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# Gaps and preliminary perspectives concerning innovation infrastructure in the Carpathian Countries

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**Abstract:** *Innovation, although still an emerging concept in terms of development policies, is no longer abstract, being defined, measured and assessed by performance indicators, thus managing to shape the global economy and also entrepreneurial dynamics at territorial level. Using as main source of documentation the "Global Innovation Index 2020" Report, this paper seeks to highlight by using quantitative statistical methods the innovation performance of the Parties of the Carpathian Convention with a deep focus on innovation infrastructure, measured by 10 performance indicators .*

**Keywords:** *Innovation, indicators, mountain areas, Carpathian Convention, policy, innovation infrastructure*

**JEL Classification***:* O31



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## 1. INTRODUCTION

Innovation is the new mirage of the first two decades of 21'st century, with the onset of global competition for exploitation and commercialization of scientific research. As the mentioned optical phenomenon, innovation occurs in inhomogeneous media when layers of knowledge at different stages of development may form, brought together, a brand new product, service, or process, valid and deeply beneficial to the environment in which it is implemented.

Mountain areas are inhomogeneous in terms of development stages, although have in common specific socio-economic challenges. To compare innovation performance between different areas characterized by similar geographical and environmental coordinates, we have to consider both widely accepted and relevant indicators to measure innovation and development policies that governs the mountain areas, through which innovation launch into territorial economies.

To pursue a consistent evaluation we choose to study a macro-regional area adhering to common values, where there are formal agreements among states for development policies that are at least congruent at territorial level. This paper aims to pave the way for in-depth analyzes on the capabillities for innovation among the Parties of the Carpathian Convention, to analyze overall status but emphasize on the performance of the seven Member States (Serbia, Romania, Ukraine, Hungary, Poland, Slovakia, Czech Republic) in terms of indicators related to innovation infrastructure. The research is based on key findings publised in *Global Innovation Index 2020*, meaning 80 indicators by which innovation is measured in this report, clustered into 7 main groups, namely: *institutions*, *human capital & research*, *infrastructure*, *market sophistication*, *business sophistication*, *knowledge & technology outputs*, *creative outputs*.

*Global Innovation Index „GII" 2020* analyze 131 economies of the world, being the result of Cornel University, INSEAD, and the World Intelectual Property Organization „WIPO" as co-publishers (Cornell University, et all. 2020).

## 1. MOUNTAIN AREAS. OVERVIEW

Awareness for the global importance of the mountains is largely acknowledged and increasingly addressed through strategic and policy instruments, evidenced by including the 13th chapter "13" in Agenda 21(United Nations, 1992) as well as the declaration of year 2002 as the International Year of Mountains(FAO, 2000). In Europe, interest on mountain topics increased with the emergence of umbrella organizations such as EUROMONTANA, Interim Secretariat of the Carpathian Convention – UN ENVIRONMENT Vienna, The Mountain Partnership – FAO, and other similar, which led to a policy of awareness of the opportunities and threats that reside in these geographical and cultural spaces. According to the European Commision study *Mountain Areas in Europe* „Europe's mountains are of vital importance to the continent's population in four main ways: 1) as 'water towers' supplying much of the continent's water, especially in summer, and as sources of hydroelectric power; 2) as centres of diversity, both biological and cultural; 3) for providing opportunities for recreation and tourism, based on natural attributes and cultural heritage; and 4) because of their sensitivity to environmental change, as manifest in the melting of glaciers. Mountain geo- and ecosystems are highly sensitive to environmental change, and extreme events likely to derive from climate change may have major consequences in both mountain areas and downstream"(NORDREGIO, 2004). With this in mind, there is the problem of existing data, often lacking, from which a governing body can begin drafting development policies. When decision makers in governance have access to information, problems of coherent interpretation may arise, because there are differences in data collection between different areas, different methodologies, all of which make comparisons

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difficult. From the point of view of cohesion, the European mountain regions are characterized by series of natural handicaps, some of them on indefinite period or even permanent, arising form the limitations generated mainly by slopes and climate , restrictions that are also manifested on the economic activity.

