helps to find necessary contacts in high schools, science research institutes and finance sphere.

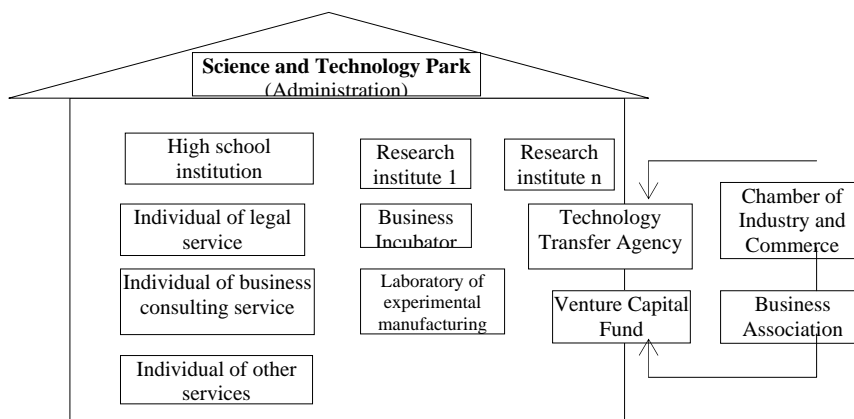


Fig. 2. Science and Technology Parks' activity: it is possible to clearly to defined territory of the Science and Technology Park

Such Science and Industry Park should be located near high school institution (in optimal case this should be the same territory). All participants of Science and Technology Park physically are near each other. Science and Technology Park may be perceived as one large enterprise and its participants are vertically related.

If *isn't possible to clearly to defined territory* of the Science and Technology Park when Park's participants physically are not located in one

clearly defined territory, then all elements of Science and Technology Park's infrastructure are cooperatively related.

Science and Technology Park as a legal entity coordinates the activity of separate participants in the Park. In such structure a few high schools may participate, to be precise, separate divisions of those institutions which operate in the same fields. Advantage of this Park is that maximum large group of science potential is involved; research and orders may be filled in minimum short period of time.

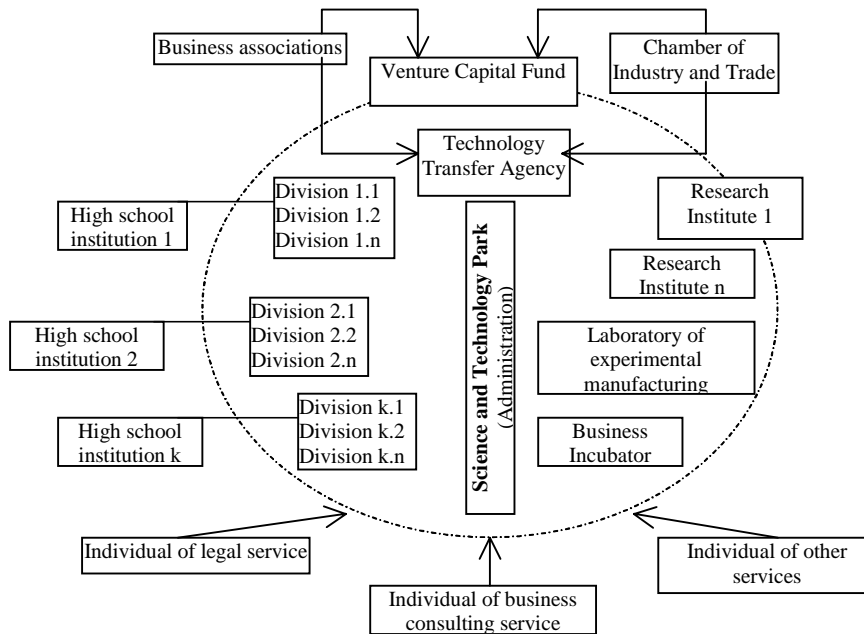


Fig. 3. Schema of Science and Technology Parks' activity: isn't possible to clearly to defined territory of the Science and Technology Park

During the questionnaire and abyssal interview respondents indicated *insufficient qualification of personnel* as one of the reasons that hinder better performance of innovation activities in Science and Technology Parks. One of conditions for successful activity in the Parks' is labour resources in the region. The specialists of the highest class and those who dispose of newest knowledge must work in Science and Technology Parks and companies operating inside them. These structures must be opened to new initiatives and

access infrastructure of science, business and administration in that region and in Lithuania.

