UDC 005.591.6:001.895(476)
Original scientific paper
Received: February 23, 2022
Accepted: April 25, 2022
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ON THE POTENTIALITIES OF AN INNOVATION COUNCIL CONCEPT IN THE BELARUSIAN RESEARCH AND TECHNOLOGICAL DEVELOPMENT

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Abstract: *A major problem for institutional actors is ensuring that the current status and prospects of the Belarusian innovation policy are upgraded. An assessment of the environment for research and technological development is carried out on the basis of Belarusian official statistical indicators and State program documents. Research results indicate the need to further modernize the environment for conversion of research results into innovative and improved services and products for Belarus to become more competitive in the world market place which would elevate the country's development level. This implies modernizing the institutional framework for stimulating innovations. The authors particularly take into consideration the accomplishment of an EU approach towards innovations and the suggested concept for the Belarusian innovation coordination model is based on introducing an "innovation council". After analyzing and discussing innovation performance in Europe a simple correlation model demonstrates that countries with an innovation council achieved superior innovation performance. This institution could be responsible for the successful innovation performance. It coordinates policy, which is then in a better position. Findings also*

suggest that substantial benefits for SMEs could be ensured by developing an open innovative development and by introducing competitiveness changes at enterprise level.

Key words: *innovation policy; research and technological development; SMEs; innovation council; EU; Belarus.*

INTRODUCTION

Dynamizing development of innovations is one of the most promising directions in modern economic and business development. For example, in the disk drive industry rapid basis of competition involved factors of capacity, size, reliability, (Christensen, 2011, pp. 212-216), innovation, price and collective investments in education and access (Day, Schoemaker & Gunther, 2000, pp. 133-134). Innovatively active organizations also become more competitive by turning weaknesses into strengths (Christensen, 2011, pp. 219-220) and by using alliances to build competitive advantage (Porter, 1985) in emerging technologies (Day, Schoemaker & Gunther, 2000, pp. 358-375). They create new needs, services, jobs, ensure investment flows, reduce the cost of goods, improve the company and national image, etc. Manufacturing of high-tech products not only enables but also strengthens the external sector of the economy thus improving the trade balance and finally, it leads to an increase in living standards and protection of the environment.

The authors consider an innovative environment as a part of a changing business environment that potentially facilitates an innovative activity of enterprises (Hrechyshkina, Samakhavets, 2019; Vemić, 2017a; Vemić, 2017b). Innovations of Belarusian enterprises are determined by both internal enterprise level innovation capability and external environment fostered by innovation policy at the national level. In fact, the external environment can both create restrictions and promote innovative business development. Our study leads us to conclude that successful innovative development of Belarusian businesses requires an enhancement of an environment for development and dissemination of innovations.

The need to introduce innovative technologies derives from the scientific and technological changes arising globally and the competitive struggle between countries in the high-tech marketplace (Gusakov, 2015). As noted earlier (Hrechyshkina, Samakhavets, 2018), human potential of Belarus seems sufficient for the development

of innovative intellectual services. However, it is important to use it for the development of the IT sector, innovative clusters, as well as to expand SMEs' potential. Therefore, the aim of this paper is to examine the current situation and development perspectives of an innovative policy environment in the Republic of Belarus which could potentially foster a competitive and diversified economic base.

Research of the authors will indicate that currently there exist policy and practical limitations for improving an innovative environment in Belarus. Improvements require intensified interaction of the business and science sectors through further development of innovation policy management in order to create more comfortable enabling conditions for R&D partnerships of public and private sectors involved in innovation developing activity.

This article is divided into seven sections. Section I presents the introduction describing the approach. Section II shows the theoretical background and methodology. The main characteristics of the innovative environment in the Republic of Belarus are discussed in section III by illustrating its current situation and main development perspectives. In section IV authors use correlation as a statistical technique that can show whether, to what extent and how strongly the pairs of innovation variables are interconnected. In section V authors integrate the results of their analysis with their innovation coordination mechanisms and competitiveness models. The last section provides some concluding remarks and proposals.

