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## COOPERATION MODEL BETWEEN THE *BIOENERGY FOR THE REGION* CLUSTER AND COMPETENCE NETWORK *DEENET*

### Abstract

There is a great need for cooperation of entities from different sectors of the economy to make development more efficient and fruitful. Since clusters and networks are complex structures while analyzed alone, it is a specially hard task to create networks of cooperation not only within them, but also between them. While the international component is added there, it seems of crucial importance to create a cooperation model with a well-designed monitoring system to make such cooperation possible, which was the main goal of the article.

### Key words

cluster, network, cooperation, bioenergy, renewable energy, cooperation monitoring, international cooperation

### Introduction

The cooperation model between the *Bioenergy for the Region Cluster* and competence net *deENet* is based on information collected during the project, many years of experience gained during cooperation and an apprenticeship worked out by the members. The model takes into account various aspects of cooperation: substantive, focused on issues related to renewable energy sources, organizational and logistical, cultural, financial and non-financial. Furthermore, the model is embedded in the existing provisions of the European law, common to both nets, as well as the current regulations in Poland and Germany. At the same time, references are made to the new regulation concerning renewable energy sources, which is likely to enter into force in mid-2013 and will radically change the situation of renewable energy in our country. The model systematizes the relationship between the main types of linkages and connections between members and presents a set of tools and methods that can be used to efficiently and effectively build positive relationships between the actors of cooperation.

### Model areas of cooperation

A substantive area of cooperation between the *Bioenergy for the Region* cluster and network *deENet* is widely understood to be renewable energy, in particular:

- Biomass – issues related to the cultivation of energy crops, cultivation of algae, plants and machinery for cultivation, harvesting and processing of biomass, logistics of sourcing, packaging and distribution of biomass, biomass boilers, integrated with other sources of renewable energy.
- Biogas – issues related to the production of biogas from post-industrial organic waste, organization and logistics of capturing systems of biodegradable municipal waste, microtechnologies to produce biogas in distributed systems.
- Wind energy – issues related to the research and testing of micro wind turbines, installation, operation and maintenance of micro wind turbines integrated with other sources of renewable energy for application in distributed systems.
- Solar power – issues related to the use of solar collectors and photovoltaic cells integrated with other sources of renewable energy for application in distributed systems.
- Energy efficiency – issues associated with energy savings through the use of modern materials and energy-efficient technologies as well as by developing responsible social behaviors.

The graph below presents the suggested model of cooperation between the Cluster and the Net, making functions of the entities a basis for creating fields of interest.