Personnel working in the administration of Science and Technology Parks and in economy subjects (participants of the Park) must have these characteristics:

- technical education;
- background of management;
- background of manufacturing planning.

Recently there is no high school in Lithuania, which prepares specialists of technology transfer. These specialists must firstly achieve fundamental education, that is to say, engineer, medical, social or fundamental (physics, math, chemistry). Later by can achieving backgrounds of management and manufacturing planning these specialist could better represent industrials and scientists in technology transfer process. Such specialists having fundamental, managerial and organizational education will be able to prepare technical projects for science research, compile research and manufacturing estimates and plan experimental manufacturing.

The directions of Science and Technology Parks orientation suggested:

- to the one product – bunch;
- to the group of products;
- to indefinite products;
- to the interaction of science, manufacturing and infrastructural elements.

Park is oriented on group of products – bunch – of analog or similar researches the results of which may be predicted and employed for producing products or services of the same group. In this instance Science and Technology Park should be of wider specialization and develop high technologies.

These Science and Technology Parks would organize their performance on the regional background when analog or similar divisions of high schools participate in Parks' activities. Physical distance between Parks' participants would be rather large and so their activity would be organized in the way of cooperation, preparing and managing projects (researches).

Park is oriented onto undefined products when the results of the researches cannot be predicted or defined or investigations are associated with social science or art, then Science and Technology Park, which is being established, is oriented not onto end product of the research but on the investigation process itself.

Regional and international involvement is very important for Science and Technology Parks' development because it allows the efficient exchange of information and examples of good practice or improving quality of human

resource. Therefore Lithuanian Parks should intercommunicate efficiently, try to maintain close relations to similar organizations in other countries and seek to come into international networks of Parks.

CONCLUSIONS AND SUGGESTIONS

In the international praxis there are some essential tendencies of Science and Technology Parks as organizations observed. The most important tendencies between these ones are:

- the variety of companies, institutions and other organizations participating in Science and Technology Parks is increasing; many new combinations of Science and Technology Parks' participants come into existence;
- the establishment of Science and Technology Parks is becoming more rapid and their diffusion is getting wider; presently, Science and Technology Parks are being established intensively and functioning in all regions of the world they can be characterized with greater impact on evolution of regions' economical systems;
- the evolution of Science and Technology Parks has a tendency of becoming large-scaled; the extent of science research, planning and constructing works in Science and Technology Parks is getting larger, the variety of topics is typical for these works.

The needs of Science and Technology Parks' development are determined by a few circumstances:

- building of knowledge society and knowledge economy requires to speed up the new knowledge formation processes and to assure the possibly full use of this knowledge in industry praxis by diffusing new technologies in the first place; Science and Technology Parks as organizations are most suitable for performing the function of integrating various research, studies, industrial and technological works into one system; that is to say, the development of Science and Technology Parks is adequate to the needs of knowledge society and knowledge economy;
- Science and Technology Parks as organizations are meeting new challenges – increasing competition in the international markets, the necessity of rapid technology modernization in all industry and service fields.

The priority direction in developing Science and Technology Parks and improving their activity is preparing and implementing the means of management improvement:

- by the means of management improvement the efficiency of Science and Technology Parks' management may be increased; the possibly full use of Parks' resources may be attained; the Parks' production could be defined by characteristics of high quality and innovativeness;
- The development of Science and Technology Parks as organizations and their networks also requires adequate management tools; the creation of Science and Technology Parks' networks is noteworthy because it must be grounded on strategical decisions (strategical management in developing Science and Technology Parks and their networks may be valued as new and perspective trend of management activity).

Science and Technology Parks, as organizational structures, are very effective developing the progress of science and technologies, and accelerating social economic development. The effectiveness of Science and Technology Parks is reasoned by a few circumstances. In particular worth to highlight among the later are the following:

- Science and Technology Parks function on the *principle of integrity*: in the park of science and technology, as organization, the activities of different purpose and different functions, and of the entities supplementing each other, are being integrated, and this enables to join fundamental and applied research of science, work of design and construction, experimental manufacturing, particularly in the field of product development requiring new and high technologies, also the studies oriented towards nurture of scientists and specialists generating innovations, various construction, marketing, audit, and accounting legal and other services into a unified complex;
- Science and Technology Parks, as organizations, are especially favourable for formations of various synergetic effects, and this allows to make supplementary assumptions to stimulate innovations.