1. THEORETICAL BACKGROUND AND METHODOLOGY

The innovation system in Belarus has common roots and expresses joint problems with the Russian national innovation system, such as low financing potential, poor efficiency in many business sectors, significant state involvement, poor marketing of research and development results, as well as low capacity networking institutions and partnerships (Gupta et al., 2013). Russian authors also actively researched the national innovation system (NIS) to identify different areas of its development (Eremina, Demina, 2015; Golichenko, 2006; Suglobov, Smirnova, 2015, etc.). Having in mind the nature and purpose of this paper the authors would like to single out the following

Belarusian scientists who are actively engaged in the area of innovation research: Babosov (2012), Myasnikovich (2004), Nikitenko (2006), Sechko (2008).

For example, Eremina and Demina (2015) pointed out the problem of weak interaction between science and production and emphasized the contradictory goals and objectives of scientists and investors as some of the main difficulties of Russian innovation system. This may have spilled over into Belarus. They saw the State as the leading link in the complex innovation system of interrelations and argued that it should necessarily participate more actively and perhaps differently in the development of innovations. Furthermore, scientists offered various directions for the development of innovation systems. For example, Suglobov and Smirnova (2015) proposed a network model of scientific, educational, industrial, and business organizations. Similarly, Moulaert and Sekia (2003) examined the territorial innovation models. Leydesdorff and Etzkowitz (1998, 2000) offered the model of effective interaction of university, education, industrial production and government sectors.

Important new approaches also include the so-called open innovation model, still not observed in the Belarusian innovation system. Originally it was Chesbrough (2003) who defined the term "open innovation". He discovered that with broad-based dissemination of knowledge and technology companies should not exclusively rely on their internally developed knowledge, ideas, experiences and that they should reap the benefits of applications developed and disseminated within other business enterprises, among their customers, clients and other external stakeholders. Therefore, this concept suggests restructuring or even reengineering companies in order to transition from a closed towards an open strategic model (Chesbrough, Vanhaverbeke, West, 2006). Consequently, it derives from this approach that open innovation can be defined as business model that combines internal and external business processes benefiting from innovation, research and development. Following his discovery, Chesbrough (2011) further developed his theory of an expanded open innovation model suggesting then broader use of "open service innovation" including both product and service innovations in order to practically apply R&D as a way of doing business and achieving competitive advantage of companies (Porter, 1985).

The study of the innovative environment in the Republic of Belarus is based on the investigation of the modern innovation system, the assessment of scientific and

innovative development (based on the official statistical indicators for the years 2011-2019).

In the study and treatment of the presented material, the authors used scientific methods such as systematization, classification, comparison, scientific abstraction, analytical method, statistical analysis, correlation and modeling. Correlation as a statistical technique is used to analyze whether and how strongly the pairs of innovation variables (ranks) are interconnected. Determining rank correlation is one way to use this technique. The presence of correlation is not a confirmation of the existence of a causal relationship between statistical phenomena. Authors don't imply correlation is caused by an innovation council but it can serve as a signal to signify achievements similar among countries that introduced it. The correlation coefficient of the English psychologist Charles Spearman (rho) is calculated according to the formula (Spearman, 1904):

$$r = 1 - \frac{6\Sigma d2}{n(n2 - 1)} \quad (1)$$

In the second instance, the correlation coefficient of the English statistician Maurice Kendall (tau) is calculated according to the formula (Kendall, 1943):

$$\tau = \frac{S}{\frac{n(n-1)}{2}} \quad (2)$$

In the current research Kendall's rank correlation coefficient, which generally shows lower values than Spearman's coefficient, is an alternative and supporting evidence.

With both coefficients it shall be assumed that pairs of innovation ranks are independent, that they are measured on the ordinal scale and that there is a monotonic relationship between the two variables. Modeling as a technique will be used to integrate correlation and analysis with innovation coordination mechanisms and competitiveness factors at enterprise level.

2. THE CURRENT STATE AND TRENDS OF BELARUSIAN ENVIRONMENT FOR DEVELOPMENT OF INNOVATIONS

The policy environment for development of innovations in Belarus includes a combination of public authorities, business entities and individuals which are related to innovations. The currently existing Belarusian model of relations between entities in the innovation sector is represented by the authors organizationally as follows (see Figure 1).

