

TRIPLE HELIX MODEL IN PRACTICE IN THE CZECH REPUBLIC

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Abstract. The paper deals with the problem of the triple helix model, from the points of view of both its theoretical basis and the practical effects of its application in the Czech Republic. The introduction explains the nature of this model, which expresses cooperation of enterprises, universities and governments (national, regional and local). Then, the paper identifies, characterizes and evaluates alternative forms of bilateral and multilateral cooperation within the triple helix model in the Czech Republic. The attention is focused on the possibilities of mutual cooperation of enterprises, partnerships of universities and on cooperation between the individual government levels, i.e. cooperation of the entities within individual helices of the model. Further on, the attention is paid to cooperation between the entities of different helices of the model, i.e. the cooperation between enterprises and universities, enterprises and governments, and between universities and governments. And of course, cooperation on the level enterprise – university – government is not omitted, either.

Keywords: triple helix model, cooperation, partnership, enterprise, university, government.

Jel classification: H70, I29, L14, L24

1. Introduction

The economic situation and competitiveness of both individual enterprises and the entire national economies are, thanks to globalization tendencies, exposed not only to the strong pressure both from the point of view of threatening worldwide economic crisis and from the point of view of the debt crisis (now taking place in the EU and the USA), but also to the strong Asian competition. A way how to achieve economic growth and stronger competitiveness of individual entrepreneurial entities and the entire economies is partnership, or cooperation, of all the economic entities based on sharing and common creation of knowledge. One of the forms in the given context of relevant partnerships is the partnership of enterprises, universities and governments called the triple helix.

The paper aims to identify possible forms of cooperation and partnerships within the triple helix model, and to put them in concrete terms by example of the Czech Republic.

The author of the paper used the following research methods: interpretative-theoretical research, descriptive research, correlation research and micro-study.

The paper summarizes the theoretical basis of the given problems and further develops the knowledge of the alternative forms of partnerships within the triple helix model both from the general point of view and from the point of view of par-

ticular examples from the Czech Republic practice, which can be seen as its original contribution.

2. The substance of the Triple Helix Model

Academia (i.e. educational institutions of higher learning - colleges and universities), government (national, provincial and municipal), and industry (e.g. private corporations, partnerships, or sole proprietorships) constitute the three helices that engage in triple helix innovation (National Institute for Triple Helix Innovation 2010). Triple helix of innovation is a process by which academia, government, and industry collaborate, i.e. engage in a process of mutually beneficial leveraging of resources, to create or discover new knowledge, technology, or products and services (National Institute for Triple Helix Innovation 2010).

The triple helix is “a spiral model of innovation that captures multiple reciprocal relationships at different points in the process of knowledge capitalization” (Etzkowitz 2002). The triple helix model of collaboration represents “new patterns of collaboration among industry consortia, university linkages and government agencies, with an emphasis on commercialization” (Asheim, Coenen 2005; Jerome, Jordan 2010; Leydesdorff 2005; Leydesdorff, Etzkowitz 2001).

According to Etzkowitz (2002) the first dimension of the triple helix model is internal transformation in each of the helices, the second is the

influence of one helix upon another and the third dimension is the creation of a new overlay trilateral networks and organizations from the interaction among the three helices, formed for the purpose of coming up with new ideas and formats for high-tech development.

Etzkowitz (2008) differentiates several triple helix models – statist model, laissez-faire model, interaction model and circulation model. Individual models differ in the character of relationships. The most perfect is the circulation model (see Figure 1), which expresses not only the possible knowledge transfer within individual helices of the model and relationships between individual helices, but also the highest form – relationships among the entities of all the helices.

