

# DESCRIPTIVE ANALYSIS OF THE REGIONAL INNOVATION SYSTEM – NOVEL METHOD FOR PUBLIC ADMINISTRATION AUTHORITIES\*

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## Abstract

Making innovation is currently one of the key factors of economic development, both for the private sector and the public sector. The public sector can help to support the effective form of knowledge creation and development that will lead to real innovations in the administrated region. Innovations can help meet the objectives of public policies (such as the creation of new jobs and support small and medium-sized enterprises, etc.). This paper tries to summarize the findings regarding knowledge and the innovation environment that public authorities can support in the form of regional innovation systems (RIS). Authors suggest a novel method for increasing efficiency of public financial support. This method was proven in RIS research in the Czech Republic, where the strategic documents initiating support RIS were created. The authors discuss the characters which adequately describe RIS. The added value of this paper is represented by the methodology of RIS describing and listing the public authorities' roles in establishing a knowledge environment.

**Keywords:** knowledge, knowledge environment, public sector, public support, efficiency.

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## 1. Introduction

The position of individual economic subjects on current globalized markets is given by the ability to compete and gain competitive advantage over others. Especially small and medium enterprises can currently enter national and international markets as a result of globalization – that is liberalization of markets and elimination of transport, logistic, information and sales costs.

For a long time such a strategy was thought of as being identical with the promotion of high-tech, R&D-intensive industries in accordance with the linear view of innovation. Increasingly the recognition has evolved that a broader and more comprehensive view on innovation has to be applied, to retain and develop competitiveness in the heterogeneity of regions. This implies that the regional advantage has to be constructed more based on the uniqueness of the capabilities of firms and regions, rather than solely based on R&D efforts (Asheim, Cooke and Martin, 2006; Maskell and Malmberg, 1999). This reflects recent research pointing to the complexity of modern products and their innovation processes, which requires a differentiated knowledge base perspective to be fully accommodated (Asheim and Gertler, 2005; Asheim, Coenen and Vang, 2007). More researches show that the developed nations will be built on diversity and variety and not on specialization. This runs against the traditional cluster policy (Porter, 1990). The New Economic Geography approach discusses the move towards diversity as their primary competitive strength (Krugman, 2010). Boschma and Frenken (2011) have demonstrated that firms and regions basing their activities on variety are the most innovative and competitive. Florida shows that the large cities or regions demonstrating strong urbanization economies are the most innovative and competitive locations due to their openness, diversity and tolerance, with a highly educated 'creative class', favored by high-tech and creative industries (Florida, 2002). The issue of gaining competitive advantage does not concern only the private sector. Currently, also the public sector and public administration authorities have to cope with competition. The European Commission launched the idea of 'Constructing Regional Advantage' as the new way of combating these new challenges and problems, and presented perspectives on how innovation policies and strategies can resolve the tension between competition and cohesion (Asheim, Cooke and Martin, 2006). Public administration must work actively with knowledge and to manage it, which is common in developed regional economies. It shows that knowledge can also be transferred or transformed and thus a synergy effect can be triggered, which leads to an increase in competitive advantage of the administrated region. It can bring public incomes by increasing firm competitiveness, and it can help improve the quality of citizens' life, which is the objective of all public policies adopted in the public sector. That is the reason why the public sector must play an active role in establishing a positive knowledge environment (Balzat and Hanusch, 2004).

In order to transfer knowledge successfully, it is necessary that the society creates a so called knowledge system which generates, processes and applies knowledge either in the private or the public sector. In practice, it is necessary to cope with the pro-

blem of knowledge transfer and application which occurs when knowledge becomes a production factor and its economic function makes the transfer to public sector and public interest more difficult.

In the present paper the authors undertake to characterize the innovation environment based on knowledge systems, to show the types of knowledge environment formation and the role of public authorities (PAs) in supporting one type of this formation – the regional innovation system (RIS). PAs need to have a simple analytic method that can help uncover the features of RIS in practice. The problems addressed in this paper are: *'how can PAs find out if the RIS exists in our region'* and then *'if not, what is missing or what the weaknesses of the existing RIS are?'*. The paper also presents the novel descriptive method and its validation.