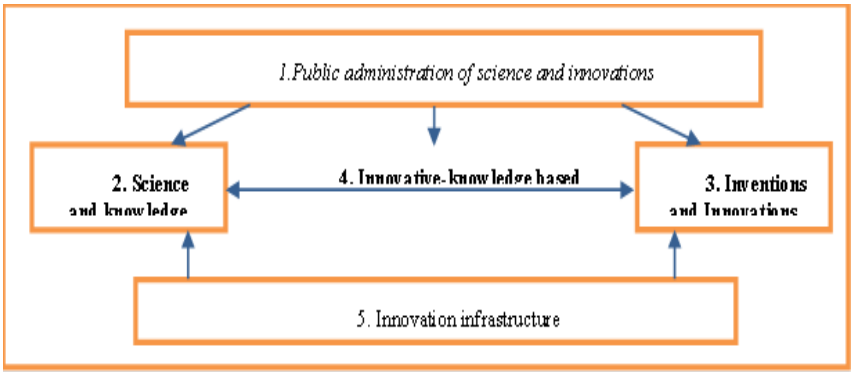

Figure 1. Existing interaction between various participants of the Belarusian national innovation system (NIS) (Source: own study and presentation of the authors)

Authors discuss the existing potential of Figure 1 in more detail. The public administration system (1) includes State administration bodies of science and innovations. The Science and Innovations Policy of Belarusian government is being implemented in order to create more favorable conditions for innovative development of all economic entities. Specifically, the public administration of science and innovations in Belarus is implemented by the President, the Council of Ministers and the National Academy of Sciences. As such innovation performance is mainly achieved through forecasting organization of technological development, implementation of technical regulations and standardization.

Science and innovations (conversion of acquired knowledge into practice) are the basis of the NIS. Also, from Figure 1, the system of knowledge production (2) is based

on interaction of education and science sectors. The knowledge application system (3) includes commercial and non-commercial organizations and incorporates education (including clusters). This block is represented by a large number of organizations and individuals engaged in the implementation and (or) ensuring the interaction of science and innovations in the Republic of Belarus. The interaction of science (2) and innovations (3) occurs through activities involving knowledge based dissemination of innovations (4).

Innovative organizations are prominent in the innovative development of any country, since they finance, create and establish up-to-date products and technologies. Consequently, R&D organizations in the Republic of Belarus operate in various sectors: public, commercial, non-profit sectors, and in the higher education system. Their performance and dynamics is presented by our findings in Table 1.

Table 1. Measured dynamics of the R&D organisations in Belarus

Indicators	2011	2012	2013	2014	2015	2016	2017	2018	2019	Δ2019/11
Total R&D units & organisations	501	530	482	457	439	431	454	455	460	0.92
Year to year growth rates, %	-	105.8	90.9	94.8	96.1	98.2	105.3	100.2	101.1	-
Including										
No. units of public organisations	96	104	98	94	87	90	93	90	89	0.93
Year to year growth rates, %	-	108.3	94.2	95.9	92.6	103.4	103.3	96.8	98.9	-
No. commercial organisations	331	352	317	294	286	277	286	287	296	0.89
Year to year growth rates, %	-	106.3	90.1	92.7	97.3	96.9	103.2	100.3	103.1	-
No. high education organisations	70	70	64	66	64	61	72	76	74	1.06
Year to year growth rates, %	-	100.0	91.4	103.1	97.0	95.3	118.0	105.6	97.4	-
No. of non-profit organisations	4	4	3	3	2	3	3	2	1	0.25
Year to year growth rates, %	-	100.0	75.0	100.0	66.7	150.0	100.0	66.7	50.0	-

(Source: Own calculation based on National Statistical Committee of the Republic of Belarus, 2020.)

Table 1 shows that quality wise the structure of the scientific complex in the Republic of Belarus did not change significantly and that indicators were clearly volatile with many ups and downs in the observed period 2011-2019. Year to year growth rates for several indicators were negative in the period 2014-2016. The total number of R & D units and organizations in the Republic of Belarus actually decreased by 41 units (8.2%), 2011-2019. Similarly, between 2019 and 2011 the number of public organizations decreased by 7 units (7.3%) and commercial organizations by 35 units (10.6%). The number of higher education organizations increased by 4 units (5.7%) which represents a positive but insufficient development. The number of non-profit organizations remained very small and ranged from 2 to 4 units throughout the studied period. The share of public organizations in R&D accounted for 19.3%, commercial organizations 64.3%, higher education organizations 16.1%, and non-profit organizations 0.2% in 2019. It should be noted that innovation activity in Belarus is still dominated by large enterprises and practically does not involve SMEs (United Nations Economic Commission for Europe, 2017). However, this problem is typical for the entire modern business environment of the Republic of Belarus and increase in the role of SMEs in the total GDP is one of the major identified tasks for the period until 2030 (Hrechyshkina, Samakhavets, 2019).