Science and Technology Parks must be consolidated to the network, which would have an objective to coordinate, develop, and optimize science and technology sales to the industry. First of all, Science and Technology Parks functioning in Lithuania, not excluding their specialization or regional dependence, should be connected to the national network, which will integrate to the EU network.

According the research performed, it was identified that Science and Technology Parks or similar structures currently functioning in Lithuania *do not meet the needs* of economic entities, therefore it would be advisable to review standard acts, regulating activity of the structures, activating the progress of science and technologies as well as to carry out *an accreditation* of science and technology parks.

Science and Technology Parks, as organizations, *perform the functions of breakthrough catalyst* in the cases, when the need to radically change the structure of economy over the short time arises, to solve complicated problems of economic backwardness and other social economic problems, to ensure 'up-to-date' economic growth and competitive advantages in the international and global markets.

Science and Technology Parks or analogous organizations feature by a great significance in those countries, which belong to the category of modern economically developed countries, but where the level of GDP per capita is not the highest, (where GDP per capita is from 10 to 15 thousand US dollars).

In the countries, where GDP per capita level is lower, i.e. from 5 to 10 thousand US dollars (Lithuania and more other countries of Central and Eastern Europe belong namely to this group), development of Science and Technology Parks is perceived as determinant factor, in preparation of economic and technologic breakthroughs and 'bounds' in the future. That means, to ensure successful adaptation of these countries in the unified European spaces of science, technologies, informational and other, also competitiveness of economic entities of these countries in international and global markets, the exceptional priority has to be provided for the development of Science and Technology Parks, expansion and making the activities more effective in these countries.

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ABOUT THE AUTHOR

Name, surname	Aistė Miliūtė
Education and qualification	2000 – 2004. Doctor’s degree studies at Vilnius Gediminas Technical University, Business Management Faculty, International Economy and Management Dept. Research topic: Development of Science and Technology Parks: Management Models. 1998 – 2000. Master’s degree studies at Kaunas University of Technology, Management Faculty. Master’s thesis topic: Integration of Lithuanian Finance System into United European Market. 1994 – 1998. Bachelor studies at Kaunas University of Technology, Management faculty. Final paper’s topic: Research of Possible Reorganisation Rorms on Enterprise "X".
Participation in international projects	Leonardo da Vinci Project No. LT/99/1/088105/PI/I.1.1.b/FPC Training network of Business Incubators. July 2002 – 2003. Phare Project „Competitiveness Project: Innovation- Science and Technology Parks“.
Probation	September - October 2000 probation in Germany, Stralsund, Programe Financed by CDG „Berufliche Weiterbildung fur Fach- und Fuhrungskrafte der wirtschaf aus Litauen“.

REZIUMĖ

Temos aktualumas. Būtinumas pastoviai užtikrinti mokslo ir technologijų parkų bei jų plėtros vadybos adekvatumą šiuolaikiniams reikalavimams leidžia teigti, kad realioje mokslo ir technologijų parkų bei jų plėtros vadybos praktikoje taikomų vadybos modelių neadekvatumas šiuolaikiniams iššūkiams ir reikalavimams mokslo ir technologijų pažangos bei socialinės ekonominės raidos srityje, kurios lemia naujos konkurencijos tarptautinėse rinkose formos, žinių ir informacinės visuomenės formavimasis, gali būti traktuojamas kaip aktuali socialinių mokslų, ypač vadybos ir administravimo mokslo, problema. Tuo pačiu pažymėtina, jog šios problemos suvokimas ir siekimas ją spręsti reikalauja adekvačių mokslo tyrimų, skirtų sudaryti prielaidas vadybos tobulinimo priemonėmis ženkliai padidinti mokslo ir technologijų parkų, kaip specifinių darinių, kūrimo, plėtojimo bei veiklos efektyvumą, tuo pačiu užtikrinant, kad mokslo ir technologijų parkų plėtra reikštųsi kaip vis reikšmingesnis šiuolaikinės visuomenės modernizavimo, mokslo ir technologijų pažangos bei socialinės ekonominės raidos veiksnys.