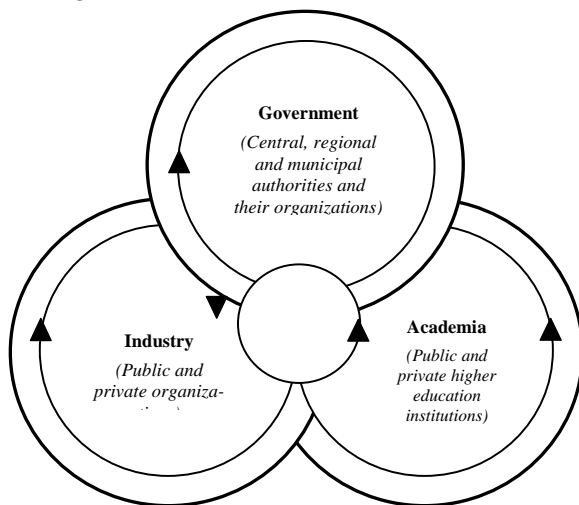


Fig.1. Triple Helix Model (Source: modified according to Etzkowitz 2002, 2008; Tetřevová 2010)

3. Alternative forms of partnerships within the Triple Helix Model

Cooperation between enterprises, universities and governments connected with transfer, transformation and internalization of knowledge can be based both on separate cooperation on the corporate, university, or government levels, and on cooperation of enterprises and universities, enterprises and governments, or governments and universities. The highest form of cooperation is then partnership of all the three mentioned entities. Further on, we will focus on the details of those forms of cooperation where one of the partners is a business. Now, we will briefly characterize the other forms of partnerships.

As for partnerships on the university level, i.e. partnerships between universities, it can be put into practice both in educational and in scientific and research activities. In the case of the educational activities, it can mean creation of common subjects of study or even branches of study, having selected lectures at a partner university, common

production of teaching texts, mutual second reading of bachelor, diploma, and dissertation theses, or participation in the state exam commissions. In the case of the scientific and research activities, it can mean utilization of the scientific and technical background of a partner workplace, common presentation and implementation of scientific and research projects, participation in organization of workshops and conferences, or cooperation in publication.

As for partnerships on the government level, which usually consists of the national, regional and local levels, the nature of relationships will mostly depend on the applied model of the fiscal federalism, which specifies separation of powers and responsibilities of individual government levels not only for ensuring, but also for funding of the public goods in the given country.

As for partnerships on the government – university level, the government, usually represented by the Ministry of Education, or a separate institution, e.g. in the form of an accreditation committee, represents a regulatory and supervisory body over tertiary education in the country. At the same time and in compliance with the valid legal regulations, it provides financial means for funding public universities in particular. The government organizations and institutions, mostly in the form of grant agencies, are often also the organizers of tenders for a number of grant projects focusing on universities.

3.1. Partnerships on the enterprise – enterprise level

A partnership between enterprises results from the process of extending business partnerships. It is implemented in the form of strategic alliances that are not based on joint ownership. These strategic alliances have the character of integration, which can be vertical, horizontal or conglomerate.

Strategic alliances are based on agreement of two or more independent businesses, whose goal is to establish a joint partnership and gain strategic advantages. At the same time, each of the companies contributes in the area where they have exceptional dispositions and abilities, i.e. where they are strong. Strategic alliances can have, from the point of view of their organizational structure, a number of forms. They can be strategic alliances based on joint ownership in the form of alliances based on ownership sharing, where the agreements are usually accompanied with a holding form of ownership sharing, see more e.g. (Dědina, Čejka 1999; Synek *et al.* 2006, 2007), and joint ventures, where the strategic alliances consist in establishment of a new entrepreneurial unit owned jointly by the con-

tracting partners, see more e.g. (Berdrow, Lane 2003; Smith, Parr 2004; Tetřevová 2003; Vodáček, Vodáčková 2002). They can also be strategic alliances that are not based on joint ownership, where cooperation between the partners is based on contracts of a formal or informal character. However, there is no ownership interconnection between the partners.

Strategic alliances that are not based on joint ownership can implement cooperation in the form of strategic alliances of a franchising type, strategic alliances in the area of research and development, purchase, manufacturing, sale and distribution and administration.

In some cases, the agreements on the base of which strategic alliances arise may have the character of cartel agreements. A cartel represents an agreement between entrepreneurial entities (usually from the same business sector) on meeting certain conditions, e.g. price, sales, production conditions, see more e.g. in (Niels *et al.* 2011; Valach *et al.* 1999). These agreements lead to restraint of competition on the market, and so they are prohibited in most countries.

