

Analysis of chosen aspects of innovative environment of the Czech Republic

MILAN VITURKA

Faculty of Economics and Public Administration, Masaryk University
Lipová 41 a, 602 00 Brno
Czech Republic
viturka@econ.muni.cz

Abstract

Contribution deals with evaluation of innovative environment of the Czech Republic from point of view both branch and regional approach. The main goal of contribution is presentation of corresponding regional analyses of competitiveness including innovative potential (with respect to administrative division and formerly elaborated space model of economic development of the Czech Republic). Special attention is paid to space distribution of innovative companies, which is interpreted by means of identification of innovative centres and their differentiation according to appointed hierarchical importance (innovative centres of above regional, regional, bellow regional, micro regional and local importance).

Key words: innovation, innovative centre, region, environment.

1 Introduction

Hand in hand with a widespread onset of the phenomenon of knowledge-based economy an ability to create and adopt innovations is considered the decisive factor of a long-term competitive potential of countries, which ability is conditioned by the level of education of the population and by science and research. This development is logically linked to an increasing demand for corresponding analyses forming a starting point for the formulation of development strategies. At the level of the EU, a so-called Lisbon strategy has been developed, on whose practical implementation a major part of the means within the framework of economic and social cohesion policy will be spent – an amount of approximately 200 billions Euros out of the total of 350 billions of Euros ([1]). Nonetheless, fulfilling the strategy has not produced convincing results so far, which resulted in a certain revision of the original objectives of the strategy. One of the causes is, among others, thought to be the low emphasis put on the role of this strategy in regional politics. In conformity with this view, an opinion is becoming widespread that the main vehicles of national competitiveness are innovatively dynamic regions, since the most intensive interactions between creators of knowledge and its users take place at this level ([2], [3]). In the Czech Republic it is the Faculty of Economics and Administration of the Masaryk University where much attention is paid to these questions: at this faculty an original methodology of regional competitiveness evaluation has been created, which develops previous works focusing on business environment quality evaluation and on creation of a three-dimensional model of the

Czech economy development ([4], [5]). The objective of this report is to present the results of competitive potential analyses done for individual regions in the CR, with emphasis put on innovative potential including identification of main centres of innovation. Prospective assets of these surveys lie chiefly in their relation to the creation of an optimal innovation strategy for the CR.

2 Regional analysis of innovative environment

A system-based viewpoint understands innovative environment as an integral part of the business environment, whose quality is one of the fundamental components of regional competitiveness (in this connection it should be emphasized that the relation between the competitiveness of regions and the competitiveness of respective firms is not quite definitive, which is natural, if we only consider the possibility of opposing interests – e.g. firms reducing number of employees in order to sustain their competitiveness with negative side effects on the living standard in the region). The methodology of regional competitiveness evaluation created at the Faculty of Economics and Administration of the MU further comprises, as its definition suggests, analysis of human resources utilisation and analysis of the innovative potential of companies ([6]). As basic territorial units regions was selected and as secondary territorial units the territories coming under the authority of settlements of the third degree (these units, used for the evaluation of the business environment quality, in fact represent so-called nodal regions with their territories integrated by bidirectional bonds between capital centres and their surroundings). The main advantages of the approach described above in comparison to simple segregations of macroeconomic indicators lie in its higher explanatory ability and further relate to the existence of direct bonds to formulation of concrete objectives (measures) at level of regional politics.

The evaluation of business environment quality – BEQ is based on identification of main factors that reflect investment or development preferences mainly with big companies active in the processing industry and higher market services. Factors of BEQ, identified on the basis of results of foreign surveys (adapted to the conditions in the CR), can be divided into six main groups: business factors, labour factors, regional/local factors, infrastructural factors, price factors and environmental factors. To this must be added that the onset of knowledge-based economy naturally causes adequate changes in the significance of the individual factors of BEQ induced especially by the intensity of their pro-innovative effect. In respect of this, especially the significance of the infrastructural factors group and of some other chosen partial factors (e.g. the financial assistance factor) is gradually diminishing, while the significance of others is growing – that is true for the groups of labour factors and environmental factors and for some other partial factors (especially the factor of business and knowledge basis where the theoretical potential of increase in significance is the highest). The mentioned changes within the framework of evaluation of BEQ were taken into consideration regarding also the situation of the Czech economy, which is the phase of transition from the stage of “investment-driven development” to the stage of “innovation-driven development”.

A strategically important finding is the confirmation of set hypotheses on the strong link of BEQ to GDP (and thus in fact also to the competitiveness of private businesses), which is proved by correlation coefficient of 0.95, and further more to the population size of nodal regions ([7]). The practical significance of the region-based factors of BEQ from the viewpoint of regional development strategy creation is based mainly on the fact that an adequate offer represents the most important area for mutual competing of individual regions in an effort to create the best conditions possible in order to lure external investments.