European coutries have mountains. Among the very few exceptions we mention the Baltic States and Malta. As Europe will continue to develop by pursuing cohesion goals through smart and green growth, the policies taken for mountain areas shall better assess the state of the art of social, environmental and and economic context, and have a thorough understanding of policies which directly or indirectly affected these areas and the past and present.

### 2.1 European policies for mountain areas

A wide range of public interventions are available to support development in European mountain areas. These interventions vary considerably depending not only on the importance and diversity of these areas, but also on the institutional framework of each country (centralized, federal states, EU Member States, non-EU members, etc.). Most of the countries with mountain regions have some kind of implicit or explicit "mountain policy" or a mountain approach to certain issues, albeit there must be significant differences from state to state. The comparative nature of this paper enables us to focus especially to macroregional areas, transnational territories, where interventions are based on ratified agreements between states.

In the Carpathian Basin, the transnational strategic document is the *Carpathian Convention*, a treaty created to foster sustainable development and protection of the Carpathian region. It was signed and ratified in May 2003 by the seven states in the Carpathian Basin (Czech Republic, Hungary, Poland, Romania, Serbia, Slovak Republic, Ukraine). It is the only multilevel governance mechanism covering the entire Carpathian area and, in addition to the Alpine Convention, the second such treaty for the protection and sustainable development of a mountain region worldwide. The common vision of the Parties to the Carpathian Convention is to pursue comprehensive policy and cooperation in order to guarantee protection and sustainable development of the Carpathians(Carpathian Convention, 2003). The Convention contains a large number of measures agreed between the Member States' diplomatic corps. These measures and types of interventions are rectified by means of protocols: the Protocol on Biodiversity, the Protocol on Sustainable Forest Management, the Protocol on Sustainable Tourism, the Protocol on Sustainable Transport, the Protocol on Sustainable Agriculture and Rural Development. The Convention provides a framework for cooperation and multi-sectoral policy coordination, a platform for joint strategies for sustainable development, and a forum for dialogue between all stakeholders involved – from the local community and various NGO's up to the regional and national Governments, Institutions of the European Union and the United Nations(ibidem).

## 2. METHODOLOGY AND RESEARCH FINDINGS

### 3.1. Methodology

The following variables related to *innovation infrastructure* in the seven countries, were used for quantitative analysis(Cornell University, et all. 2020):

- ICT access

- ICT use
- Government's online service
- E-participation
- Electricity output, kWh/mn pop
- Logistics performance
- Gross capital formation, % GDP
- GDP/unit of energy use
- Environmental performance
- ISO 14001 environmental certificates/bn PPP$ GDP

Data is extracted from the report *Global Innovation Index 2020 "GII"* and by using SPSS 23.0 the following statistical methods were applied:

- **Pearson parametric correlation** to analyze whether there are correlations / associations between the 10 indicators related to the innovation infrastructure for the 7 Carpathian countries;
- **Student's t-test** for comparing the averages of these indicators taking into account the grouping of countries according to important geo-political and economic criteria, respectively: *geographical position of the country, EU membership*, the state of the economy according to Porter's classification (2002): *factor -driven -economy/efficiency -driven- economy/innovation-driven-economy*.
- **Oneway ANOVA**

At the same time, for assessing the overall inovation performance, based on the data presented in the GII report and the country sheets, the main groups of indicators for all seven Carpathian states were analyzed.

### 3.2. Specific results on innovation infrastructure in the Carpathian countries

Following the running/application of correlation by SPSS, resulted the data presented in Table no. 1, with statistically significant correlations (p-value< 0.05) also with percentages of significance between 90-95%, respectively:

- For *ICT use* and *ICT access* there is a direct correlation of strong intensity (0.821), statistically significant of 97.7% (p-value = 0.023);
- For *Government's online service* and *E-participation* it is a direct correlation of strong intensity (0.826) statistically significant of 97,8 % (p-value = 0.022);
- Among *ICT use* and *GDP/unit of energy use* there is a direct correlation of strong intensity (0.763) with statistical significance of 95,4 % (p-value = 0.046);
- For *ICT use* and *Environmental performance* resulted a direct correlation of strong intensity (0.954) with statistical signifiance of 99,9 % (p-value = 0.001);
- Among *ICT access* and *Gross capital formation, %GDP* resulted a direct correlation of moderate to strong intensity (0.724) with statistical signifiance of 93,4% (p-value = 0.066);
- For *ICT access* and *GDP/unit of energy use* resulted a direct correlation of moderate to strong intensity (0.717) with statistical signifiance of 93,0% (p-value = 0.070);