In the Czech Republic, the above legal forms of partnerships are used to a limited extent only. The reason can be seen in the specific character of the entrepreneurial environment being distinguished by high non-transparency of relationships and a danger of deceits. The other reasons include limited enforceability of law, a high rate of bribery, or disrespecting the basic ethical principles, which could finally lead to the transfer of know-how to a competitor. Vlckova (2011) also states that there is very low willingness and thus a very low level of information sharing among enterprises. As for the forbidden cartel agreement, as stated by the Office for the Protection of Competition, the last two years have seen a decrease in the number of banned agreements, where 5 cases were dealt with in 2005 and 2006, 9 cases in 2007, 16 cases in 2008, 2 cases in 2009, and only 1 case was dealt with in 2010 (Office for the Protection of Competition 2011).

3.2. Partnerships on the enterprise – university level

Partnerships of enterprises and universities are primarily seen from the point of view of universities. These activities are then often marked as outreach activities (e.g. Dolan 2008; Husárová 2007; Ray 1999), academic entrepreneurship (e.g. Boehm 2008; Shattock *et al.* 2009; Wright *et al.* 2007), academic commercialization (Bok 2005; McKelvey *et al.* 2009), or industry-university partnership activities (Heidrick *et al.* 2005). They are based on

cooperation of universities not only with businesses, but also with other external entities. The aim is to widen the range of educational and scientific and research activities offered by universities to satisfy the needs of external entities (Tetřevová 2009). Figure 2 shows possible forms of partnerships between universities and enterprises.

O U T R E A C H A C T I V I T I E S	Providing materials	Guest lectures	Teacher professional development workshops	Research experience for teachers	Ongoing collaborations
	Providing information	Ask-a-scientist	Equipment loan	Research experience for students	Teacher/Scientist exchange programs
	Judging science fairs	Advising on/ providing materials for science fairs	Co-teaching	Support for teachers making conference presentations	Outreach training for scientists
			Mentoring students in science fairs		
	<i>Awareness</i>	<i>Involvement</i>	<i>Support</i>	<i>Sponsorship</i>	<i>Strategic Partnership</i>

Fig. 2. Forms of Enterprise – University Partnerships (Source: Dolan 2008).

In the Czech Republic, university – enterprise partnerships are mainly developed at technical universities. The activities carried out within such partnerships can be divided into the following three groups (Tetřevová 2010):

- activities related to the universities’ educational activities, e.g. introduction of lifelong learning programs; active (academic staff as the lecturers) or passive (academic staff and students as the audience) attendance at corporate trainings; cooperation in preparation of educational programs and subjects or syllabi of special subjects; cooperation in drawing up diploma papers (bachelor, master, rigorous, dissertation or inaugural); cooperation in arrangement of internships and short term attachments not only for students, but also for the university staff; cooperation in arrangement of field trips; participation in organization of contact days for students, incl. possible graduate recruitment;
- activities related to the universities’ research, e.g. project solution ordered by an external entity; mutual participation in projects (of university or external entities); drawing up expert’s opinions and surveys; professional consultations.
- other activities, e.g. lease of the university campus (lecture rooms, accommodation, catering and leisure-time facilities); lease of univer-

sity facilities (computer or other specialized laboratories); participation of external entities in the conferences or professional seminars organized by the university departments.

The survey involving 70 businesses in the Czech Republic implies that 77 % of them are interested in cooperation in the area of analyses, expert opinions and professional consultations, 39 % in the area of education, training and professional development, and 31 % in the area of research and development. Only 11 % companies are interested in cooperation with students. (Husárová 2007)

The closest form of cooperation of universities and enterprises is a corporate university. The only such university in the Czech Republic is Skoda Auto University, which was established in 2000. Nowadays, it has 719 students in the full-time study mode, 313 students in the part-time study mode, both in undergraduate (Bachelor) study programs and postgraduate (Master) study programs with economic specialization. Both parties benefit from participation of Skoda Auto experts in the educational process and participation of the students in internships in Skoda Auto and the Volkswagen Group. (Škoda Auto University 2011).