## **2. Knowledge systems and their initiation**

Knowledge is know-how, in other words the ability to transform and apply observations and information (Johnson, 2009). Blackler (1995) adds that knowledge is a part of the active process of knowing, which is difficult to describe due to its disputability and situatedness. That makes its capturing, subsequent transfer, and use more difficult.

Sometimes the inability to rigorously define knowledge forces scientists to add skills, experience, mental models, relationships, values, opinions and principles. These parts are summarized under the term 'competences' which is defined as a set of skills, knowledge and opinions of a human.

Mladkova (2005) postulates about data, information and knowledge. She says that if data is available, but its meaning and substance is unknown, then the data is irrelevant and useless. Only after the data is understood and used, it is transformed into information. Information can be processed into knowledge. The whole process can be closed by transformation of knowledge into data again. Knowledge is transformed into information when owned by a particular individual.

From those mentioned above the significance of communication elements and networks in each organization is clear, as communication channels are also a determinant of information. The question remains whether the transformation of data into knowledge or back always leads to creation of high-quality and utilizable knowledge. Some knowledge has very limited transferability. These types of knowledge are called tacit. The opposite is explicit knowledge.

### ***2.1. Explicit and tacit knowledge***

Explicit knowledge can be captured and is interpretable by standard means of communication. It is easy to transfer it by the standard learning methods which are common for all education systems.

Tacit knowledge cannot be fully transferred by the standard learning methods. Tacit knowledge can be defined as interaction of explicit (formalized) knowledge and skills, experience, personal imagination, mental models and intuition of an individu-

al. It is closely connected to processes, actions, ideas, routines, emotions and values. Therefore, tacit knowledge is highly individual and its bearer does not have to know about possessing it. This is the challenge for the public sector – to create a school system that will focus on the creation of tacit knowledge during the school attendance and the practices in the firms (typically in technical, chemical, machinery and other industries).

Tacit knowledge has a very personal character. It is very hard to define and difficult to communicate. It is also deeply rooted in action and engagement of an individual in a concrete context – craft or job, particular technology or product market, or activity of a working group or team. Tacit knowledge consists of technical skills – a type of informal skill which can be easily expressed as ‘know-how’. At the same time it represents a cognitive dimension which can be expressed by mental models, belief and perspective, so deeply rooted that we take it for granted and it is, therefore, not easy to express its significance.

Knowledge networks recognize both types of knowledge (Hildreth and Kimble, 2004). When creating and managing knowledge are networked it is vital to differentiate both types of knowledge and activity, which are named as ‘knowing’. It represents means to use individualized knowledge (both types) to obtain social knowledge by transformation (sometimes called conversion). This thought eliminates the significance of individual knowledge and uncovers a new type of knowledge which is collectively shared (so called public or group knowledge).

Figure 1 shows four types of knowledge which together impact knowing and initiate transformation of individual to group knowledge.

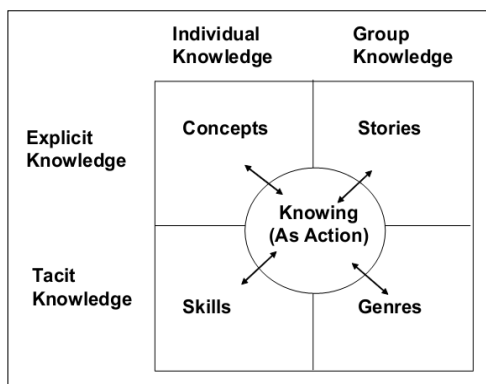


Figure 1: Interaction of knowing and types of knowledge

Source: Small and Sage (2005, p. 155)

It is logical that knowledge is dynamic and keeps changing, both by developing knowledge and by its overcoming (important knowledge becomes obsolete). The change process is, according to Small and Sage (2005), divided into several stages:

- a. socialization;
- b. externalization;

- c. internalization; and
- d. combination.