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- For *ICT access* and *Environmental performance* there is a direct correlation of moderate to strong intensity (0.707) with statistical significance of 92,4 % (p-value = 0.076);
- Among *Environmental performance* and *GDP/unit of energy use* there is a direct correlation of moderate to strong intensity (0.676) with statistical significance of 90,5% (p-value = 0.095);
- For *ISO 14001 environmental certificates/bn PPP$ GDP* and *Gross capital formation, %GDP* there is a direct correlation of moderate to strong intensity (0.681) with statistical significance of 90,8 % (p-value = 0.092).

**Table no. 1 – Pearson correlation coefficients**

| | | ICT access | ICT use | Government's online service | E-participation | Electricity output, KWh/mn pop | Logistics performance | Gross capital formation, %GDP | GDP/unit of energy use | Environmental performance | ISO 14001 environmental certificates/bn PPP$ GDP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ICT access | Pearson Correlation | 1 | .821* | .645 | .292 | .068 | .589 | **.724** | **.717** | **.707** | .479 |
| | Sig. (2-tailed) | | .023 | .118 | .525 | .885 | .164 | .066 | .070 | .076 | .277 |
| | N | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| ICT use | Pearson Correlation | | 1 | .452 | .070 | .408 | **.711** | .568 | .763* | .954** | .580 |
| | Sig. (2-tailed) | | | .309 | .881 | .364 | .073 | .183 | .046 | .001 | .172 |
| | N | | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Government's online service | Pearson Correlation | | | 1 | .826* | -.029 | .413 | .006 | .377 | .180 | -.118 |
| | Sig. (2-tailed) | | | | .022 | .950 | .357 | .989 | .405 | .700 | .801 |
| | N | | | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| E-participation | Pearson Correlation | | | | 1 | -.276 | -.157 | -.367 | .136 | -.187 | -.252 |
| | Sig. (2-tailed) | | | | | .549 | .736 | .418 | .771 | .688 | .585 |
| | N | | | | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Electricity output, KWh/mn pop | Pearson Correlation | | | | | 1 | .475 | .218 | -.206 | .473 | .477 |
| | Sig. (2-tailed) | | | | | | .281 | .638 | .658 | .284 | .280 |
| | N | | | | | 7 | 7 | 7 | 7 | 7 | 7 |
| Logistics performance | Pearson Correlation | | | | | | 1 | .488 | .416 | .661 | .142 |
| | Sig. (2-tailed) | | | | | | | .267 | .353 | .106 | .762 |
| | N | | | | | | 7 | 7 | 7 | 7 | 7 |
| Gross capital formation, %GDP | Pearson Correlation | | | | | | | 1 | .404 | .642 | .681 |
| | Sig. (2-tailed) | | | | | | | | .368 | .120 | .092 |
| | N | | | | | | | 7 | 7 | 7 | 7 |
| GDP/unit of energy use | Pearson Correlation | | | | | | | | 1 | **.676** | .372 |
| | Sig. (2-tailed) | | | | | | | | | .095 | .411 |
| | N | | | | | | | | 7 | 7 | 7 |
| Environmental performance | Pearson Correlation | | | | | | | | | 1 | .653 |
| | Sig. (2-tailed) | | | | | | | | | | .112 |
| | N | | | | | | | | | 7 | 7 |
| ISO 14001 environmental certificates/bn PPP$ GDP | Pearson Correlation | | | | | | | | | | 1 |
| | Sig. (2-tailed) | | | | | | | | | | |
| | N | | | | | | | | | | 7 |

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

*Source: Authors' projection*

Upon applying Student's t test to analyze whether there are significant differences between the average values of the indicators in the study depending on different geo-political and economic criteria, using the criteria *EU membership* the results presented in table 2 were obtained. It is noted that for indicators *ICT access*, *ICT use* and *Logistic performance* there are significant differences between the 7 Carpathian countries.