By cross-referencing results of table 1 with the model from figure 1 suggested is that Innovation infrastructure enabling mechanisms (item 5 from figure 1) should include a set of entities engaged in the material, technical, financial, organizational, methodological, informational, and consulting activities. Presently the actors of Belarusian innovative infrastructure involve innovation and engineering centers, innovation funds, venture capital organizations, science parks, and technology platforms. In addition, other institutions (legal, financial, and social) ensure the functioning of the innovation system as a whole (e.g. legal regulation of this sphere and the innovative culture of society).

According to the current Science and Technology Strategy of Belarus, development of innovative co-operation by including all participants of development processes in a single chain of the innovation cycle and strengthening interaction of science (item 2 from figure 1) and innovations (item 3 from figure 1) seem to be promising areas for improving the innovative environment of the Republic of Belarus (Strategiia Nauka i

tekhnologii: 2018-2040, 2017). As a result, State support system for cluster projects in the high-tech sector will be created with international technical assistance to stimulate this process. Modernization of public administration of the innovation system (item 1 from figure 1) is aimed at the State support for the formation of innovative and industrial clusters in the high-tech sector. Improvement of planning and evaluation of the innovative development is also in strategy.

Advancement of Innovation infrastructure enabling mechanisms (item 5 from figure 1) should be carried out through the creation of collective technological use centers, with unique scientific equipment, and industry laboratories for testing and disseminating the scientific results into industry. It is also envisaged to further use the potential of cooperation with the private sector and its deeper involvement in development and dissemination of innovation. It is recommended to create an effective organizational and economic mechanism for the commercialization of innovations, including through the entry of the Belarusian Innovation Fund into the founding capital of business entities created in this manner.

One of the significant problems is that the relevant policies in the field of innovations, science, training, SMEs and entrepreneurship, regional development of different business entities are usually managed only by government ministries and their departments handling separate portfolios, objectives and components of an innovation support infrastructure.

This presently fragmented institutional approach is inappropriate to manage major innovation issues within the NIS. The discussion on innovation management has become very dynamic and has intensified in recent years due to the increased complexity of national innovation policies which foster the development of a multi-actor innovative environment. Innovation policies have become more and more concerned with handling not only the elements of the innovative environment but also the relationships and collaboration between them that should lead to integrated national innovation policy. Hence, it is clear from this finding of the authors that interrelated and cross-departmental innovation issues demand cross-departmental concepts and solutions discussed through open innovation and competitiveness models discussed in next sections.

3. MAJOR COORDINATION MODELS AND ANALYSIS OF SME INVOLVEMENT TRENDS IN INNOVATION PROCESSES

In the past two decades there have been worldwide fundamental advances in our theoretical understanding of the working of innovation coordination.

In the EU, the European Commission produced a communication on a data-driven economy (European Parliament, 2001) followed by a second communication titled "Innovation in a knowledge-driven economy" (European Commission, 2004). Noticed EU approach was based on five main objectives (European Commission, 2009), focused on enhancing potentiality of member countries to resolve barriers hampering a more innovation-fostering environment.

At present these are the most significant innovation coordination mechanisms which can be distinguished in the EU:

High-level advisory committees, or councils, for managing a strategic framework (i.e. Finland, Ireland, Portugal). Efficient and simplified functioning decision making in consultative mechanisms at higher hierarchical levels lower than government ministries have been developed in these countries.

Responsibility for coordination assigned to one Minister or Department, which results in enhancing coordination mechanisms at interdepartmental level (i.e. UK, Sweden).

Formation of one Ministry with managing the entire knowledge production and implementation chain (i.e. Denmark).

It should be noted that an innovation council is not entirely an EU innovation policy development. This article focuses on EU and Belarus because of their proximity and presently it is beyond its scope to analyze innovation policies of other countries and territories. However, authors must emphasize that in United States many federal states such as Iowa (IIC, 2022) use innovation councils for policy or industry development. Japan established an open innovation council in 2017 (JOIC, 2022) which is led by private businesses and in which The New Energy and Industrial Technology Development Organization (NEDO) serves as the secretariat for the JOIC.