Socialization represents creation of tacit knowledge and it is based on it. Practically it means sharing of experience within practical execution, observation etc. The name comes from the fact that the transformation is initiated by influence of interaction within a social group which is characterized by this knowledge (an example might be education of apprentices during practical training).

Externalization is based on widening the tacit knowledge by interpretation. This represents a process in which an individual tries to communicate by standard communication tools. It is not an easy process. It uses a range of methods – models, stories, analogies etc. The process of interpretation brings three options:

- transformation will fail and new knowledge will not arise;
- transformation will succeed and new knowledge is transformed into the original form; and
- transformation will succeed and the knowledge at the new receiver is different (better/worse).

The risk which is taken during transformation is significant, however, without taking it there would be no transformations and subsequently no knowledge development. Combination represents theoretical research. Individual explicit pieces of knowledge are connected to units which have new meaning, are usually more detailed, and describe the nature of knowledge in a better way. The combination has three stages:

- a. gathering and combination (formulation of new knowledge);
- b. increasing the width or depth of knowledge; and
- c. passing the knowledge on further potential users.

Internalization is the transfer of explicit knowledge into tacit. It amounts to creation of new models, know-how etc. It requires the basis of explicit knowledge, obtained by common learning and high-quality bearer (recipient), who fulfills basic prerequisites for receiving and developing knowledge (experience, high specialization, presence at other tacit knowledge etc.). Internalization requires long time and suitable favorable environment for the knowledge transformation itself.

## ***2.2. Transformation of knowledge as the essence of knowledge environment formation***

Each type of transformation requires a different environment, which helps efficient transfer of knowledge. Those are for:

- a. socialization – group with tacit knowledge (tacit knowledge remains in the group);
- b. externalization – common environment with subjects who are interested in the tacit knowledge (school, re-qualification, enterprises, cooperating subjects, industrial clusters, innovation centers etc.);

- c. combination – scientific-research institutions, standard enterprise environment favorable to innovations; and
- d. internalization – favorable environment enabling transfer of explicit knowledge to tacit knowledge (then it can help create important innovations).

From the facts analyzed above it is obvious that the influence of environment on the quality of final transformation is undeniable. The environment must always contain a subject *who has the knowledge and a subject willing to gain the knowledge*. If there are more such subjects (often grouped in triple-helix) in a favorable environment, a knowledge network is created. It represents subjects with a common goal, which is transfer of knowledge in order to increase own competitiveness on the market. The transformation itself in a knowledge network is, therefore, a regular business relationship because creation, acquisition, purchase and sales of knowledge take place. Cohesion of this network takes the form of knowledge contained in a dense network of social, economic, contractual and administration relationships. This means that a network (or knowledge system) can be considered the ideal form for storing and sharing knowledge (Badarcoo, 1991, pp. 13-14).

As transfer of knowledge is a very fragile process, the environment of the knowledge network has to include these elements (they must be shared by individual subjects of the network):

- common values;
- trust;
- common goals and feeling of mutual efficiency of cooperation; and
- supporting ICT.

Every knowledge network which contains these elements is in its nature a dynamic structure based on very fragile foundations. According to the type of transformation, the knowledge networks can be divided into these four types of networks:

1. experience (tacit → tacit; socialization takes place);
2. materializing (tacit → explicit; externalization takes place);
3. learning (explicit → tacit; internalization takes place); and
4. reorganizational (explicit → explicit; combination takes place).

Processes of knowledge transformation are the basis of knowledge networks (Back *et al.*, 2005, pp. 32). In order to fulfill the goals of business processes and carry out specific processes with knowledge efficiently, suitable conditions and tools have to exist, which will enable forming of a network. This means that knowledge processes, knowledge networks architecture, and conditions of network creation must be in harmony. Referential types of knowledge networks may be used for identification of the 'ideal' form and organization of knowledge networks with the aim to successfully accomplish a particular business goal.