Tyrimo objektas – mokslo ir technologijų parkų kaip inovacijų pažangą veikiančios organizacijos, jų raidos bei vadybos tobulinimo tarptautinė patirtis bei šios patirties taikymo galimybės Lietuvoje, ypač atsižvelgiant į Europos Sąjungos plėtros tendencijas.

Tyrimų tikslas - išryškinti tarptautinėje praktikoje susiklosčiusias mokslo ir technologijų parkų, kaip organizacijų, raidos tendencijas, įvertinti naujus poreikius šių organizacijų plėtrai ir jų veiklos modernizavimui bei numatyti galimybes vadybos tobulinimo priemonėmis efektyvinti mokslo ir technologijų parkų kūrimą, veiklą bei kryptingai spartinti tolimesnę jų plėtrą.

Apibūdintai problemai spręsti skirti tyrimai pasižymi **uždavinių** gausa ir įvairove. Šių uždavinių tarpe išskirtini tokie:

- apibrėžti mokslo ir technologijų parką kaip integruotą organizacinę struktūrą, veikiančią integratyvumo principo prioriteto pagrindu, apibendrinanti tarptautinėje praktikoje įgyvendintų mokslo ir technologijų parkų vadybai skirtų modelių naudojimo patirtį;
- išryškinti mokslo ir technologijų parkų bei jiems analogiškų organizacijų evoliucijos Lietuvoje tendencijas, jas įvertinti bendresniame tarptautinėje praktikoje išryškėjusių tendencijų kontekste;
- išryškinti aktualias mokslo ir technologijų parkų bei jų tinklų kūrimo, veiklos ir plėtros problemas, numatyti galimybes spręsti šias problemas vadybos priemonėmis, atsižvelgiant į situacijos Lietuvoje ypatumus bei į Europos Sąjungos plėtros sąlygojamus iššūkius;

- pasinaudojant tarptautinėje praktikoje sukaupia patirtimi įvertinti mokslo ir technologijų parkų bei analogiškų organizacijų ir jų tinklų poveikį ekonomikos augimui, ir tokio vertinimo pagrindu atskleisti naujas galimybes plėsti mokslo ir technologijų parkus Lietuvoje.

Teoriniai darbo rezultatai: Mokslo ir technologijų parkų bei analogiškų organizacijų tarptautinės ir Lietuvos evoliucijos tyrimų rezultatai leido apibendrinti svarbiausias mokslo ir technologijų parkų vystymo raidos užsienio šalyse ir nacionalines tendencijas, kuriomis remiantis įvertintas Lietuvoje keliamų prioritetų mokslo ir technologijų parkams adekvatumas pasaulinėje praktikoje taikomiems bendriesiems prioritetams:

- išvados apie mokslo ir technologijų parkų bei kitų analogiškų organizacijų išplitimo reikšmingumą skirtingo ekonomikos išvystymo lygio šalyse, taip pat rekomendacijos dėl šių išvadų taikymo Lietuvos bei kitų Centrinės ir Rytų Europos šalių sąlygomis Europos Sąjungos plėtros kontekste;
- apibendrinti Lietuvos ir užsienio mokslininkų darbuose siūlomi arba taikytini teoriniai vadybos modeliai, kompleksiskai įvertintos jų taikymo galimybės; integruojant pagrindinius žinomų ir tarptautinėje praktikoje taikomų metodologijų ypatumus;
- atsižvelgiant į statistinį tyrimą naujai konceptualizuota mokslo ir technologijų parkų tinklo vystymo perspektyva Lietuvoje;
- įvertinus atliktų tyrimų rezultatus buvo pasiūlytas originalus teorinis mokslo ir technologijų parkų veiklos analizės indikatorių modelis, rekomenduotinas taikyti plėtojant šių struktūrų veiklą Lietuvoje.

Tyrimo praktiniai rezultatai:

Mokslo ir technologijų parkų bei analogiškų organizacijų poveikio ekonominiam augimui tyrimo rezultatai leido papildomai patvirtinti šiuos faktus:

- Lietuvoje itin aktualu plėtoti mokslo ir technologijų parkus;
- vertinant mokslo ir technologijų parkų reikšmingumą skirtingo ekonominio lygio šalyse, išryškėjo šių struktūrų plėtros aspektai Lietuvoje.