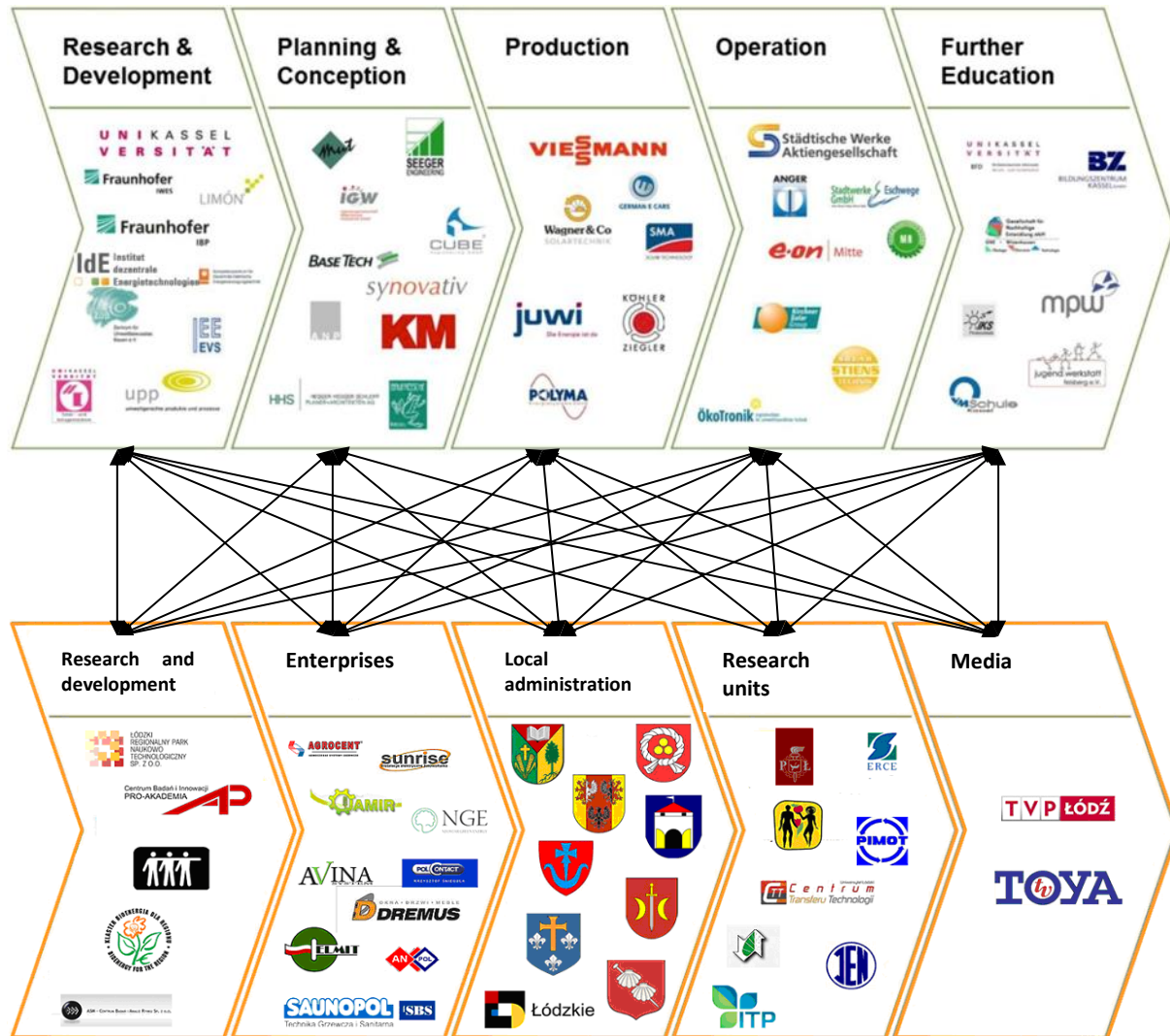


Figure 1. Functional connections between the *Bioenergy for the Region* cluster and competence deENet.  
Source: Elaboration of RIC Pro-Akademia and deENet.

DEVELOPMENT OF RENEWABLE ENERGY IN THE LODZKIE VOIVODESHIP AND

### Determinants of Cooperation

There are several main fields in which both entities might cooperate. The basic ones are:

- The need to introduce a network to improve products or services on the market;
- Standards and apprentice;
- Public, non-financial system supporting cooperation between science and business at the local level;
- Public financial system supporting cooperation between science and business at the local level;
- Promotion and information on the benefits of cooperation between science and business;
- Qualifications of academic workers, corresponding with the current needs of business;
- Logistics opportunities for joint research and development;
- Joint investment in research tools;
- Availability of forms and language of cooperation between science and business;
- Flexibility of economic and research structures.

### The model of cooperation between the *Bioenergy for the Region* Cluster and competence net deENet

A model collaboration between cooperative relations of the *Bioenergy for the Region* and the network deENet on the following areas:

- First – at the level of creation of joint projects and searching for external funding, which allow for their implementation. Appropriate members of both sides are invited to linked cooperation, initiated by the coordinators.
- Second – at the level of joint research, involving research and development institutions, research units and, if required, companies.
- Third – at the level of the business, allowing the members of both connections, not just enterprises, transactions of a commercial nature.

### **Model indicators allowing for cooperation monitoring**

Monitoring of all the actions is a basis for fruitful cooperation. The model for monitoring is necessary for standardized and open cooperation. There are many models of monitoring, but the most interesting one is the model created for project monitoring analysis,<sup>1</sup> because it was a source of inspiration for deepening the analysis in a particular context. The cooperation monitoring systems are based on the assumption that each member of the system can and should influence the model and prepare a kind of report on it.<sup>2</sup> The scope of cooperation analysis, primarily defined as a number of projects created between the Cluster's and the Net's members, might be one of basic steps to monitor and evaluate that, just as the relation between goal (which is building in-depth cooperation) and actions.<sup>3</sup>

Indicators allowing for monitoring the development of new projects, helping to increase the cooperation between the *Bioenergy for the Region* cluster and the network *deENet* include:

- Number of prepared joint projects;
- Number of joint applications for funding from external sources;
- Number of the members of the two links, involved in the preparation and implementation of projects;
- Results for the relationship as a whole and individual members;
- Sustainability of the results;
- Number of developed concepts for the new projects.

Such projects are not the only source for sufficient evaluation. The level of engagement and scope of projects can give some details as well.<sup>4</sup> To diagnose engagement and add it to a general description of the monitoring system, it is necessary to present each project in detail in the second step of the analysis. Indicators allowing for monitoring the joint research and development, inspired by the cooperation between the *Bioenergy for the Region* cluster and the network *deENet* include:

- Number of prepared joint research projects;
- Number of developed patent applications;
- Number of joint research grant applications from external sources;
- Number of members of the two links that are involved in the research;
- Results for the relationship as a whole and individual members;
- Number of initiated commercialization procedures.

Intellectual engagement in projects, in addition to economic cooperation, should be analyzed. Indicators monitoring the economic cooperation, inspired by cooperation between the *Bioenergy for the Region* cluster and the network *deENet* include:

- Number of bilateral transactions in the relationship;
- Number of joint business ventures outside connections;
- Number of members of both groups involved in cooperative ventures;
- Results for the relationship as a whole and individual members;
- Number of export transactions;
- Number of developed concepts for the new business projects.

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<sup>1</sup> P. Gudda, *A Guide to Project Monitoring and Evaluation*, AuthorHouse, Bloomington 2011, p. 31-42.

<sup>2</sup> *Ibidem*, p. 7.

<sup>3</sup> J. Z. Kusek, R.C. Rist, *Then Steps to a Results-Based Monitoring and Evaluation System*, The World Bank, Washington 2004, p. 103.

<sup>4</sup> A. Bishop, B.C. Bruce, K. Williams, P. Prior, *From Outreach to Engagement: an Actor-Network-Theory Analysis of Attracting Spanish-Speaking Participants to Public Programming*, Brigham Young University, Urbana 2009, p. 120-122.