3.3. Partnerships on the enterprise – government level

In the case of partnerships on the enterprise – government level, it is, in our opinion, possible to identify the following three basic forms of partnerships:

- institutional business support;
- financial business support;
- public private partnership projects.

Each country creates a system of institutions and organizations that, on the one hand, ensure regulation in the area of business and, on the other hand, support activities of entrepreneurial entities in the country. Representatives of individual government levels can, at the same time, take part in activities of other organizations that are established to support business (e.g. councils, associations, or chambers).

In the Czech Republic, they are the competent ministries (particularly the Ministry of Industry and Trade, the Ministry of Regional Development, the Ministry of the Environment, and the Ministry of Labor and Social Affairs), the state Investment and Business Development Agency – CzechInvest, the Czech-Moravian Guarantee and Development Bank (whose 73 % owner is the state), the Business Council, or locally competent Labor Offices.

Their activities are specified by e.g. Stejskal, see (Tetřevová *et al.* 2009a).

Financial business support is usually in the form of grants. A grant is a financial payment or contribution from the public budget or extra-budgetary funds (Doležal *et al.* 2009). Grants can be provided both from the budgets on the national level (the state budget and the local government budgets) and from the supranational budgets, e.g. from the European Union sources.

In the Czech Republic, the volume of financial sources provided purely from the national sources in the form of grants of the competent ministries to support the business sector is currently only marginal.

The national sources are then used in this area more as an additional source supplementing the sources coming from the European Union funds within the following programs Thematic Operational Programs (OP Enterprise and Innovation, OP Environment, OP Research and Development for Innovations, OP Human Resources and Employment), Regional Operational Programs (ROP NUTS II North-West, ROP NUTS II North-East, ROP NUTS II Central Bohemia, ROP NUTS II South-East, ROP NUTS II Moravia-Silesia, ROP NUTS II Central Moravia), Operational Programs Prague (OP Prague - Competitiveness, OP Prague - Adaptability), European Territorial Cooperation (OP Cross-Border Cooperation CR - Bavaria, OP Cross-Border Cooperation CR - Poland, OP Cross-Border Cooperation CR - Austria, OP Cross-Border Cooperation CR - Saxony, OP Cross-Border Cooperation CR - Slovakia, OP Interregional Cooperation, OP Transnational Cooperation). (EU Funds 2011) For an overview of the programs intended for entrepreneurial entities with a volume of financial sources appropriated for the Czech Republic in the programming period 2007-2013 and examples of the areas of financing, see Table 1.

Public private partnership (PPP) projects represent projects of building an extensive infrastructure, implemented in the public interest using the private sector financial means, where the private partners usually provide certain public services for the citizens at the same time. However, what is used - is not only the financial sources of private enterprises, but also their knowledge, organizational and innovation potential. PPP projects are characterized by certain common features, which include long-term partnerships, financial demandingness of projects, the fact that the risk of the invested capital is borne by the private partner and the cooperation effects are predefined outputs, using the principle of value for money and the fact that these projects do not concern provision of “core” services, but “non-core” services. (Tetřevová *et al.* 2009a)

vová 2006) The problems of PPP projects are dealt with in more detail by e.g. Akintoye (2009), Jirásková (Tetřevová *et al.* 2009a, 2009b), Sabolová and Tetřevová (2010), Tetřevová (2006) or Yescombe (2007).

Table 1. EU Sources for Entrepreneurial Entities in the Czech Republic (Source: modified according to EU Funds 2011)

Name of program	Financial means in EUR billion	Examples of the areas of financing
Thematic Operational Programs		
OP Enterprise and Innovation	3,04	support of establishment and development of enterprises, innovations or corporate networks
OP Environment	4,92	reduction of industrial pollution and diminishing of the environmental risks, installation of renewable energy sources
OP Research and Development for Innovations	2,07	establishment of European excellence centers and regional scientific and research centers
OP Human Resources and Employment	1,84	educational programs for employees, support of beginning entrepreneurs, ensuring equal opportunities
Regional Operational Programs	4,6	preparation of an area for business, investments into the infrastructure of industrial zones, corporate investment support
Operational Programs Prague	0,34	brownfields renewal, support of establishment of technically oriented enterprises and small and medium-sized companies, education
European Territorial Cooperation		
OP Cross-Border Cooperation	0,39	cooperation in the area of research and development, education, innovations
OP Transnational Cooperation		cooperation of incubators, cooperation in preparation of investments into clusters, science parks, etc.
OP Interregional Cooperation	0,32 for EU	cooperation in the area of financial support of small and medium-sized companies, education