In current life it seems to be necessary to support creation of knowledge networks on various levels. The creation of a knowledge network in a company is a microeconomic matter and cannot be significantly influenced. Networks between companies or

other subjects (public administration offices, universities, research and development institutions, and other service organizations) are a mezzoeconomic matter and can be efficiently influenced, possibly even initiated, by public policies and public finances. Typically, these networks occur on the level of large cities and regions and their substance is transfer of knowledge which would lead in its commercialized form to creation of innovation by which the creators or transformers of the knowledge (or innovation) would increase competitiveness of both firms and regions.

Creation of networks, in other words connecting individual subjects from the private and the public sector, leads conclusively to creation of spillover effects which is a guarantee of reaching sustainable growth and development of the managed region even in the future. A significant role in creation of knowledge (innovation) networks is played by public administration authorities at different levels. A substantial requirement for involving public subjects must be maximal efficiency of the support provided (especially of financial support). If the public sector initiated and financially supported the creation of networks which would bring no innovations and spillover effects at the end, it would mean wasting public resources and support of private organizations without remarkable effects for the public sector, as well as for society. Thus, a new adequate instrument was extensively used in Europe during the last ten years, namely regional innovation systems, which can be effectively supported by regional public administration authorities.

### **3. Innovation environment in the region**

Innovation environment, sometimes also called innovation milieu, can be defined in various ways (Camagni and Capello, 2005), but in every way the innovation environment grows from the knowledge (especially tacit knowledge) environment. Some authors (Rumpel, Slach and Koutsky, 2009) define it as an incubator for creation of innovation in an environment where the originator of innovation is not an economic subject but the milieu (environment) itself. This environment consists of the economic and sociologic background represented by the region where networks of various subjects are anchored, these subjects involve private as well as public sector actors (public administration authorities; university sector or scientific-research sector is delimited – only some types of public organizations are included; non-profit organizations).

#### **3.1. Subjects of innovation environment**

In this environment, which is favorable for knowledge and subsequently for innovations, there are many interactions among the involved economic subjects, the bearers of knowledge, their owners and public institutions and organizations (Svejda *et al.*, 2010). These interactions must run between several different subjects of the environment which involves certain trust (decreasing uncertainty) and the result is transformation into innovation (sometimes the literature refers to the so-called technological paradigm, the output of which is innovation). Even the transformation itself is a process of learning, thus a desired production factor. There is reciprocal exchange of knowledge with creation of tacit knowledge, mostly thanks to work force mobility

or its geographical proximity. This proximity can be, and often is, replaced by technologies, which, however, do not fully replace the synergy of team work in a single place. The proximity must be realized in a framework (i.e. innovation environment) that requires coordinated cooperation between the public institutions and private subjects.

Innovation environment forms a functional and organizational framework which includes, according to Maillat (1998), these elements:

- owners of technologies and knowledge (natural persons or enterprises, scientific-research organizations, and semi-public institutions). These subjects work independently and they decide about cooperation based on their economic analysis;
- knowledge and technological infrastructure (hard – buildings, technological parks, innovation and incubation centers etc.; soft – know-how, patents, utility models);
- public authorities (those organizations which have decision-making competences that can influence technology, and knowledge owners, e.g. by targeting public policies, allocations, financing etc.);
- relationships, connections, interactions (these have to be founded on trust and efficient outputs of cooperation which can lead to tight connections and thus increased dependency of originally independent subjects);
- atmosphere of mutual learning (individual economic subjects have to include continuous learning elements into their behavior).

The environment is represented, according to Boschma and Kloosterman (2005), as a complex or dense network of relationships (especially informal social relationships) inside a bordered geographic unit (region). The authors understand this unit as profiling and creating a specific image of the whole regional network. Internally, this domicile of subjects can help to create feelings of mutuality, proximity inside the region which helps the creation of functional relationships and connections, and can initiate processes of continual learning.