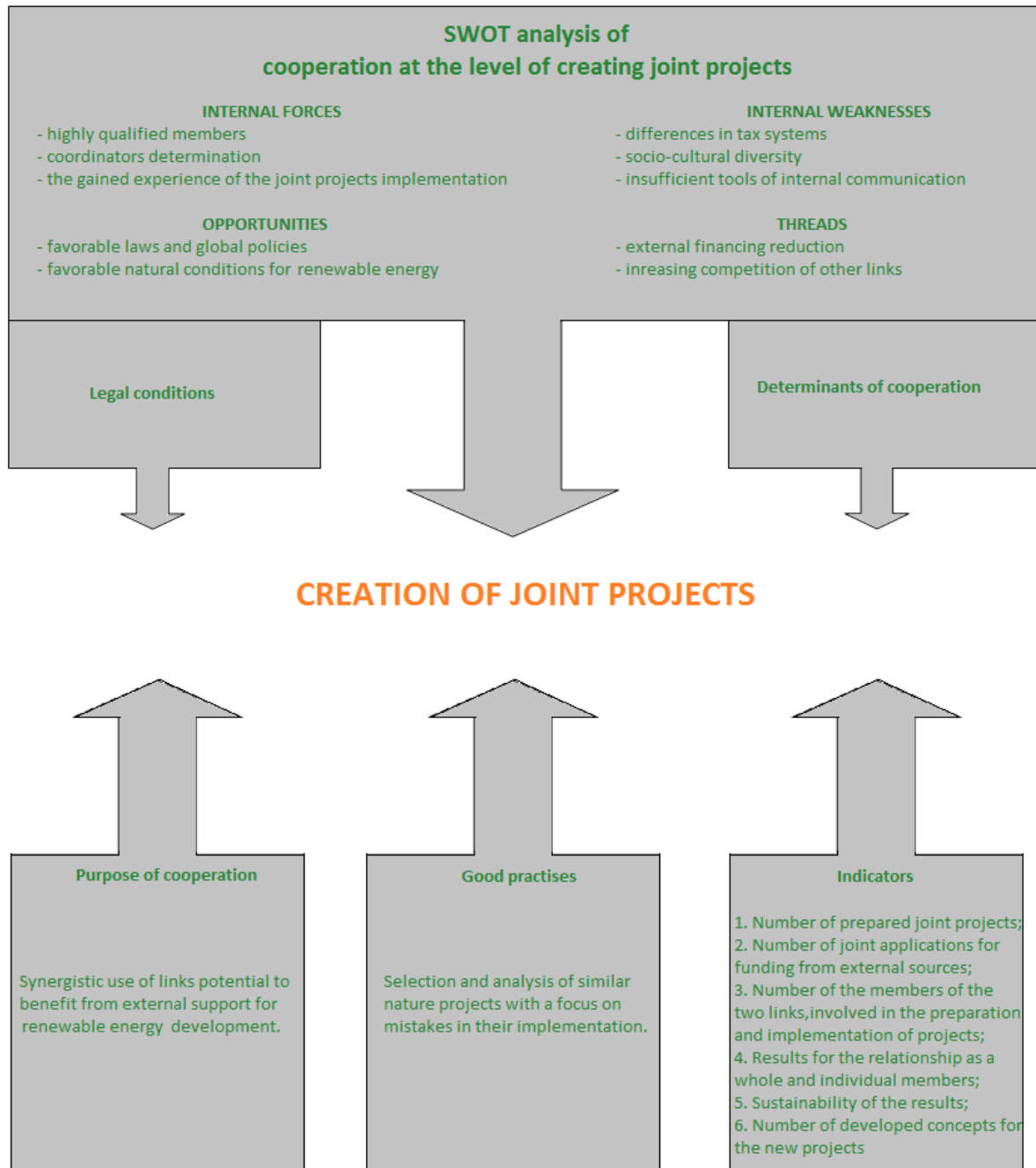


Figure 2. SWOT analysis of cooperation at the level of creating joint projects.

Source: own study.