In the Czech Republic, the problems of PPP projects have been solved for years. However, their implementation is still just beginning; only some pilot PPP projects are prepared – see Table 2. The basic barriers preventing PPP project implementation can be seen, according to Jirásková (Tetřevová *et al.* 2009b), in the lack of experience of the public sector, lack of information, missing example of a successful project, limited quality of human resources in the public sector, or the problematic legislation. Sabolová (2011) then sees the reasons for failing to start implementing PPP projects in the Czech Republic in the missing practical experience with PPP project implementation, non-transparency enabling corruption, the risk of a change of the political representation, the risk of

hidden indebtedness, and a high rate of the risk of project failure.

Table 2. Pilot PPP Projects in the Czech Republic (Source: modified according to PPP Centrum 2011)

PROJECT NAME	MORE DETAILS OF PROJECTS
AirCon (Airport Connection)	Upgrade of the Prague-Kladno railway line and construction of a railway connection to the Ruzyně Airport, including operation and maintenance; investment costs: CZK20bn; contract duration: 30-40 years.
Building and Financing of D3/R3 Motorway	Construction, maintenance and operation of D3 motorway and R3 road; investment costs: CZK27bn; contract duration: 30 years.
Lodging house for CMH staffs, Hotel - type lodging house and parking site	Construction, maintenance and operation of a hotel-type lodging house and a parking lot in the Central Military Hospital in Strešovice, Prague, the lodging house being intended for staff; investment costs: CZK1bn; contract duration: 25 years.
Building and Operation of Guarded Prison	Construction, maintenance and operation of a new guarded prison with the capacity of 500 inmates that will meet European standards; investment costs: CZK1.1bn; contract duration: 25 years.
Justice Courts in Ústí nad Labem	Construction, maintenance and operation of court house in Ústí nad Labem - infrastructure and support services focus only; investment costs: CZK1.4bn; contract duration: 25-30 years.
Revitalization of the Třebíč Bus Station	Design, construction and operation of bus terminal in the city of Třebíč, including construction of a shopping gallery and parking house; investment costs: CZK349m; contract duration: 25 years.
Central Heating Supply in Kopřivnice	Construction, maintenance and operation of central heating supply system in Kopřivnice; investment costs: CZK250m; contract duration: 15 years.
Reconstruction and Operation of the Sport and Recreational Complex „Pod Červeným kamenem“	Construction, maintenance and operation of complex of sporting grounds, with the possibility of sports and recreational activities; investment costs: CZK 150-400m; contract duration: 25-30 years.

3.4. Partnerships on the enterprise - university – government level

A mutual partnership of all the entities of the triple helix model can have several forms related to the above mentioned forms of partnerships within bilateral relations. The following forms can be considered as the basic ones:

- science and technology parks and clusters;
- financial support of partnerships.

Science and technology parks represent the entrepreneurial infrastructure (e.g. industrial zones) built by the government authorities, universities, industrial enterprises, or chambers and associations to support development and growth of businesses and the region. Science and technology parks involve scientific parks (centers), technological parks (centers), entrepreneurial and innovative centers. (Švejda *et al.* 2008) Science and tech-

nology parks usually include a business incubator, which is an environment (a building or a small zone) for beginning companies, which can take advantage of a reduced rent and other supporting services (Technologické centrum Hradec Králové 2011). The first science and technology parks in the Czech Republic were put into operation in 1991 (12 parks), their number is gradually increasing, in 2008 there were 46 parks, from which 25 parks were accredited by the Science and Technology Parks Association of the Czech Republic. (Švejda *et al.* 2008)

A cluster is a regional concentration of mutually cooperating enterprises in a specific sector and affiliated organizations, particularly tertiary education institutions and the regional government institutions and organizations. For a more detailed definition of the term “cluster” see (Pavelková *et al.* 2009; Stejskal 2011). Nowadays (i.e. November 2011), there are 25 active clusters in various sectors of the national economy in the Czech Republic (CzechInvest 2011).