Both Russia and Kazakhstan have innovation councils in a variety of fields related to education and economy. In the Community of Independent States there exists an Interstate Council for Cooperation in Scientific, Technical and Innovation Spheres (CIS, 2022). Therefore, the existence of similarities and correlation with these and other countries using innovation councils strengthens the results of this analysis and recommendations for Belarus arising from research in this article.

Based on available empirical data, it can be observed that the EU approach to form a more innovation-fostering environment for business shows its effectiveness in practice.

Table 2 demonstrates a high level of development of SMEs involvement in the innovation processes, especially for product innovation in Finland, Netherlands, Portugal and Ireland for process innovation. Germany, France and Lithuania were also high performers while new EU entrants seem to be lagging behind.

Innovation performance ranking of the EU and Belarus is herewith analyzed on the basis of data provided in Table 2, followed by the correlation analysis of authors.

Table 2. Development of SMEs Involvement in Innovation Processes (Comparison of EIS indicators of Belarus and selected EU member countries)

Country	SMEs introducing product innovations (Regional)				SMEs introducing business process innovations (Regional)				Innovative SMEs collaborating with others (Regional)			
	Rank 2019	Value 2019	Rank 2014	Value 2014	Rank 2019	Value 2019	Rank 2014	Value 2014	Rank 2019	Value 2019	Rank 2014	Value 2014
Finland	1	227,38	5	144,71	4	168,62	11	112,57	5	265,49	7	172,57
Portugal	2	212,61	9	115,52	1	210,41	2	165,03	16	112,50	18	73,75
Netherlands	3	184,92	2	160,58	13	127,08	16	92,64	7	174,83	6	174,90
Italy	6	154,42	7	139,94	10	135,80	3	157,59	22	59,99	23	47,58
Germany	7	151,59	1	180,18	12	130,54	13	110,86	18	96,93	13	136,38
Ireland	11	134,49	8	126,64	5	154,45	6	137,88	13	137,31	11	142,49
France	12	124,87	14	101,36	6	154,23	9	133,02	8	160,60	14	135,45
Lithuania	13	120,15	21	20,37	8	143,31	21	58,69	6	204,64	16	83,29
Estonia	16	81,08	17	81,39	14	115,00	17	90,49	1	308,42	2	192,28
Latvia	23	31,59	23	13,23	22	42,74	24	42,29	23	58,01	24	43,75
Bulgaria	24	28,56	22	16,12	24	14,03	25	21,63	25	32,25	26	14,71
Spain	25	17,63	25	13,03	20	70,45	22	51,38	20	68,97	20	63,88
Poland	26	6,83	26	2,86	26	5,15	27	8,02	24	43,19	25	34,97
Belarus	27	3.86*	27	3.07*	27	0.82**	28	0.87**	28	0,39	27	0,4
Romania	28	0,00	28	0,00	28	0,00	26	18,18	27	6,76	28	0,00

Note:
*This indicator for Belarus includes product or process innovation;
**This indicator for Belarus includes marketing or organizational innovations

(Source: Own calculation based on (National Statistical Committee of the Republic of Belarus, 2020; European and Regional Innovation Scoreboards, 2019))

Table 2 reveals that for all three criteria and for both observed years (2019 and 2014) Belarus maintained the rank of 27 or 28 together with Romania and Poland. Poland has an innovation council since 2016 and in Romania it existed 2011/2012. It also derives from Table 2, that the success of a sustainable "innovation council" management model implemented in several researched EU countries (i.e. Ireland, the Netherlands, Portugal, and Finland) clearly contributes to their superior performance. Although innovation council is not the only factor, it seems to be an optimal approach to further upgrade the Belarusian innovation policy management at this stage, for these main reasons identified in our paper:

The character of innovations (e.g. fast developing, dynamic and cross-functional) currently demands the participation of a broad group of stakeholders, both form the public and the private sector. There are a growing number of different actors involved in innovation management. Therefore, it seems logical that a coordination mechanism at a high enough level could prove to be successful in fostering innovation and competitiveness.

Trends and statistics from recent years reveal that there is a growing portfolio of innovation measures and instruments at the disposal of innovation mechanisms. This development imposes the need for systematic approach, transparency, and high level of public responsibility.

With the availability of several unequal support models for the innovative development using State budget or government financial resources, there seems to be a growing necessity for recording that spending of funds is performed rationally and effectively.

The increasing autonomy of development regions imposes growing necessity of coordination with these entities to achieve optimum innovation effects. Without this

approach, nations risk lack of developmental synergy, and poor performance with implementation of national priorities.