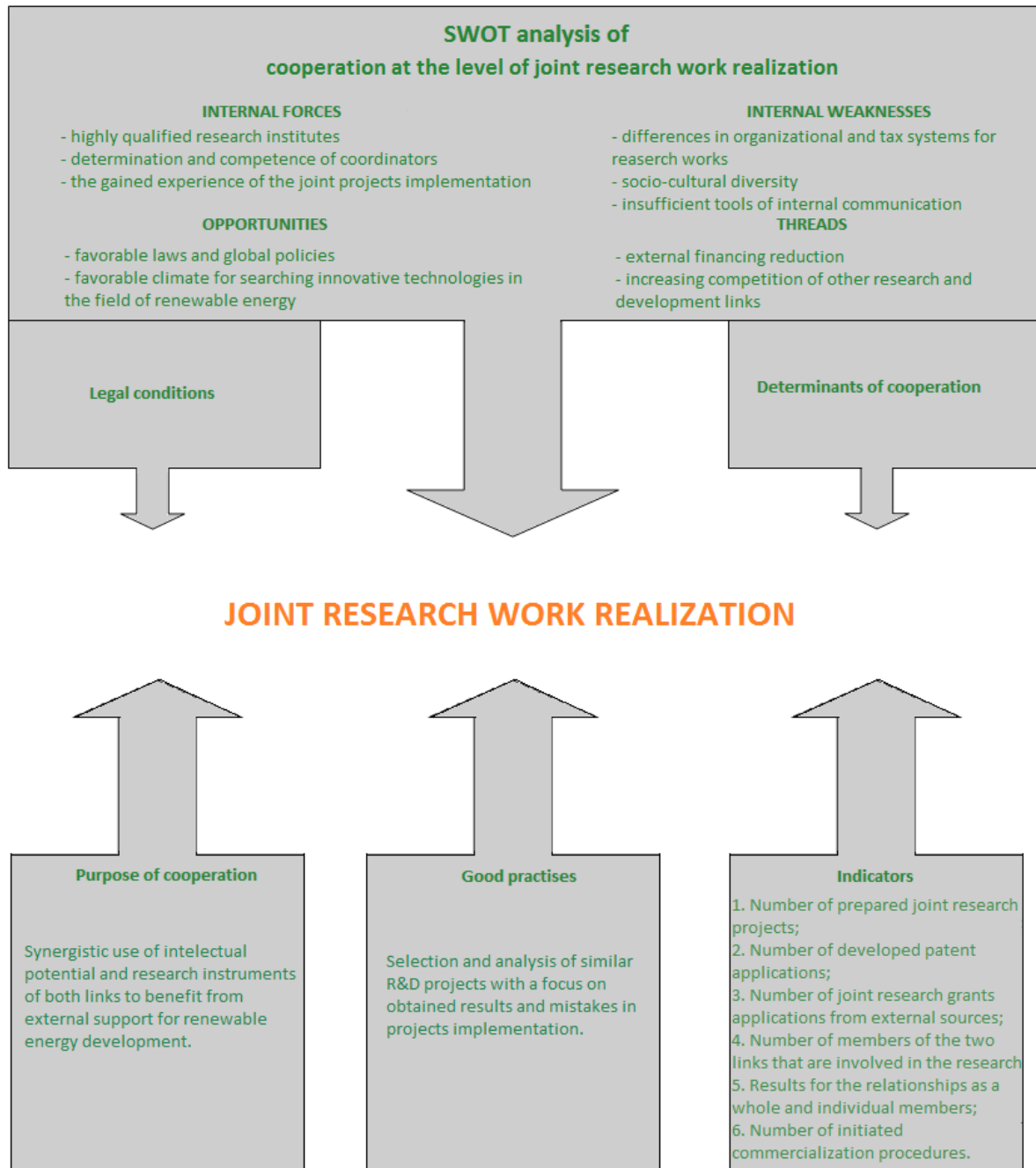


Figure 3. SWOT analysis of cooperation at the level of joint research work realization.

Source: own study.