The basis of the financial support of partnerships consists in provision of grants by individual government levels, particularly from the national government budgets on the central level (i.e. from the state budget), but also from the budgets of potential supranational governments, which is the EU in our conditions (i.e. from the EU funds), to finance activities of university – enterprise partnerships, which have positive economic and extra-economic effects.

The financial support of partnerships is implemented in the Czech Republic through common funding from the EU sources and the national sources. In the present programming period, these activities are financed mainly from the Thematic Operational Programs, but also from individual Regional Operational Programs (e.g. for development of innovation centers, or support of partnerships of research institutes, universities and enterprises). An important priority within the Thematic Operational Program Enterprise and Innovation is Priority 5 – The Environment for Business and Innovation, for which EUR 1,080.9 million is earmarked from the EU funds. It is focused on the support of creation and development of line and branch groupings of entrepreneurial entities, scientific and research, educational and other institutions, or on establishment and development of entrepreneurial incubators and corporate innovation centers. Another important source is the Thematic Operational Program Research and Development for Innovations, Priority Axis 2 – Regional Scientific and Research Centers, for which EUR 685.4 million is earmarked (the support aims to strengthen cooperation between scientific and re-

search workplaces and the application sphere), and Axis 3 – Commercialization and popularization of the science and research with the subsidy of EUR 213 million (e.g. support of development of centers for transfer of technologies). Another possible source is the Thematic Operational Program Education for Competitiveness, Priority Axis 2 – Tertiary Education, Research and Development with the subsidy from the EU funds of EUR 626.5 million; the means can be used for involvement of experts from the practice in creation and implementation of university study programs, for support of the workers mobility between the research institutes and the private and public sectors, or for cooperation of tertiary education institutions, research and development workplaces and the entrepreneurial and public sectors. The last chance lies in the sources of the Thematic Operational Program Human Resources and Employment, Priority Axis 1 – Adaptability, with the subsidy from the EU funds of EUR 525.4 million, intended e.g. for continuing education of the employees. (EU Funds 2011).

4. Conclusions

Partnerships of enterprises, universities and governments are a source of important economic and social effects of both microeconomic and macroeconomic nature.

Partial benefits from the point of view of enterprises can be seen in sharing the partners' sources (particularly co-financing of activities, utilization of the partner's scientific and research base), sharing the partners' activities (e.g. common research and development), sharing the partners' knowledge (e.g. possibility of using the potential of students, academicians and scientists), and reduction of competition conflicts (strengthening of the own position on the market compared to the competitors). These benefits finally result in an increase in the market value of the company, strengthening of its competitiveness and image.

The benefits from the point of view of universities can be divided into the benefits for the students (getting practical experience connected with better opportunities on the labor market), benefits for the academicians (improvement of their pedagogical, scientific and research, and publication activities), and for the university itself (obtaining alternative financial sources, extension of contacts, increasing the prestige and attractiveness of the university).

The benefits from the point of view of the governments can have both financial and non-financial character. The benefits of the financial character consist in higher tax yields of the public

budgets thanks to higher profitability of enterprises and higher incomes of persons with higher education, and also in savings in the public finance, e.g. in the area of unemployment benefits or other welfare benefits, or support of efficiency of the public sector organizations within the meaning of 3E methodology (Economy, Efficiency, Effectiveness). Non-financial benefits consist mainly in the change of the public management system, reduction of the rate of bureaucracy, and higher quality of life in the society.

“The interaction among university, industry, and government is the key to innovation and growth in a knowledge-based economy.” (Etzkowitz 2008) In the comprehensive concept of enterprise – university – government partnerships, it brings positive synergy effects consisting in creation, transformation and transfer of knowledge.

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