The component utilization of human resources – UHR reflects the extent of structural adaptation of a regional economy to main developmental trends and processes. The main indicator of UHR is considered to be the regional unemployment rate (data from selective

surveys of the Czech Statistical Office on workforce). Due to the fact that the informative value of the unemployment rate indicator is complicated by different space dimensions of supply creation and demand creation on the labour market, a complementary indicator of economic sensitivity was used, which is expressed as the structural share of industries in which the original countries of the EU-15 have been losing competitive potential in the long run or industries whose development has been suffering from a long-term stagnation. The used indicator interprets regional shares of employment in sensitive industries (as for the CR, an adjusted set of these industries comprises mining industry without oil and natural gas mining, food industry, textile industry, clothes industry, leather manufacturing, oil refinery, chemical industry, metallurgy and mechanical engineering – production of other transport machinery for production). The observed correlation coefficient of dependency between the unemployment rate and sensitivity indicator stays under the value of 0.85. To this must be added that the relation of the given component to other macroeconomic aggregates is not definitive and the same naturally applies for its links to innovations (in accordance with the growing role of innovations in economy, significant changes in conditions for creation of dynamic equilibrium on labour markets can be predicted, especially in respect of interactions between improving level of education of the population and creation of jobs of high quality). Due to the overall focus of the report, most attention is paid to the component of innovative potential of companies – IPC, which is considered to a dynamic factor of regional development (from the viewpoint of businesses the most important assets of introducing innovations are, as a rule, considered the improvement of quality of products and services, extension of the product range, and better relationships with customers). In order to carry out evaluation of IPC, we used chiefly information from the third survey of the Czech Statistical Office concerning innovations in the private sector executed in 2003 to 2005 in accordance with the methodology of the so-called Oslo manual ([8], [9]). The basic difference from previous surveys concentrating on technical innovations of products and processes is the extension by organisational and marketing innovations (i.e. non-technical innovations). The results of this survey (about 17% of all news units was included) have it that the share of innovative businesses in the CR is about 45% out of the total of firms with more than 10 employees (about 50% of firms active in industry had their own research and development, while as for firms in services the portion was 41%). An adjusted set contains ca 14.3 thousand businesses (the innovation potential analysis itself excluded mining and building companies and also firms with territorial monopoly – production and distribution of electricity, gas and water). The data of the CSO were supplemented, in response to the limitation of their informative value (related especially to the problem of possible verification of collected data), by our own survey, whose main source of information was information from the database of the Association for innovative business ([10]). Unlike the survey done by the CSO, this survey comprised firms that had declared their active interest in the sphere of creation and transfer of innovations – they had done so via their memberships in the given organisation. In order to evaluate territorial concentration of innovative companies only the most important ones active in the processing industry and higher market services were chosen (industries numbered by NACE 15 to 17 and 72 to 74), which spheres represent a dominant area for emergence of product and process innovations inducing their creation in other industries. In comparison with the survey of CSO, this was a substantially smaller set of about 1.8 thousand companies, which nevertheless employed approximately 450 thousand people by the end of 2004 (within the final synthesis the survey of the CSO was attributed a double value). Especially the following facts can be considered as strategically important findings from the viewpoint of the creation of regional or economic policy:

- the share of innovative businesses grows for all types of innovations with the size of a company (the increase is most evident in the case of process innovation) and firms in the processing industry are the most active as to innovations,
- innovative activity of foreign companies was higher by 50% than innovative activity of Czech firms,
- firms actively following technical innovation do better on international markets than non-innovative firms (the mutual ratio international, national and regional markets was 0.8 : 1 : 0.5 while in the case of non-innovative firms this ratio was 0.5 : 1 : 1.2,
- statistical values did not confirm the hypothesis stating strong dependence of IPC on the level of education of the population, which indicates a dominant role of corporate expenditure in research and development in creation of innovations (see the model of knowledge capital accumulation by P. Romer).

Using the results of partial syntheses of the mentioned components BEQ, UHR and IPC a synthetic or generalized evaluation of the competitive position of individual regions in the CR can be executed with interpretation via their classification into corresponding types and subtypes: regions with excellent – type A, favourable – type B and less favourable – type C competitive position (for more detail see table No. 1).