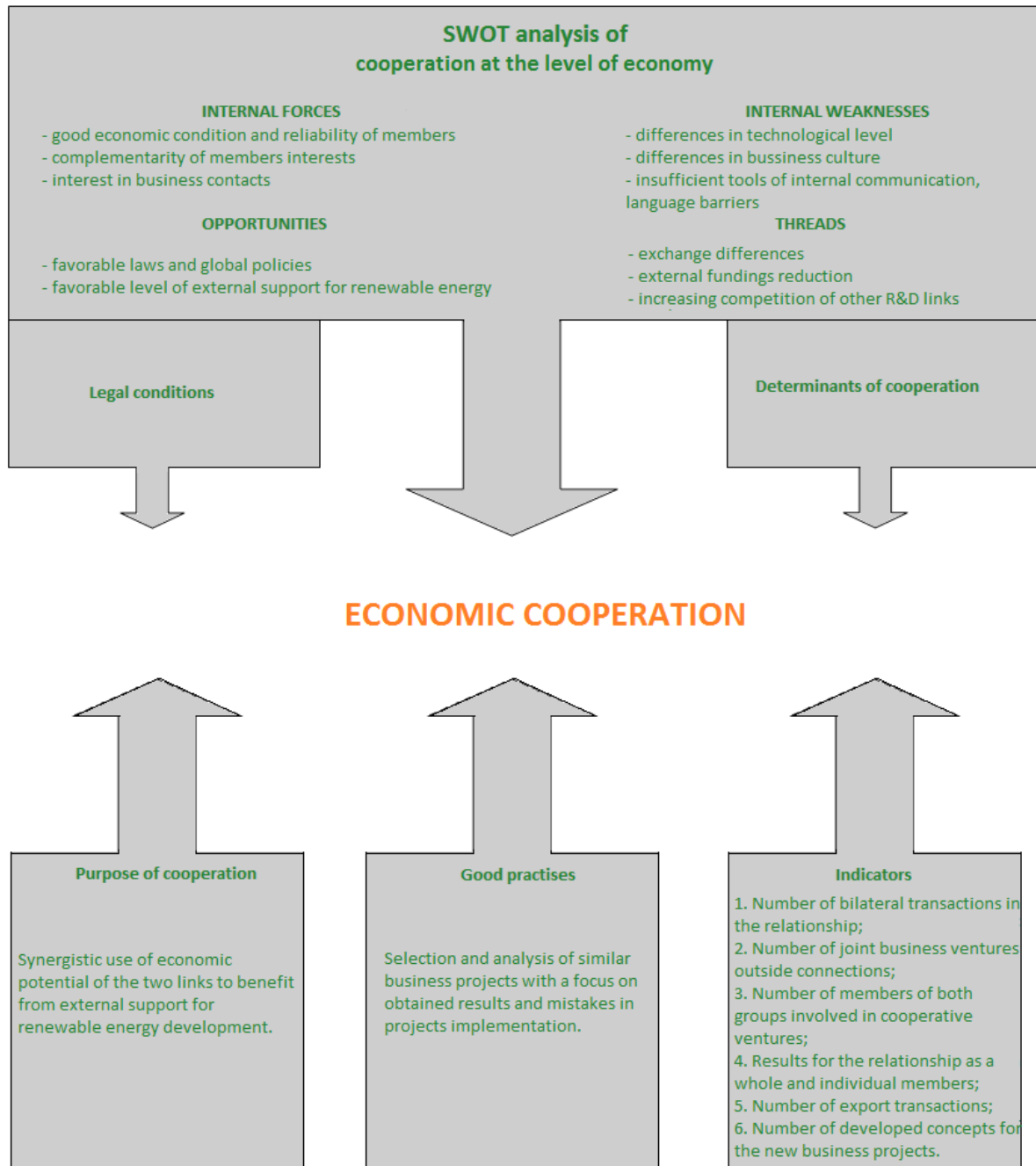


Figure 4. SWOT analysis of cooperation at the level of economy.

Source: own study.

### **Effective cooperation and knowledge transfer model in renewable energy sources business in Łódzkie with the use of German competence network deENet solutions**

Effective cooperation and knowledge transfer model in renewable energy sources business in Łódzkie with the use of German competence network deENet solutions is aimed to help with the growth of renewable energy. The model is built on the basis of observations of contacts between science and economy in Łódzkie, Poland and the European Union led from 1996 by the coordinator of the cluster – Research and Innovation Centre Pro-Akademia – as well as information gathered during the implementation of the project, years of experience and good standards worked out by members.

The model takes into account various aspects of science and economy cooperation in the field of renewable energy sources: on the basis of merit, concentrated around problems connected to building regional specializations, organizational, logistical, social, financial and non-financial. The broad scope of description of cooperation is reasoned with a need to present it in a possibly complex way, just as monitoring requires.<sup>5</sup>

What is more, the model is in line with binding law: European as well as current legal regulations in Poland and Strategy of Łódzkie Development for years 2014-2020<sup>6</sup> and Strategy of Łódzkie Innovations<sup>7</sup>. At the same time, references were made to the new Renewable Energy Sources Act, which will be probably introduced in the middle of 2013 and will significantly change the situation of renewable energy in Poland and Łódzkie.

The model systematizes the main types of relations between *Bioenergy for Region Cluster* and presents the set of tools and methods, which can be applied to efficient and effective development of relations between the scientific environment and entrepreneurs.

#### **MODEL COOPERATION AREAS**

Renewable energy is a substantial area of cooperation between science and economy, especially with respect to:

- **Biomass** – issues related to energy plants and alga cultivation, devices and machines for biomass cultivation, harvesting and processing, logistic system of acquiring, packaging and distribution of biomass, biomass pots integrated with other renewable energy sources;
- **Biogas** – issues related to biogas production from industrial organic waste, organization and logistics of biodegradable communal waste retrieval systems, microtechnologies for biogas production in dispersed systems;
- **Wind energy** – issues related to research and testing of original wind microturbines, planting, servicing and maintenance of wind microturbines integrated with other renewable energy sources applied in dispersed systems;
- **Solar power** – issues related to use of solar collectors and photovoltaic cells integrated with other renewable energy sources applied in dispersed systems;
- **Hydroenergy** – issues related to hydro microturbines utilizing the energy potential of lowland rivers;
- **Energy effectiveness** – issues related to search of energy savings by use of modern materials and energy efficient technologies and by building responsible social attitudes.

#### **Determinants of cooperation between science and economy in Łódzkie**

- The need to introduce new or improved products and services;
- Standards and practice;
- Non-financial public support system for cooperation between science and economy on local level;
- Financial public support system for cooperation between science and economy on a local level;
- Promotion and information about benefits from cooperation between science and economy;
- Qualifications of science employees responding to present requirements of regional economy;

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<sup>5</sup> F. Gault, *Innovation Strategies for a Global Economy. Development, Implementation, Measurement and Management*, International Development Research Centre, Cheltenham 2010, p. 70-71.

<sup>6</sup> Zarząd Województwa Łódzkiego, *Strategia Rozwoju Województwa Łódzkiego 2020*, Łódź 2013, available through: [http://www.strategia.lodzkie.pl/images/srwl\\_2020\\_uchwalona\\_26\\_02\\_2013.pdf](http://www.strategia.lodzkie.pl/images/srwl_2020_uchwalona_26_02_2013.pdf).

<sup>7</sup> Regionalna Strategia Innowacji dla Województwa Łódzkiego LORIS 2030, Łódź 2012, available through: [http://www.lodzkie.pl/wps/wcm/connect/89168c004e1e5485a448f7359c9a2dc0/RSI+LORIS+2030\\_projekt\\_.pdf?MOD=AJPERES](http://www.lodzkie.pl/wps/wcm/connect/89168c004e1e5485a448f7359c9a2dc0/RSI+LORIS+2030_projekt_.pdf?MOD=AJPERES).

- Logistic possibilities of managing common research and development projects by science research institutes and companies;
- Mutual investments in research instrumentarium;
- Availability of forms and language of cooperation between science and economy;
- Economy and research and development structures elasticity conditioning cooperation between sectors.