The current development of national innovation policies is characterized by the fact that it interplays either directly or indirectly with practically all other economic and development policies of the country.

It should be noted that there isn't one single department able to manage and coordinate the whole set of measures with which innovation policy should be consistent with. Therefore, several EU member countries streamlined their innovation and/or research councils to interact with the Enhanced European Innovation Council (EIC), (European Commission, 2019), whose mission is to support scientists, innovators, entrepreneurs, and SMEs with fresh ideas and ambition to grow competitively and internationally.

Correlation analysis of empirical evidence on innovation ranks among selected countries which introduced an innovation council

Table 2 indicated the innovation values and ranks. We shall now show whether and to what extent pairs of observed years (2019 and 2014) of innovation ranks on SMEs introducing product innovations, SMEs introducing business process innovations and innovative SMEs collaborating with others correlate with each other in terms of performance achieved by Finland, Portugal and the Netherlands. These are the countries, which were top performers on product innovations in 2019 and have previously introduced an innovation council currently missing in the Belarus policy environment.

Table 3. Correlation of ranks on SMEs introducing product innovations

	Overall rank in 2019	Overall rank in 2014	Rank against each other in 2019	Rank against each other in 2014	d	d2
Finland	1	5	1	2	1	1
Portugal	2	9	2	3	1	1
Netherlands	3	2	3	1	-2	4
					Σ d2	6

(Source: Own calculation based on (National Statistical Committee of the Republic of Belarus, 2020), (European and Regional Innovation Scoreboards, 2019))

We calculate Spearman's coefficient of correlation:

r = 1 - (6 x 6) / 3(3 x 3 - 1) → r = 1 - (0 / 3 x 8) → r = 1 – 1.5 → Therefore r = -0.5

We calculate Kendall's coefficient of correlation:

1 2 3

2 3 1

1 0 -

-1 0 -

0 0 - Total 0 Therefore $\tau = 0/0 = 0$

Table 4. Correlation of ranks on SMEs introducing business process innovations

	Overall rank in 2019	Overall rank in 2014	Rank against each other in 2019	Rank against each other in 2014	d	d2
Finland	4	11	2	2	1	1
Portugal	1	2	1	1	0	0
Netherlands	13	16	3	3	0	0
					Σ d2	1

(Source: Own calculation based on (National Statistical Committee of the Republic of Belarus, 2020), (European and Regional Innovation Scoreboards, 2019))

We calculate Spearman's coefficient of correlation:

r = 1 - (6 x 1) / 3(3 x 3 - 1) → r = 1 - (6 / 3 x 8) → r = 1 – 0.25 → Therefore r = 0.75

We calculate Kendall's coefficient of correlation:

2 1 3
2 1 3
1 0 -
-1 0 -
0 0 - Total 0 Therefore $\tau = 0/0 = 0$

Table 5. Correlation of ranks on innovative SMEs cooperating with others

	Overall rank in 2019	Overall rank in 2014	Rank against each other in 2019	Rank against each other in 2014	d	d2
Finland	5	7	1	2	1	1
Portugal	16	18	3	3	0	0
Netherlands	7	6	2	1	1	1
					Σ d2	2

(Source: Own calculation based on (National Statistical Committee of the Republic of Belarus, 2020), (European and Regional Innovation Scoreboards, 2019))

We calculate Spearman's coefficient of correlation:

$r = 1 - (6 \times 2) / 3(3 \times 3 - 1) \rightarrow r = 1 - (12 / 3 \times 8) \rightarrow r = 1 - 0.5 \rightarrow$ Therefore $r = 0.5$

We calculate Kendall's coefficient of correlation:

1 3 2
2 3 1
1 0 -
-1 0 -
0 0 - Total 0 Therefore $\tau = 0/0 = 0$

Table 6. Interpretation of correlation coefficients

Criteria for interpretation of correlation	Interpretation of correlation values	Description
Value for r and τ is always between –1 and 1	0,00 – 0,19	Very weak correlation
r=0 and/or τ =0 means no connectedness	0,20 – 0,39	Weak correlation
r>0 and/or τ >0 positive correlation	0,40 – 0,69	Moderate correlation
r<0 and/or τ< 0 negative korrelation	0,70 – 0,89	Strong correlation
Greater |r| and/or |τ| higher connectedness	0,90 – 1,00	Very strong correlation