In another part attention is paid to the industry structure of individual regions from the viewpoint of the most significant innovative industries (see table No. 2). When we study similarities between productive innovative structures we see that the role of so-called neighbourhood effect is important, nonetheless it is not crucial. This effect is more to be felt in Moravian regions (in the case of the Vysočina region the same level of similarity was found as in the case of the South Moravian Region and the Central Bohemia Region) and also in the Karlovy Vary Region and the Ustí Region. As for the other half of the regions, there the innovative structures manifest higher degree of similarity with other than neighbouring regions. The Prague Region, which has its own specific development (characterised by “metropolitan” economic specialisation combined with intensive division of labour with the neighbouring Central Bohemia Region), manifests in this respect the most similarities to the Pilsen Region, the Liberec Region and the Pardubice Region – the Prague region is interlinked with these regions by growth axes of national significance. Despite the fundamental transformation of the Czech economy we can say that the industry structure of individual regions manifests a high degree of inertia (the most significant changes in this direction are induced by the dynamic development of the car industry and electrotechnical industry). Further development of specialisation will depend, among other things, on whether the decisive innovative entities manage to keep the high level of economies of scale, and naturally also on the development of new innovative industries, especially in the region of internationally marketable market services (as for innovative SMEs, their disadvantages in comparison with big businesses can be overcome by applications of new approaches focusing on acquisition of external savings, e.g. via creation of clusters).

As far as the regional development itself is concerned an important role is to be attributed to the placement of important innovative centres – IC, which are classified according to classifying degrees described below (for concrete information of placement of ICs see table No. 3):

1. IC of national importance with at least 5 big innovative firms with the total number of employees over 5 thousand employees.
2. IC of regional importance with at least three big innovative firms with the total number of employees over 2.25 thousand (possibly also with only one firm with +/- 3 thousand employees).

3. IC of sub-regional importance with at least two big innovative firms with the total number of employees over 0.75 thousand (possibly also with only one firm with +/- 1 thousand employees).
4. IC of micro-regional importance with one big firm with the total number of employees over 0.25 thousand.

The most important innovative centres are mostly regional capitals Prague, Ostrava, Brno, Pilsen, Liberec (together with the town of Jablonec n. N.), Jihlava, Zlín, Pardubice and Olomouc, complemented by Mladá Boleslav. These innovation centres, offering a developed knowledge base of universities and colleges and also of institutes for science and research, are mostly natural hubs of concentric innovative areas – the most significant of these are the Prague, Ostrava and Brno innovative territories ([11]). The following group of innovative centres of regional importance includes 22 centres. The group of centres of sub-regional importance contains 76 centres and the group of micro-regional importance contains 79 centres. Besides the concentric areas mentioned above, innovative centres can make clusters of innovative zones, which generate urban and localising savings on the part of firms. In this respect we can speak of the Krušné hory zone (Děčín, Ústí n. L., Teplice, Litvínov, Bílina, Most, Chomutov and Kadaň), the Orlické hory zone (Náchod, Rychnov n. K, N. Město n. M., Dobruška, Žamberk, Ústí n. O. and Lanškroun) and the Beskydy zone (N. Jičín, Kopřivnice, Frenštát p. R, Rožnov p. R., V. Meziříčí and Vsetín) – each of these zones has more than 10 thousand employees in innovative firms. The territorial concentration of innovative firms fundamentally influences the development of innovative business enterprise and the overall quality of economic development of individual regions. In this respect, the Moravian-Silesian Region and the Ustí Region deserve positive evaluation – these two regions have to face at the moment the highest pressure necessitating restructuring of their economic bases (effective utilisation of their innovative potential is, in my view, the key issue that will influence their future competitiveness).

2.1 Tables

Table No. 1: Competitive position of regions

type group and subgroup	region	classification group		
		BEQ	UHR	IPC
type A:				
<i>AA</i>	Pražský	1	1	1
<i>AB</i>	Středočeský	2	1	1
type B:				
<i>BA</i>	Jihočeský	2	1	2
<i>BA</i>	Plzeňský	2	1	2
<i>BB</i>	Královéhradecký	2	2	2
<i>BB</i>	Pardubický	2	2	2
<i>BB</i>	Vysočina	2	2	2
<i>BB</i>	Jihomoravský	2	2	2
<i>BB</i>	Liberecký	2	1	3
<i>BC</i>	Zlínský	3	2	2
type C:				
<i>CB</i>	Karlovarský	3	2	3
<i>CB</i>	Ústecký	3	3	2
<i>CB</i>	Olomoucký	3	3	2
<i>CB</i>	Moravskoslezský	3	3	2

Source: Personal research.