#### **Model of cooperation of science and economy in Łódzkie**

The model cooperation between science and economy takes place in the following areas:

- **Firstly** – area of creating common projects and searching for external financing, which allows their implementation. Appropriate members of Bioenergia for the Region cluster and external partners are invited to work on projects initialized by coordinator of the cluster engaging science employees and entrepreneurs.
- **Secondly** – area of common research engaging research and development institutes, scientific research units and, if required, enterprises.
- **Thirdly** – area of business allowing members of both parties, not only enterprises, making transactions of commercial character.
- **Fourthly** – area of international cooperation, in the event that local partners cannot supply the required level of expertise.



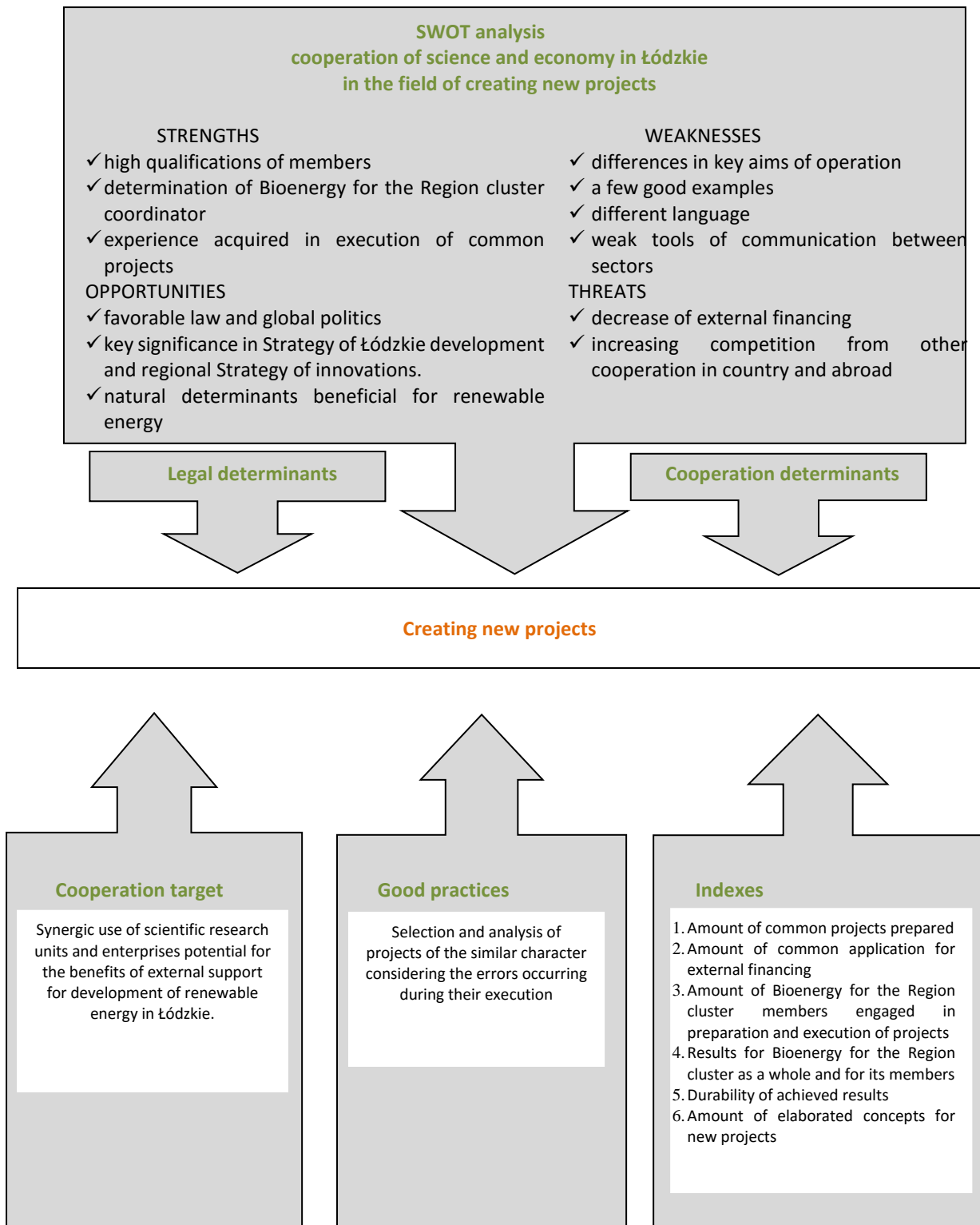


Figure 5. SWOT analysis cooperation of science and economy in Łódzkie in the field of creating new projects.

Source: own study.