Mokslo ir technologijų parkų bei analogiškų organizacijų valdymo tobulinimo perspektyvų nustatymo tyrimo rezultatai:

- aktualių vadybos problemų nustatymas;
- išryškinti mokslo ir technologijų parkų tinklo plėtojimo aktualumas, perspektyvos, prioritetai:
 - rekomendacijos kaip tobulinti mokslo ir technologijų parkų valdymą;

- kaip valstybės valdymo priemonėmis skatinti mokslo ir technologijų parkų plėtrą.

Mokslinis darbo naujumas. Disertacija yra pirmasis vadybinis tyrimas, skirtas mokslo ir technologijų parkų plėtrai, atsižvelgiant į esamas Lietuvos ekonomines aktualijas. Pagrindiniai šiam tyrimui būdingi mokslinio naujumo požymiai yra:

- pasiūlyta ir teoriniu požiūriu realizuota idėja mokslo ir technologijų parkus vertinti kaip integratyvumo principu veikiančias organizacijas, apjungiančias savyje technologijų perdavimo ir žmogiškųjų išteklių valdymo vadybos modelius;
- pasiūlyta mokslo ir technologijų parkų vadybos modelis, leisiantis vadybos priemonėmis skatinti parkų veiklą.

Pirmoje dalyje „**Mokslo ir technologijų parkų plėtra – prioritėtinė mokslo ir technologijų pažangos spartinimo kryptis**“ siekiant realizuoti darbo tikslą buvo svarbu apibrėžti mokslo ir technologijų parkus kaip integratyvumo principu veikiančią sistemą.

Vienas iš svarbiausių principų, įgyvendintų spartinant ir plėtojant socialinę, ekonominę, technologinę pažangą, yra *integratyvumo principas*. Šis principas išreiškia sisteminį požiūrį į pažangos spartinimą bei plėtojimą ir yra grindžiamas suvokimu, jog pažanga bet kurioje srityje yra įmanoma tik tuo atveju, jei pažangos galimybės siejamos su *kokybiškai naujų sistemų formavimu*: kaip prielaida pažangai spartinti ir plėtoti yra suvokiama *skirtingo pobūdžio elementų integracija*, lemianti šių elementų jungimąsi į naujas sistemas, kaip į *nedalomas visumas*, o tai leidžia gauti įvairių formų *sinergetinį (visumos) efektą*. Kitaip tariant, integratyvumo principas išreiškia *sinergetinio efekto gavimo galimybių paiešką* skirtingos kilmės ir skirtingo pobūdžio elementuose, tarp jų ir skirtingų organizacinių struktūrų ar skirtingų procesų, *integracijos pagrindu*.

Integratyvumo principas grindžiamas idėja, jog pažangos visose socialinės, ekonominės, technologinės raidos srityse pagrindas yra *naujos kokybės formavimas* ir sugebėjimas *naujos kokybės galimybes įgyvendinti praktikoje*. Siekiant socialinės, ekonominės, technologinės pažangos, į *vieningas sistemas* turi būti jungiamos *skirtingos grandys*, kurios, viena vertus, atlieka *skirtingas funkcijas* plėtojant ir spartinant pažangą, kita vertus, *papildo viena kitą* ir gali *veikti vienoje bendroje sistemoje*, realizuojančioje bendrus tikslus ir kuriančioje *bendrus produktus*.

Antroje disertacijos dalyje „**Mokslo ir technologijų parkų plėtros teoriniai modeliai**“ apibūdinamos įvairios teorijos, apibendrinančios pasaulinėje praktikoje sukaupią mokslo ir technologijų pažangos skatinimo ir

aktyvinimo patirtį. Šios teorijos apima daugelį tiek šiuolaikinių socialinių mokslų, tarp jų vadybos ir administravimo, ekonomikos, teisės, tiek ir šiuolaikinių fundamentinių bei taikomųjų mokslų sričių.