Public administration institutions and especially regional authorities should support creating the defined favorable innovation environment so that it can help to reach the publicly defined goals of regional or local development. Creation and cultivation of the innovation environment is a unique part of public policy and has to be included in the strategic documents of the particular locality. These documents must include goals, as well as tools and source of their financing (usually public or combined, e.g. PPP projects).

Cappellin and Wink (2009) define goals of regional economic development which can be fulfilled by existence of the knowledge environment in the following way:

- Growth of mezo-economic performance and employment;
- Existence of inter-regional and international network (networks) and competitiveness;
- Creation of local networks between various branches and enterprises;
- Creation, growth, and extinction of local enterprises;
- Investments, innovations of products and processes, increasing productivity;

- Creating knowledge, learning processes, competences, and human capital;
- Quality of physical environment;
- Political framework and decentralization of government (typically by regional innovation systems in regions).

These goals can be reached so that non-linear and multiple relations are initiated among individual subjects and elements of the innovation environment in the region and thus there is efficient interaction in the environment. It remains a question concerning the role played in this interaction by public institutions and organizations and their interactions with other (mostly commercial) subjects, as well as how they should efficiently play this role and at the same time ensure efficient growth of citizen welfare (when goals of private subjects are totally different from those of the public sector).

Public administration institutions can play an important role in the whole process of creation of the innovation system. A well-known way of initiating the innovation system in practice is the use of the regional innovation system.

### **3.2. Regional innovation systems**

Innovation systems belong to modern contemporary tools of the knowledge economy which usually have microeconomic nature. Regarding the connection with development of the territory managed by public institutions, it is necessary, in the context of these new approaches, to react also to the need of creation of knowledge environments by creation of regional innovation systems (RIS). Their role must be clear from the strategic documents which are accepted by regional and local governments. Lundwall (*apud* Uyarra, 2011) defines the innovation system as:

*Innovation system is a set of elements and relationships which influence each other in the sphere of production, distribution and utilization of new and economically useful knowledge. With respect to regional aspect of distribution and creation of innovation, original (not functional) national innovation systems were converted into regional innovation systems.*

Regional innovation systems include a set of public and private institutions which produce essential synergy effects that motivate enterprises and other organizations in the region to accept common norms, expectations, values, approaches and methods – based on knowledge and its spillover (Cooke, 2006). Another element of RIS is its activity, or activities resulting from geographical proximity, willingness to cooperate and trust. Communication relations between RIS subjects cannot be omitted.

Regional innovation systems are further described (Cooke, 2001) as two subsystems:

- subsystem of using and utilizing knowledge; and
- subsystem of acquiring and distributing knowledge.

Regional innovation systems include, as mentioned above, institutions from the private and the public sectors. These institutions can be called basic components. Thanks to these components it is possible to determine whether the chosen region

already has a functional regional innovation system (for more details see Anderson and Karlsson, 2004). These authors defined the basic components of a regional innovation system which can be divided into three basic levels: core of the regional innovation system, supporting and complementary organizations, and infrastructure, institutions and support (see Table 1). The authors of this paper, based on studying current knowledge and detailed research of foreign literature, suggest a set of features of a standardized RIS in Table 1. These features were defined as minimum and they represent the vital framework of assumptions for creation and at least fairly efficient functioning of RIS. The features were defined mostly as quantitative rather than qualitative (there are only 3 qualitative features and these measure the quality of knowledge chain outputs – see the stars in Table 1).