**SWOT analysis**

**Cooperation in the field of managing common research**

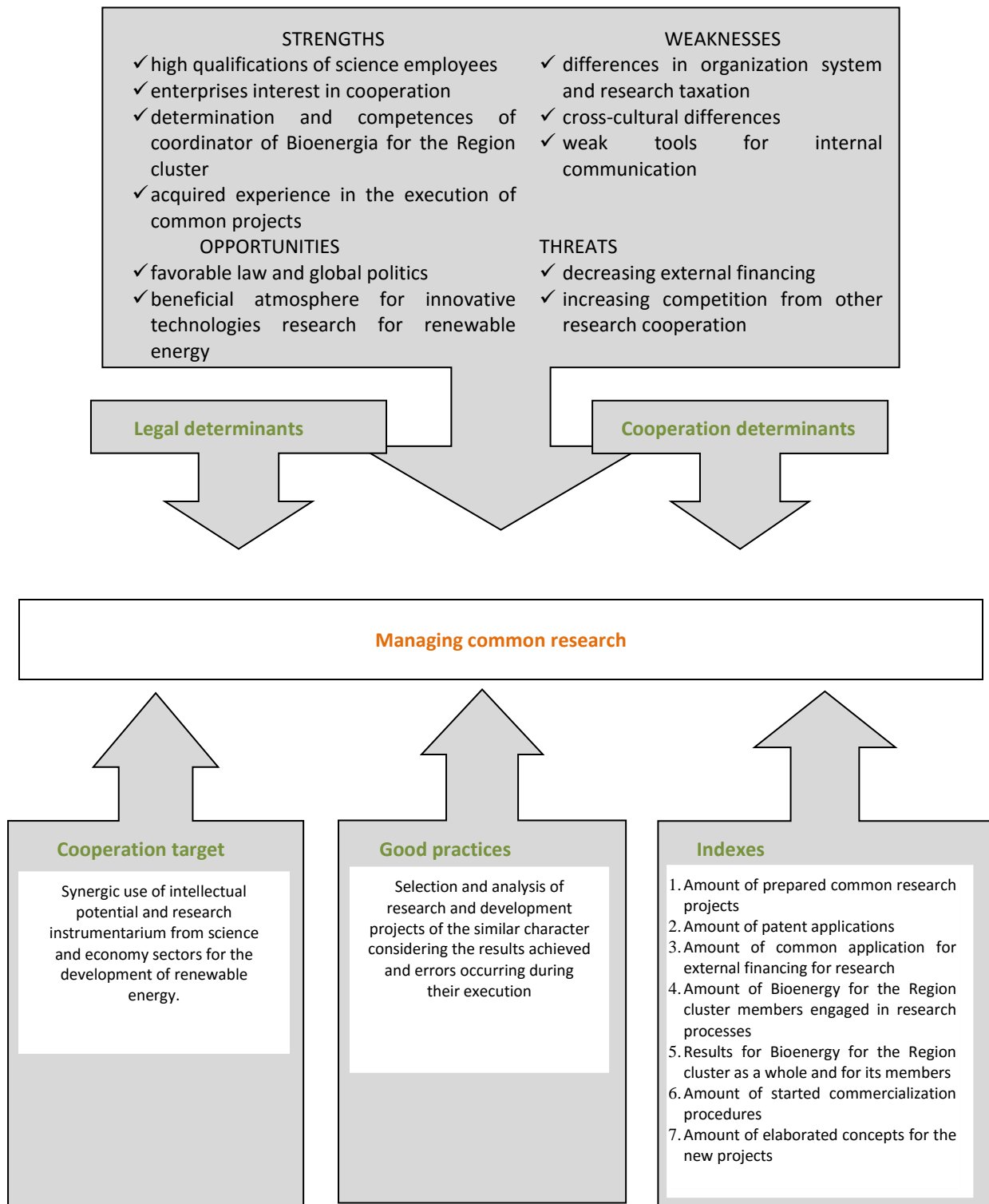


Figure 6. SWOT analysis cooperation in the field of managing common research.

Source: own study.