**Table no. 2 – Student's t-test**

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | | | | Lower | Upper |
| ICT access | Equal variances assumed | 6.560 | **.051** | 2.671 | 5 | .044 | 4.89000 | 1.83062 | .18423 | 9.59577 |
| | Equal variances not assumed | | | 1.729 | 1.119 | .314 | 4.89000 | 2.82898 | -23.17108 | 32.95108 |
| ICT use | Equal variances assumed | 16.569 | **.010** | 4.758 | 5 | .005 | 19.0000 | 3.99359 | 8.73414 | 29.26586 |
| | Equal variances not assumed | | | 2.952 | 1.088 | .191 | 19.0000 | 6.43560 | -48.63227 | 86.63227 |
| Government's online service | Equal variances assumed | .023 | .886 | .955 | 5 | .383 | 9.07000 | 9.49344 | -15.33367 | 33.47367 |
| | Equal variances not assumed | | | .931 | 1.795 | .460 | 9.07000 | 9.74361 | -37.78166 | 55.92166 |
| E-participation | Equal variances assumed | .224 | .656 | -.032 | 5 | .975 | -.28000 | 8.63770 | -22.48392 | 21.92392 |
| | Equal variances not assumed | | | -.035 | 2.189 | .975 | -.28000 | 8.04185 | -32.17179 | 31.61179 |
| Electricity output, KWh/mn pop | Equal variances assumed | .260 | .632 | .265 | 5 | .802 | 418.290 | 1581.413 | -3646.86398 | 4483.44398 |
| | Equal variances not assumed | | | .333 | 3.334 | .759 | 418.290 | 1256.709 | -3363.63573 | 4200.21573 |
| Logistics performance | Equal variances assumed | 7.121 | **.044** | 2.508 | 5 | .054 | 24.4300 | 9.73919 | -.60538 | 49.46538 |
| | Equal variances not assumed | | | 4.194 | 4.015 | .014 | 24.4300 | 5.82511 | 8.28027 | 40.57973 |
| Gross capital formation, %GDP | Equal variances assumed | .087 | .780 | 1.353 | 5 | .234 | 3.53000 | 2.60880 | -3.17613 | 10.23613 |
| | Equal variances not assumed | | | 1.416 | 2.067 | .289 | 3.53000 | 2.49257 | -6.86677 | 13.92677 |
| GDP/unit of energy use | Equal variances assumed | .005 | .944 | 3.464 | 5 | .018 | 5.39000 | 1.55614 | 1.38981 | 9.39019 |
| | Equal variances not assumed | | | 3.760 | 2.243 | .053 | 5.39000 | 1.43356 | -.18059 | 10.96059 |
| Environmental performance | Equal variances assumed | .046 | .839 | 4.017 | 5 | .010 | 13.3700 | 3.32846 | 4.81393 | 21.92607 |
| | Equal variances not assumed | | | 3.983 | 1.855 | .065 | 13.3700 | 3.35662 | -2.21338 | 28.95338 |
| ISO 14001 environmental certificates/bn PPP$ GDP | Equal variances assumed | 2.617 | .167 | .689 | 5 | .522 | 2.38000 | 3.45588 | -6.50363 | 11.26363 |
| | Equal variances not assumed | | | .484 | 1.192 | .702 | 2.38000 | 4.91390 | -40.63951 | 45.39951 |

*Source: Authors' projection*

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Moreover, using the same criteria, *oneway ANOVA* method highlights significant differences between the following indicators: *ICT access*, *ICT use*, *Logistic performance*, *GDP/unit of energy use*, *Environmental performance*.