Table 1: Features of Regional Innovation System

RIS Layer	Feature
Enterprises	Existence of industrial clusters
	Unambiguous existence of innovative enterprises in branches
	Number of patents in branches*
Supporting organizations	Existence of institutions for cooperation (facilitators, organizers)
	Existence of entrepreneur incubator/business supportive organizations
	Existence of regional development agency
	Existence of other supporting and complementing organizations
Environment and infrastructure	Existence of innovation strategy (or its update) not older than 5 years
	Existence of animators in the region and branch
	Existence of organizations forming expert community in the branch
	Existence of expert organizations, associations in the branch
	Existence of public finance schemes
	Existence of private investment initiatives
	Existence of elements of hard innovation infrastructure
	Existence of technological infrastructure
Existence of knowledge infrastructure	
Relations, connections	Existence of communications platforms*
	Existence of projects confirming cooperation and synergy*

Source: Mátalkova and Stejskal (2011, p. 137), (in Czech)

Individual layers contain private organizations (enterprises), further public institutions (usually regional government) and other public (sometimes also private) organizations which form an important component of a favorable innovation environment. All mentioned subjects can be found also in industrial clusters which could be a part of RIS.

There is one more problem to tackle and that is the branch specialization of RIS. All the authors cited consider RIS a general issue, which is a part of the social environment of a particular region and integrates all branches. According to the logic of basic RIS elements determination it is necessary to distinguish RIS branch specialization, as for some branches there may be a higher number of RIS elements fulfilled or some branches might not fit, according to the rule all-does-not-fit-to-all.

Currently RIS are a widely used tool which is supported also by public institutions, usually through public budgets. The support is usually realized by fulfilling regional innovation strategies or strategic plans of particular localities or cadastres.

If regional innovation systems receive some public support, tools of measuring their efficiency must exist. As such tools for evaluating RIS do not exist yet; it is possible to utilize designed methodology for finding out whether a RIS exists within a particular region or whether at least the basis for its creation and functioning is fulfilled. This guarantees that the outputs of the system for efficiency analysis will not be zero. This analysis should be carried out especially by institutions of the public sector which provide public finance resources for RIS support. But it is not easy to create an analytical tool for RIS, as there are tens of factors, most of which are unmeasurable or abstract.

#### **4. Descriptive method for RIS evaluation**

##### **4.1. Methodology**

The authors were faced with addressing the problem of 'how can we find out if the RIS exists in our region' and then 'if not, what is missing or what is the weakness of the existing RIS'. Authors of this paper suggest a set of features of a standardized RIS (in Table 1) and the novel descriptive method, based on the expert analyzing the defined RIS features. The expert analyzes the information from databases and tries to find the existence of the features and count them. All of the features were assigned a weight of 1.0. Assigning the weights to individual elements is subject to further research of the authors.

The features were defined as minimum and they represent the vital framework of assumptions for creation and at least fairly efficient functioning of RIS. The features were defined mostly as quantitative rather than qualitative (there are only 3 qualitative features and these measure the quality of knowledge chain outputs). To answer the research questions that there is a standardized RIS within the region (locality) it is necessary to state that *all minimal features* in all RIS layers have been identified.

In order to find really functioning RIS, an additional layer was added (in contrast to commonly published approaches from the literature) – relationship and connection layer. If the features in this layer are evaluated objectively and only active communication channels and tokens of active cooperation are included, it is possible to state that the RIS really exists and it works within given measures. This layer can differentiate RIS which is only formally founded and existing, from those which really lead to innovation outputs based on knowledge (in Table 1 marked by star).

The taxonomy of RIS features can be used for the so called primary descriptive analysis, which can be carried out by an expert from the office of a particular municipality or region, or a supervised interview with an expert in regional and public economy can be used.

#### 4.2. Method verification on case studies

The suggested method has been verified in two regions in the Czech Republic. The approach was the following:

1. select two different regions within the Czech Republic with absolutely different levels of innovation and innovation strategy implementation (documented by results of research by the Czech Statistical Office). In this way it is possible to demonstrate the application of selected RIS features on examples from practice (regions are not compared, this is used only for method validation);
2. carry out descriptive analysis of individual RIS features according to Table 1 (we used the specialist in regional science from the Regional Authority Office. He has evaluated all the features and created Table 2 for every region); and
3. process the descriptive analysis results and decide about fulfilling individual RIS features and define the result.