Mokslo ir technologijų parkų plėtrai yra skirti įvairių sričių mokslo darbai, kuriuose apibendrinama šių parkų evoliucijos patirtis, jų tolesnės raidos galimybės, pasireiškusias per daugelį metų įvairių šalių praktikoje. Šiai tematikai skirti mokslo darbai gali būti klasifikuojami įvairiais požiūriais, prioritetą teikiant šioms darbų grupėms:

- mokslo darbai, skirti mokslo ir technologijų parkų evoliucijai, apimančiai jų raidą nuo paprasčiausių verslo rėmimo ir infrastruktūros funkcijas atliekančių smulkių įmonių iki šiuolaikinių globaliose rinkose veikiančių mokslo ir technologijų parkų bei klasterių tinklų;
- darbai, skirti inovacinės veiklos plėtojimui, taigi ir įvairioms mokslo ir technologijų parkų kūrimo ir tobulinimo priemonėms;
- darbai, skirti intelektinės ir kūrybinės veiklos aktyvinimui bei vadybos tobulinimui, tam tikslui naudojant naujas technologijų raidos bei pažangos skatinimo formas;
- darbai, skirti regionų plėtrai mokslo ir technologijų pažangos priemonių pagrindu.

Trečioji disertacijos dalis „**Mokslo ir technologijų parkų bei jų tinklų plėtros empiriniai tyrimai**“.

Atliekant *Mokslo ir technologijų parkų bei analogiškų organizacijų tarptautinės evoliucijos tyrimas* buvo analizuojama kokios tendencijos ir kokios prielaidos skatino užsienio šalyse steigti mokslo ir technologijų parkus bei analogiškas organizacijas. Nustatyta, kad Lietuvoje vykstantys procesai artimi Vakarų Europos valstybėse vykusiems procesams, kadangi rengiant mokslo ir technologijų parkų koncepciją bei steigiant pirmuosius parkus buvo konsultuojamasi būtent su partneriais iš Vakarų Europos. Pagrindinis skirtumas, kurį galima pastebėti yra tas, jog Lietuvoje kol kas nėra aiškiai atskirtos sąvokos ir struktūros: mokslo ir technologijų parkas nuo verslo inkubatoriaus.

Atliekant *Mokslo ir technologijų parkų bei analogiškų organizacijų evoliucijos Lietuvoje tyrimas* buvo akcentuojama, jog konkurencingumo didinimas yra pagrindinis Lietuvos ūkio plėtros politikos tikslas – tai deklaruojama daugelyje šalies strateginių dokumentų. Mažos, gausių gamtos išteklių neturinčios valstybės, kokia yra Lietuva, nacionalinės ekonomikos plėtra ir socialinė gerovė labai priklauso nuo sugebėjimo gaminti ir pateikti rinkai konkurencingas prekes ir paslaugas, o pastarosioms labiau reikia, ne žaliavų, o aukštųjų technologijų. Siekiant sukurti konkurencingą šalies ūkį, jo struktūra turi būti orientuota į kvalifikuotos darbo jėgos reikalingumą, aukštųjų technologijų bei mokslo ir žinių pagrindu vystomus mokslo ir

technologijų parkus, kuriuose gaminami sudėtingesni ir didesnę pridėtinę vertę turintys produktai.

Atliekant statistinį *Mokslo ir technologijų parkų bei analogiškų organizacijų poveikio ekonominiam augimui tyrimą* buvo atsižvelgiama į du aspektus:

- į šalių socialinės, ekonominės ir kultūrinės aplinkos ypatumus;
- į bendrąjį šalių ekonominį gerbūvį.

Didžiausias mokslo ir technologijų parkų bei analogiškų organizacijų poveikio ekonominiam augimui yra būdingas toms šalims, kuriuose BVP 1 gyventojui nuo 10 iki 15 tūkst. JAV dol. Šiai šalių grupei artimiausiu metu turėtų priklausyti beveik ar net visos Centrinės Europos šalys, tame tarpe ir Lietuva. Todėl tokio tipo organizacijų bei jų tinklų plėtra turi būti laikoma prioritetine priemone, skatinant tolimesnį ekonominį augimą.

Iš gautų rezultatų taip pat matyti, kad mokslo ir technologijų parkų bei analogiškų organizacijų veikloje vis plačiau diegiamos informacinės technologijos, šios organizacijos yra visiškai orientuotos į žinių visuomenės standartus, todėl ryšys tarp šiose organizacijose dirbančių darbuotojų skaičiaus bei šalies gyventojų skaičiaus iš esmės nėra stiprus. Beje, pastaroji aplinkybė taip pat rodo, jog mokslo ir technologijų parkų bei jų tinklų plėtojimas yra svarbi prielaida ne tik kuriant bet ir ateityje modernizuojant žinių visuomenę.