Source: own presentation of authors

On all criteria Kendall's coefficient showed very weak correlation. On SMEs introducing product innovations Spearman's coefficient of correlation was moderately negative, on SMEs introducing business process innovations Spearman's coefficient of correlation was strong, and on Innovative SMEs collaborating with others Spearman's coefficient of correlation was moderate. We conclude then in our interpretation that Finland, Portugal and the Netherlands as innovation leaders that introduced an innovation council were not correlated in terms of product innovation performance while in terms of business process innovations and SMEs collaborating with others their ranks were moderately to strongly correlated. This finding is lesson learned for Belarus. If it potentially decides to introduce an innovation council, it might help in terms of business process innovations and SMEs collaborating with others. Factor product innovation requires further research.

4. ELABORATION OF FURTHER DEVELOPMENT OF NEW INNOVATION COORDINATION MECHANISMS IN BELARUS

From a government point of view an effective science and technology policy logically demands coordination mechanisms. Similarly, there is the need for coordination between the ministries responsible for economic-regional economic development, education, and science sectors as well. An effective coordination and accomplishment of national innovation policy calls for efficient practical measures to remove obstacles, foster partnerships and R&D.

Countries are increasingly evolving towards innovations, effective technology and science seeking a competitive approach globally. In fact, all countries are trying to improve coordination and integration. Overall the innovation models in the benchmarked EU countries (i.e. the Netherlands, Portugal, and Finland) from table 2 can be characterized as a constant national and enterprise learning process in adapting organizations and practices in order to meet both external and internal challenges. Senge et al. (1999) effectively discuss it.

However, it should be noted that good practices cannot be simply copied from one country to another as the circumstances are different. It seems that Belarus could adapt the innovation approaches in order to improve performance from table 2 where the country is clearly lagging behind most competitors. The mentioned benchmark countries of the analysis do provide initial information which can serve initially to improve the efficiency and the effectiveness of the innovation management system in Belarus.

One of the main objectives of Belarusian innovative development for the future is "Development and improvement of the NIS". Before presenting proposals the authors herewith discuss and analyze some aspects of Belarusian NIS and point out observed priority questions:

1. It is recommended to intensify the transfer of technologies between State and business (especially emerging SMEs) for both innovations and research. Industry involvement ought to be generated in advance for long-term public sector research programs. Financing is clearly seen as one of the main obstacles to the provision of business and research services to enterprises and more intensive science-industry co-operation.
2. Significant aspects of innovation policy should be optimized with horizontal support of business innovations and by developing targeted support for attraction of risk capital in specific technology areas.
3. It is recommended to increase the amount of research of commercial organizations and finance a share of total R&D and innovations. There are two aspects of this question: increase the knowledge capability in view of industry's added value capacity as well as its potentiality to borrowing knowledge from outside offered by the elaborated model of open innovation.

The authors already proposed earlier a re-engineered model of Belarus NIS (see Figure 2), which suggests that external and internal innovations are integrated in coordination with available innovation infrastructure involving an innovation council.

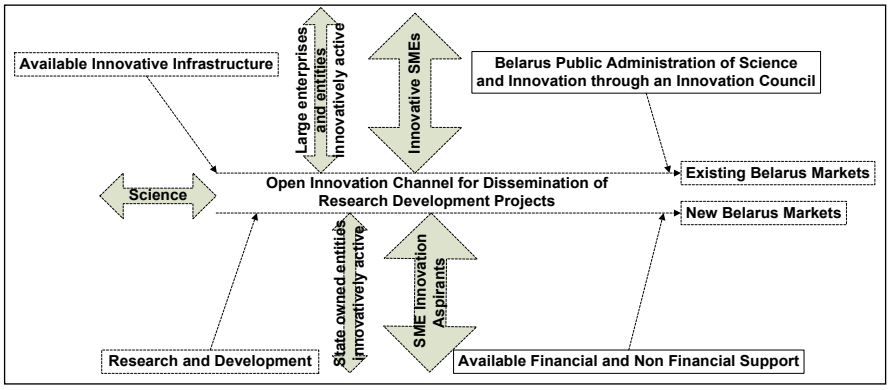

Figure 2. Proposed re-engineered model of Belarus NIS allowing dissemination of open innovation. (Source: Vemić, Hrechyshkina, Samakhavets, 2021, p. 92.)