**Table no. 3 – oneway ANOVA**

| | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| ICT access | Between Groups | 34.160 | 1 | 34.160 | 7.135 | **.044** |
| | Within Groups | 23.937 | 5 | 4.787 | | |
| | Total | 58.097 | 6 | | | |
| ICT use | Between Groups | 515.714 | 1 | 515.714 | 22.635 | **.005** |
| | Within Groups | 113.920 | 5 | 22.784 | | |
| | Total | 629.634 | 6 | | | |
| Government's online service | Between Groups | 117.521 | 1 | 117.521 | .913 | .383 |
| | Within Groups | 643.753 | 5 | 128.751 | | |
| | Total | 761.274 | 6 | | | |
| E-participation | Between Groups | .112 | 1 | .112 | .001 | .975 |
| | Within Groups | 532.928 | 5 | 106.586 | | |
| | Total | 533.040 | 6 | | | |
| Electricity output, KWh/mn pop | Between Groups | 249952.177 | 1 | 249952.177 | .070 | .802 |
| | Within Groups | 17863357.797 | 5 | 3572671.559 | | |
| | Total | 18113309.974 | 6 | | | |
| Logistics performance | Between Groups | 852.607 | 1 | 852.607 | 6.292 | **.054** |
| | Within Groups | 677.513 | 5 | 135.503 | | |
| | Total | 1530.120 | 6 | | | |
| Gross capital formation, %GDP | Between Groups | 17.801 | 1 | 17.801 | 1.831 | .234 |
| | Within Groups | 48.613 | 5 | 9.723 | | |
| | Total | 66.414 | 6 | | | |
| GDP/unit of energy use | Between Groups | 41.503 | 1 | 41.503 | 11.997 | **.018** |
| | Within Groups | 17.297 | 5 | 3.459 | | |
| | Total | 58.800 | 6 | | | |
| Environmental performance | Between Groups | 255.367 | 1 | 255.367 | 16.135 | **.010** |
| | Within Groups | 79.133 | 5 | 15.827 | | |
| | Total | 334.500 | 6 | | | |
| ISO 14001 environmental certificates/bn PPP$ GDP | Between Groups | 8.092 | 1 | 8.092 | .474 | .522 |
| | Within Groups | 85.308 | 5 | 17.062 | | |
| | Total | 93.400 | 6 | | | |

*Source: Authors' projection*

When the seven states were grouped according to the stage of economic development (*factor-driven-economy/ efficiency-driven economy/ innovation-driven-economy*) *ANOVA* analysis highlighted that countries differ according to the following indicators: *ICT access*, *ICT use*, *Gross capital formation %GDP*, *Environmental performance*.

**Table no. 4 – *ANOVA* analysis according to the status of economic development**

| | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| ICT access | Between Groups | 48.844 | 2 | 24.422 | 10.557 | **.025** |
| | Within Groups | 9.253 | 4 | 2.313 | | |
| | Total | 58.097 | 6 | | | |
| ICT use | Between Groups | 512.901 | 2 | 256.450 | 8.788 | **.034** |
| | Within Groups | 116.733 | 4 | 29.183 | | |
| | Total | 629.634 | 6 | | | |
| Government's online service | Between Groups | 324.541 | 2 | 162.270 | 1.486 | .329 |
| | Within Groups | 436.733 | 4 | 109.183 | | |
| | Total | 761.274 | 6 | | | |
| E-participation | Between Groups | 177.907 | 2 | 88.953 | 1.002 | .444 |
| | Within Groups | 355.133 | 4 | 88.783 | | |
| | Total | 533.040 | 6 | | | |
| Electricity output, KWh/mn pop | Between Groups | 3305680.941 | 2 | 1652840.470 | .446 | .668 |
| | Within Groups | 14807629.033 | 4 | 3701907.258 | | |
| | Total | 18113309.974 | 6 | | | |
| Logistics performance | Between Groups | 510.547 | 2 | 255.273 | 1.001 | .444 |
| | Within Groups | 1019.573 | 4 | 254.893 | | |
| | Total | 1530.120 | 6 | | | |
| Gross capital formation, %GDP | Between Groups | 47.588 | 2 | 23.794 | 5.055 | **.080** |
| | Within Groups | 18.827 | 4 | 4.707 | | |
| | Total | 66.414 | 6 | | | |
| GDP/unit of energy use | Between Groups | 29.493 | 2 | 14.747 | 2.013 | .248 |
| | Within Groups | 29.307 | 4 | 7.327 | | |
| | Total | 58.800 | 6 | | | |
| Environmental performance | Between Groups | 261.527 | 2 | 130.763 | 7.168 | **.048** |
| | Within Groups | 72.973 | 4 | 18.243 | | |
| | Total | 334.500 | 6 | | | |
| ISO 14001 environmental certificates/bn PPP$ GDP | Between Groups | 53.013 | 2 | 26.507 | 2.625 | .187 |
| | Within Groups | 40.387 | 4 | 10.097 | | |
| | Total | 93.400 | 6 | | | |

*Source: Authors' projection*

Depending on the geographical position in Europe, there were statistically significant differences only for *ICT access* and *ICT use*.