Mokslo ir technologijų parkų bei analogiškų organizacijų valdymo tobulinimo perspektyvų nustatymo tyrimo objektas – mokslo ir technologijų parkų padėtis ir jų steigimo skatinimo būdai Lietuvoje bei palyginimas su ES šalyse taikomais metodais.

Tyrimo *tikslas* – parinkti mokslo ir technologijų parkų veiklą apibūdinančius rodiklius ir, jais remiantis, įvertinti pastarųjų padėtį, potencialą Lietuvoje bei skatinimo būdus, lyginant su ES šalimis, išanalizuoti mokslo ir technologijų parkų sistemos struktūra Lietuvoje, jų veiklos teisinę ir finansinę padėtį bei apibendrinti prielaidas ir būdus galimam parkų tinklo kūrimui ir veiklos tobulinimui.

Lietuvoje dar neegzistuojančios struktūros – *rizikos kapitalo fondo* – atėjimas į mokslo ir technologijų parkų sistemą padidintų šių struktūrų veiklos efektyvumą, taip mano 25 proc. respondentų. Daugelis respondentų šį pasirinkimą komentavo, tuo, jog privataus kapitalo atėjimas per rizikos kapitalo fondus, turėti būti didelis sujudėjimas šiuo metu vykstantiems fundamentiniams tyrimams, būtų skatinami tie tyrimai, kurie turi konkretų komercializavimui tinkamą rezultatą. Dalis respondentų (21 proc.) tikisi pagalbos iš valstybės, galima pabrėžti, jog šį atsakymą rinkosi mokslininkai, kurie siekia komercializuoti tyrimų rezultatus, tačiau šios veiklos neperkėlė į mokslo ir technologijų parką ar verslo inkubatorių.

Apibrėžti labiausiai tinkami mokslo ir technologijų parko veikos organizavimo ir valdymo modeliai:

- kai parkas veikia aiškiai apibrėžtoje teritorijoje;
- kai parkas veikia negriežtai apibrėžtoje teritorijoje .

Pagal atliktus tyrimus buvo nustatyta, jog Lietuvoje veikiančios mokslo ir technologijų parkai bei panašios struktūros netenkina čia veiklą vystančių ūkio subjektų poreikių, todėl būtų tikslinga *peržiūrėti norminius aktus* reglamentuojančius struktūrų aktyvinančių mokslo ir technologijų pažangą veiklą, bei atlikti *mokslo ir technologijų parkų akreditaciją*.

AUTORĖS CV

Vardas,	Aistė Miliūtė
Pavardė	
Išsilavinimas	2000 – 2004m. Doktorantūros studijos, Vilniaus Gedimino technikos universitete, Verslo vadybos fakultete, Tarptautinės ekonomikos ir vadybos katedroje, Vadybos specializacija. Disertacijos tema: „Mokslo ir technologijų parkų plėtra: vadybos modeliai“.
	1998-2000m. Magistratūros studijos, Kauno technologijos universitete, Ekonomikos ir vadybos fakultete. Diplominio darbo tema: „Lietuvos finansų sistemos integracija į vieningąją Europos rinką“.
	1994-1998m. Bakalauro studijos, Kauno technologijos universitete, Vadybos fakultete. Baigiamojo darbo tema: „Įmonės „X“ veiklos reorganizavimo galimybės“.
Dalyvavimas tarptautiniuose projektuose	Leonardo da Vinci projektas Nr. LT/99/1/088105/PI/I.1.1.b/FPC Training network of Business Incubators.
	2002m. liepa – 2003m. Phare projektas „Competitiveness Project: Innovation- Science and Technology Parks“.
Stażuotė	2000m. rugsėjo 07 - spalio 31 stažuotė Vokietijoje, pagal CDG finansuojamą programą „Berufliche Weiterbildung für Fach-und Führungskräfte der wirtschaft aus Litauen“.

Aistė Miliūtė

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Leido Vilniaus Gedimino technikos universiteto leidykla "Technika",

Saulėtekio al. 11, LT – 10223 Vilnius, Lietuva

Spausdino UAB "Sapnų sala", S.Moniuškos g. 21 – 10, LT- 08121 Vilnius,

Lietuva