Table No. 2: Innovative bearing branches

region	the most important innovative branches		another innovative dynamic branches	
	industry	services	industry	services
Pražský	DE,DL	G,K (74),K (72)	-	J,K (73)
Středočeský	DM,DJ,DK	G,I	DG	-
Jihočeský	DK,DA	G,I	-	K (70)
Plzeňský	DK,DJ,DL	G,K (74)	-	-
Karlovarský	DA,DI	G,K (74)	-	-
Ústecký	DG,DI,DJ	G,K (74)	-	-
Liberecký	DI,DL,DK	G,K (74)	DM	-
Královéhradecký	DJ,DH,DB	G,K (72)	-	-
Pardubický	DL,DK	G,K (74)	-	-
Vysočina	DJ,DM	G,K (74)	-	-
Jihomoravský	DK,DJ,DH	G,K (74),K (72)	-	K (73)
Olomoucký	DJ,DK,DA	G,I	-	-
Zlínský	DH,DJ,DK	G,K(74)	-	-
Moravskoslezský	DJ,DL,DK	G,I	DM	K (72)
Czech Republic	DJ,DK,DL	G,K(74),I	DM	-

Note:

DA – food and beverages, DB – textile and clothing, DD – wood processing, DE – stationery, publishing and printing, DF – fuel production, petroleum refinery, DG – production of chemicals, pharmaceuticals and synthetic fibres, DH – production of rubber and plastics, DI – other non-metallic mineral products, DJ – metallurgical and metal working industry, DK – machinery, DL – production of electric and optical industry, DM – automotive industry, G – business and repair, H – accommodation and catering, I – transport, storage and communication, J – finance, K – real estate, leasing and entrepreneurial activities (70 – real estate, 72 – computer engineering, 73 – research and development, 74 – other entrepreneurial activities).

Source: ČSÚ, own calculations.

Table No. 3: Innovative centres

region	CNI	CRI	CSI	CLI
Pražský + Středočeský	Praha, Mladá Boleslav	2	18	10
Jihočeský	-	3	4	5
Plzeňský	Plzeň	-	5	5
Karlovarský	-	1	2	2
Ústecký	-	6	3	6
Liberecký	Liberec/Jablonec n. N.	1	2	6
Královéhradecký	-	1	9	7
Pardubický	Pardubice	1	7	6
Vysočina	Jihlava	2	3	8
Jihomoravský	Brno	-	5	9
Olomoucký	Olomouc	2	4	5
Zlínský	Zlín	-	6	2
Moravskoslezský	Ostrava	3	8	7
Czech Republic	10	22	76	79

Note:

CNI – centres of national importance (including agglomerated municipalities), CRI – centres of regional importance, CSI – centres of sub regional importance, CLI – centres of local importance.

Source: data basis AIP, own calculations.

3 Conclusion

At the end we can say that the transition to so-called knowledge-based economy definitely represents a preferential strategic objective of the economic development of the CR. The main factors conditioning success of this transition are generally considered to be the transfer

ability, innovative ability and improvement of the level of education of the population. (hand in hand with science and research). In this connection I consider the key prerequisites of their successful actuating to be especially conceptual incorporation of the adequate role of firms in the process of creation and transferring innovations, the quality of educative institutions (especially universities) and preference for the horizontal (that is regional) principle when choosing and implementing developmental programmes, which principle will respect the position of regions as the basic space dimension for creation of interactions between the public and the private sector (in respect of this a question arises whether it is not just the application of this approach that will be the right way to reduce systematically inefficient financial supports of firms via redistribution of revenues and aim at their indirect support by initiation and stimulation of creation and transfer of information – know-how, which will be a logical base of admissible public support under the conditions of knowledge-based economy). Given the context above, the main asset of the given report can be considered to be presentation of methodology for evaluation of regional competitiveness that represents an important part of regional analyses encouraging application of the principle preferring the regional approach.

References

1. MMR ČR: Strukturální fondy EU. MMR, Praha 2006, available on www.strukturalni-fondy.cz.
2. Porter, M.: The competitive advantages of nations. The Free Press, New York 1990.
3. Kitson, M. – Martin, R. – Tyler, P.: The regional competitiveness debate. University of Cambridge, 2005.
4. Viturka, M. & kol.: Regionální vyhodnocení kvality podnikatelského prostředí v České republice. ESF MU, Brno 2003.
5. Viturka, M. – Žítek, V. – Tonev, P.: Regionální předpoklady rozvoje inovací. Working paper, č. 4, CVKS ESF MU, Brno 2005.
6. Beneš, M.: Konkurenceschopnost a konkurenční výhoda, Working paper č. 5, CVKS ESF MU, Brno 2006.
7. Viturka, M.: Konkurenceschopnost regionů, možnosti jejího hodnocení a stimulace. Sborník z X. Mezinárodního kolokvia o regionálních vědách, ESF MU, Brno 2007.
8. OECD, EUROSTAT: Oslo manual: Guidelines for collecting and interpreting innovation data. EUROSTAT, Luxembourg 2005, available on www.epp.eurostat.ec.europa.eu.
9. ČSÚ: Inovace v ČR v roce 2005, ČSÚ Praha, 2006, available on www.czso.cz.
10. AIP: Databáze [online], available on www.techprofil.cz/database.asp.
11. ČSÚ: Ukazatelé výzkumu a vývoje v ČR za rok 2005, ČSÚ Praha, 2006, available on www.czso.cz.