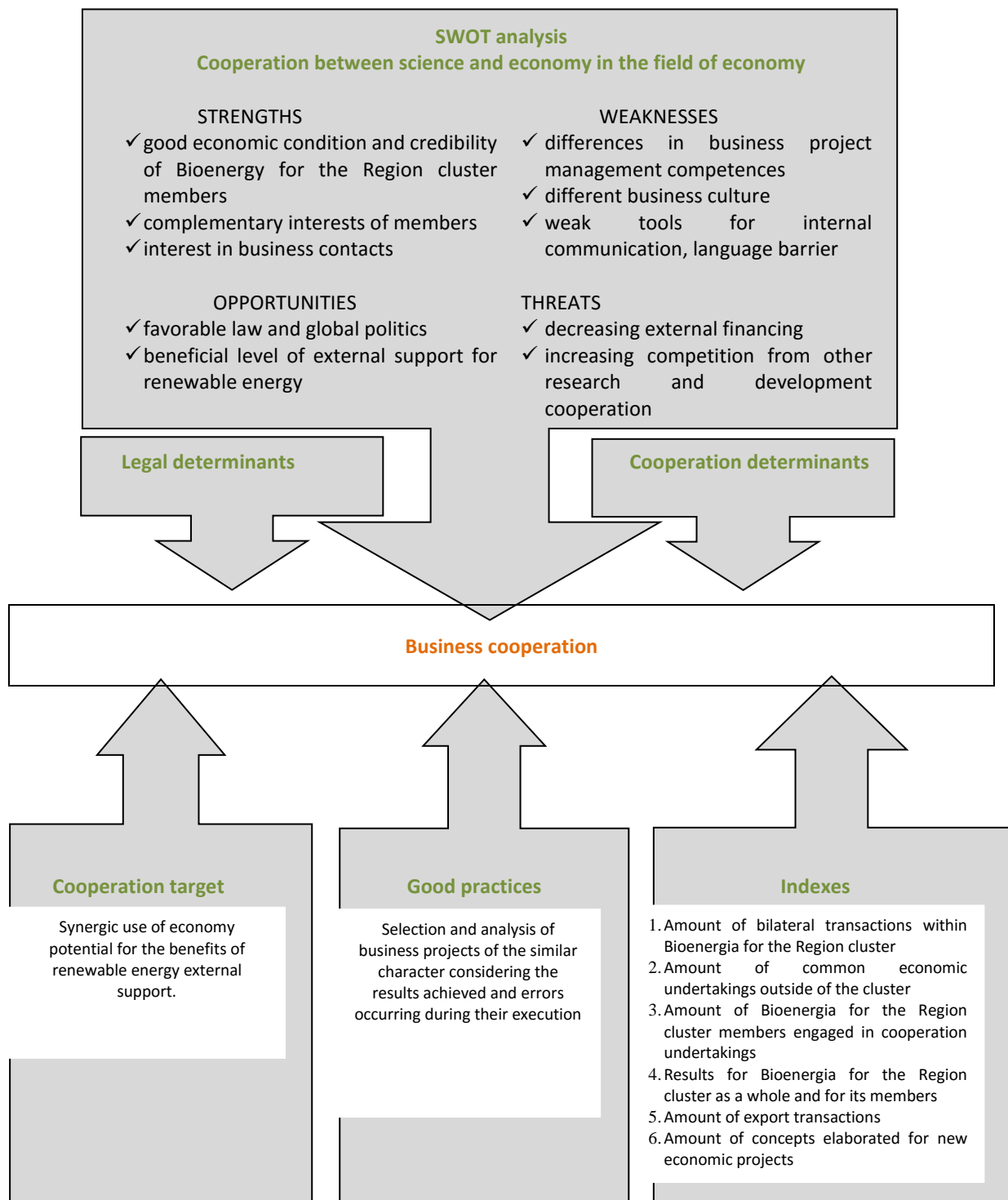


Figure 7. SWOT analysis cooperation between science and economy in the field of economy.

Source: own study.

## Abstract

The development of science and economy in Łódzkie will be a very important part of building competitive advantage<sup>8</sup> in the future financial perspective for 2014-2020. Cooperation with proven foreign partners, such as deENet network for Bioenergy for the Region Cluster may be a leading factor in the process of investigating innovative solutions, allowing companies to obtain access to a wider scope of resources and knowledge, decreasing costs and sharing the risks.

Common research and development processes of scientific units and enterprises have many forms and interactions, starting from simple, one-way information flows to highly interactive and formalized organizational systems. The rules of organizing international research and development cooperation in the field of renewable energy sources are different in Poland and Germany. There is willingness and justified necessity of creating Polish-German research teams maintaining balance between partners. International – Polish-German and interregional R&D cooperation is and will be supported, among other things, as a part of Framework Program in the field of technological research and development.

The use of deENet network experiences for Bioenergy for the Region cluster aimed at cooperation between science and economy will lead to:

- justification of the thesis that renewable energy may be, besides conventional energy based mostly on lignite, the most important stimulus for local growth of Łódzkie;
- focusing the attention of local scientific research units and enterprises on few selected issues connected with renewable energy sources that are the most significant from specificity of the regional perspective. These issues are building energy independence on the basis of local natural resources (biomass, wind and sun), intelligent waste management and retrieving energy from waste on the basis of biogas micro-technologies, taking advantage of the energy potential of regional rivers, energy-saving constructions taking into consideration climate conditions in Central Europe and local building materials, as well as the use of optoelectronics in the textile and clothing industries;
- greater integration of the world of science and economy practices around concrete and real problems – assigning tasks, providing relevant support and seeking knowledge and experience beyond Łódzkie.

Executing research in the scope of this project led to the following conclusions:

- Internationalization of research and development dedicated to widely understood renewable energy with the participation of the Polish scientific environment is definitely possible and supported by common interest in this subject in Germany and other leading European centres;
- Łódzkie and Bioenergy for Region cluster have significant intellectual capital that can be used to create technological specialization in fields like dispersed energy based on integrated energy resources, biogas micro-technologies based on industrial organic waste or micro-hydro power stations rising on steady rivers in central Europe in line with the natural environment, energy-saving construction taking into consideration climate conditions in Central Europe and local building materials;
- Although it is not an easy task, the integration of the worlds of science and practice around concrete, real problems is possible and necessary, not only in the local environment, but also with the help of cooperation between sectors and countries.

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### **MODEL WSPÓŁPRACY MIĘDZY KLASTREM BIOENERGIA DLA REGIONU I SIECIĄ KOMPETENCJI DEENETNETWORK**

#### **Abstrakt**

Model współpracy między klastrem Bioenergia dla Regionu i siecią kompetencji deENet został opracowany na podstawie informacji zebranych w ciągu wielu lat doświadczeń zdobytych podczas członków sieci deENet i Klastra Bioenergia dla Regionu. Model uwzględnia różne aspekty współpracy: badawcze, koncentrujące się na zagadnieniach związanych z odnawialnymi źródłami energii, organizacyjne i logistyczne, kulturowe i finansowe. Ponadto, model jest osadzony w istniejących przepisach prawa: europejskich, wspólnych dla obu sieci, jak również z obowiązującymi przepisami w Polsce i Niemczech. Model systematyzuje relacje między głównymi rodzajami powiązań i połączeń między członkami i przedstawia zestaw narzędzi i metod, które można wykorzystać do efektywnego i skutecznego budowania pozytywnych relacji między uczestnikami współpracy.

#### **Słowa kluczowe**

polskoniemiecka współpraca, międzynarodowa współpraca klastrów, sieci kompetencji deenet, klastry bioenergia dla regionu