Verification was carried out in regions – NUTS level III – Pardubice (PA) and Moravia-Silesian (MS) during the year 2010. Both regions have a strategy of innovation environment development created by public regional authority (RIS existence was managed by public administration in the past). The research questions are: Q1 – *RIS exists in Pardubice region*; Q2 – *RIS exists in Moravia-Silesian region*.

Descriptive analysis was carried out based on expert evaluation of information gathered from strategic documents of both regions, especially Regional Innovation Strategy<sup>1</sup>, Program for Region Development, Statistical databases, own researches and others. That enabled us to carry out the analysis not only as quantitative (existence of features of RIS in regions) but also partly as qualitative (relations and connections between subjects of RIS were evaluated based on mutual activities and projects). The result of the evaluation is listed in Table 2. The value represents the number of occurrences or occurrence.

Following the evaluation, as resulting from Table 2, it is possible to state that the regional innovation system in the Pardubice region has not been created (three features are missing) and it practically does not work (the number of forms of cooperation is very low). That is why we can say that (Q1) *RIS does not exist in Pardubice region*. The basis for this system has been laid, formally there are simple relations between subjects in the region, and however, there are no outputs of RIS (innovations) which would prove functionality of the whole system. RIS in Pardubice will need to be activated. On the other hand, in the Moravia-Silesian region almost all basic requirements for creation and functioning of RIS are fulfilled. The system evidently works (we can answer Q2: *RIS exists in Moravia-Silesian region*) and is a determinant of competitiveness of the local players involved. The results of both applications in selected regions are confirmed also by independent analysis (see Svejda, 2010).

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1 See more about Regional Innovation Strategy in Sipikal, Písar and Uramová (2010, pp. 74-84).

Table 2: Descriptive method of evaluation of selected RIS on 31.12.2010

RIS Layer	Feature	PA Region	MS Region
Enterprises	industrial clusters	6 (2 functional)	10
	innovative enterprises	5.0 %	9.8 %
	number of patents	100	274
Supporting organizations	institutions for cooperation	Yes - 2	Yes - 3
	entrepreneur incubator	No	Yes - 6
	development agency	Yes - 1	Yes - 1
	other supporting and complementing organizations	No	Yes - 2
Environment and infrastructure	regional innovation strategy/update	Yes (2006), update no	Yes (2003), update 2010
	animators within branch	Yes - 2	Yes - 2
	organizations/expert community	Yes - 2	Yes - 5
	expert organizations/associations in branch	Yes - 5	Yes - 10
	public finance programs	Yes - 4	Yes - 5
	private finance initiatives	Data not available	Yes - 5
	elements of hard innovation infrastructure	No	Yes - 6
	elements of technological infrastructure	Yes - 3	Yes - 6
Relations, connections	elements of knowledge infrastructure	Yes - 2	Yes - 4
	communication platforms	Yes - 3	Yes - 3
	forms of cooperation and synergy	Yes - 1	Yes - 7

Source: own research based on information from the Czech Statistical Office and Regional Offices of both regions; numbers represent the number of occurrences in region.

The added value of this descriptive method is the ability to identify the fundamental features, elements that are still missing, or the existing weaknesses (according to low number of occurrences). Public administration authorities interested in having the RIS in the region they manage can focus their attention and support from public budgets on the weaknesses. This focus and support will be more effective than when they provide 'blind support'. Accordingly, public authorities in regions have their active role in establishing the innovation environment.

### 5. Public administration authorities' role in innovation environment establishing

The role of public administration authorities is linked to encouragement of the innovation environment in the managed regions and localities, but it is not yet clearly defined. The general framework provides *at the national level* the set of public policies that should be included in strategic documents of the country. In the Czech Republic there are the Strategy of regional development and Concept of the national innovation policy. After studying these strategies and concluding on what was discussed above, the strategies must contain:

- setting of the strategic objectives, which must not be confused with the tools to achieve the goals (an example might be a target: goal – to generate innovation instead of promoting competitiveness through the generation of innovation);

- defining the tools for the creation of innovative environment, respectively innovation networks (both in non-financial form and also in the form of frameworks and financial incentives);
- establishing an active role and specific tasks for public authorities both at national and regional level, and possibly at the local level. There must also be a definition of accountability;
- setting of the timetable within which the strategy will be implemented. The regular and planned updates and assessment of achievements in the form of feedback must be the schedule part of every strategy.