**Table no. 5 – ANOVA Geographical position**

| | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| ICT access | Between Groups | 51.632 | 2 | 25.816 | 15.973 | **.012** |
| | Within Groups | 6.465 | 4 | 1.616 | | |
| | Total | 58.097 | 6 | | | |
| ICT use | Between Groups | 536.689 | 2 | 268.345 | 11.549 | **.022** |
| | Within Groups | 92.945 | 4 | 23.236 | | |
| | Total | 629.634 | 6 | | | |

*Source: Authors' projection*

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### 3.3. Overall results on innovation in the Carpathian countries

Many developing countries face a real lack of human and organizational resources to streamline the creation and implementation of policies to restore markets, absorb the shock of economic system errors and generate systemic innovation. This aspect stands out if we analyze the 'eastern bloc' in Europe, where with the exception of the Czech Republic, we find that the Carpathian states are not performing in terms of innovation.

**Table no. 6 – Innovation in Carpathian states**

| | Serbia | Ukraine | Romania | Hungary | Polond | Slovakia | Czech Rep. |
|---|---|---|---|---|---|---|---|
| Institutions | 69,4 | 55,6 | 68 | 71,3 | 73,1 | 72 | 77,1 |
| Human capital & Research | 31,7 | 40,5 | 27,7 | 41,4 | 41,6 | 31,2 | 43,4 |
| Infrastructure | 48,6 | 33,1 | 51,9 | 52,4 | 49,4 | 52,5 | 55,8 |
| Market sophistication | 41,6 | 42,1 | 44,9 | 43,3 | 46,8 | 45,3 | 51,1 |
| Business sophistication | 25,8 | 29,5 | 29,6 | 37,8 | 34,6 | 31,7 | 46,2 |
| Knowledge & Technology outputs | 30,0 | 35,1 | 34,6 | 38,2 | 32,7 | 34,4 | 45,2 |
| Creative outputs | 20,5 | 29,9 | 20,3 | 29,4 | 28,9 | 31,3 | 38,7 |
| Global ranking* | 53 | 45 | 46 | 35 | 38 | 39 | 24 |

*ranking among the 131 economies analyzed in GII 2020

*Source: Authors' projection, upon GII 2020*

Serbia ranks 10th among the *upper middle-income* group (37 countries) and 34th in Europe (39 countries). Ukraine, like Serbia, performs better on innovation outputs than inputs, which certifies growth potential. Unlike Serbia, Ukraine ranks better in the European rankings, 30th. Hungary ranks 22nd among European economies and 33rd among countries with a high-income economy. Compared to other European economies, Hungary ranks above average in terms of research and technology outputs, but below average in terms of institutions, human capital and research, infrastructure, creative outputs, market and business sophistication. Poland is struggling with market sophistication (69/131), but performs quite well in human capital and research (35/131). As well as the above mentioned Carpathian countries, innovation outputs are higher than inputs. Slovakia follows the same pattern, while the Czech Republic is the leader of the Carpathian countries in all respects. Compared not only with the Carpathian states, but with other European economies, the Czech Republic is a good performer in terms of infrastructure, institutions, business sophistication, technological and creative outputs, and somehow below average in terms of research and human capital, but also market sophistication.

## 4. CONCUSIONS

Innovation varries from state to state, usually clustering in certain regions or even large metropolitan areas that manages to generate an ecosystem conducive for the emergence of products that can easily penetrate the global market. On theory it starts with the capitalization of certain assets of an area, for which there is a consistent and diverse critical mass: academic and research environments concerned about market dynamics and related industries, authorities capable of creating and managing innovative public policies, an active and effectual civil society, but especially companies with financial strength and adequate capacity to forecast, mitigate and take risks.

Relatively developed infrastructure of innovation is balanced among the Carpathian countries, with relevant correlations between its branches. Even so, there are gaps compared to other states with stronger economies that will be further detailed in an upcoming research, which shall contain the multi-annual analysis of all innovation indicators beside infrastructure, but also an analysis to compare the Carpathian Basin innovation performance to a similar geographical area in terms of mountain policies - the Alpine countries.

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