Thus prepared, a strategic document must be discussed and approved by the legislative authorities to receive the form of a binding regulation. This usually does not occur in many countries. Therefore, the strategies become only the 'ethereal' frameworks, which can be arbitrarily changed (usually a change of political orientation). This leads to fragmented support and inefficiency of public funds expended.

At the regional level (territorial self-governing unit) the regional strategic documents must be processed by the regional authorities. These strategies must be built on the national strategies and also account specific objectives for every region taking into account the current socio-economic situation, political orientation and financial possibilities of the region. In the Czech Republic, all the regions have special strategies focusing only on the support of the regional innovation system and the network (known as the Regional Innovation Strategy).

Regional public administration authorities must incorporate into these strategies various instruments. Among the best are:

- the secondary school system support – support for gifted students, student mobility, cross-border cooperation, the creation of a sufficient number of suitable secondary schools, where the emphasis is on knowledge spillovers. Secondary schools in the region must reflect localized universities;
- the creation, initiation and promotion of projects that may involve private firms and various research institutions and universities. The aim is the creation of a general climate of trust and cooperation so that there will be spillovers of knowledge. Other interesting and functional effective tools are voucher programs (support of commercialization of ideas and knowledge – for more details see Matkova and Stejskal, 2012a).
- establishment of support organizations (agencies) or a special division of the public administration offices, which will stimulate the cooperation between different actors of the innovation system. The elaboration of projects arising from the cooperating entities could be one of the activities.
- clearly identify the amount of public funds from the regional budget to support the creation and dissemination of knowledge, its transformation and use. The rules for the funding, based on a reciprocal system (public administration pays, the project must have clearly measurable outputs), must be exact and clear.

- the definition of effective tasks to individual subjects (for more details see Matakova and Stejskal, 2012b), who will draft the regional innovation strategy, including schedule.
- the information system is the essential ingredient of the innovation environment. Through it, all information will be communicated in order to minimize information asymmetry.
- the building of hard infrastructure based on the strategy can start (including industrial zones, technology centers, incubatory etc.). Before that, however, it is also necessary to analyze the feasibility and demand from private and public sector bodies.

The support of the knowledge environment at the local level is not in practice possible or common. The local levels are involved in supporting it as part of a larger territorial unit – the region. Also, most strategic documents have only a formal character, i.e. they exist, but they are not really implemented.

## 6. Conclusion

In practice, it is not easy to establish a RIS in the region and to initiate its activity to generate measurable effects that support real competitiveness. Moreover, only RIS characteristics are defined in the literature and one can also find discussions on the process of implementation. However, in Europe there are no common best-practice examples for benchmarking. Many regions wanted to implement the fundamentals of RIS, but they have met many obstacles. The most common implementation examples create different tasks for public administration institutions (and are also of interest for academics and researchers). They are, for example related to:

- missing active connections between research and enterprises, or organizations and institutions of the public sector;
- preferring of basic research instead of applied research and missing forms of utilization of these results for further applied research, application in practice;
- insufficient financial sources for creating basic prerequisites for existence of functional RIS (public as well as private);
- wasting of public resources for non-viable projects; and
- missing knowledge environment in cities and regions which could initiate knowledge and its transformation into innovations.

All tasks and incentives create the space for public policy and active interventions from the public sector side. Without them, managed regions will lose their innovative potential and limit the ability to achieve higher social benefits. On the other hand, non-systemic massive financial support and public interventions towards fulfilling regional innovation strategies does not have to mean practical realization of goals of RIS. This causes the well-known innovation paradox and inefficiency of public funds invested to support regional development.

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