In the proposed concept, enterprises share the innovation road map, align their business model with those of stakeholders and incorporate the support of the policy makers which already exist in Belarus, while focusing on new business opportunities as well as current business operations. Enterprise business models and approaches of the stakeholders are interconnected in the suggested open model and, therefore, innovations become a much more significant criterion in their development. Furthermore, innovations management does become the responsibility of every unit in an enterprise while intellectual property is considered as a "strategic business asset". The authors are led to think that a re-engineered model is able to share substantial advantages for a wide variety of Belarus stakeholders. The authors identified the main advantages of the model which could especially benefit SMEs:

- Opportunity to cooperate with large enterprises, value chains and major innovators.
- Insight into best practice in Research & Development & Innovation Management.

- Benchmarking own performance in innovation management with relevant qualitative tools.
- Business interventions are identified to fill innovation gaps as compared to the best industry benchmarks.
- Opportunity to establish links with R&D institutions.
- Testing Belarus own innovation management performance with relevant quantitative tools.

Fundamental functions and coordination activities of the proposed Innovation Council could include IBNLT: awareness creation, shaping an innovation agenda, establishment and adjustment of innovation priorities in the national system. In principle, based on discussed best practices from EU and other parts of the world it is proposed that the Prime Minister could chair the Innovation Council while Cabinet members in charge of the economy, science and education could be functional members. In addition, a number of chief executive officers from Belarusian innovatively active organizations as well as a number of top scientists active in research and development could be valuable members. A small number of members could be invited from other circles such as business associations, major universities and academia. Finally, a small select committee from the Government of the Republic of Belarus could conceive and propose to Parliament the Charter of an appropriate national Innovation Council including membership and responsibilities.

Integrating the factor of competitiveness in an improved innovation model

At the time of preparing this study, Belarus is still not present in the Global Competitiveness Index ranking (GCI 4.0, 2022) which makes comparative analyses more difficult. However, the potential place of Belarus in GCI ranking could have been between 55th and 61st place according to the last CASE Belarus analytical papers (Akulich et al., 2015). That particular analysis further confirms a relatively low innovative activity of organizations in Belarus, and their technological backwardness, which is the reason for the poor competitiveness of Belarusian products in foreign markets. These findings (Akulich et al., 2015) coincide with the EIS indicators of Belarus from table 2. Absence from GCI is a weakness requiring attention and alliances to build

competitive advantage (Porter, 1985) in emerging technologies (Day, Schoemaker & Gunther, 2000, pp. 358-375). In addition, the re-engineered Belarus NIS on the innovation policy side from figure 2 also requires a supplemental enterprise development model which can serve to improve competitiveness through organizational innovation and learning (Senge et al.,1999), as shown in Figure 3.

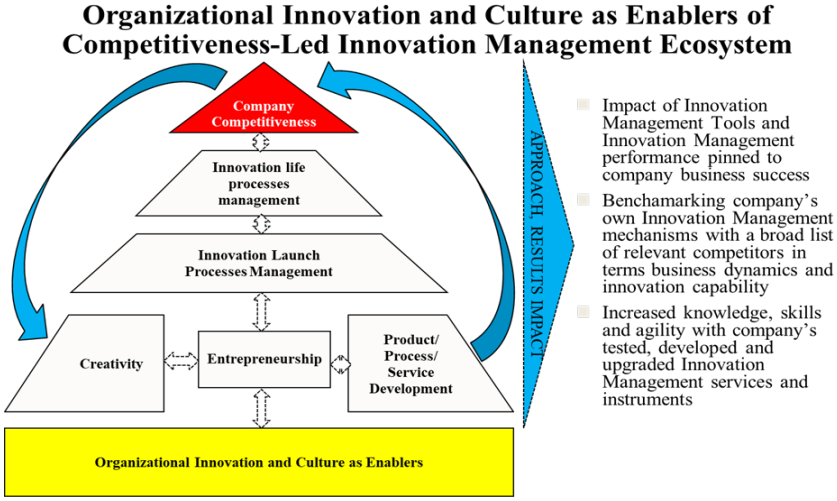

Figure 3. Enterprise level organizational innovation and culture as enablers of competitiveness-led innovation management ecosystem. (Source: model of the authors)

Figures 2 and 3 show that we relate national systems and policies with organizational innovation and culture as enablers of the competitiveness-led innovation management ecosystem. The division between the two no longer arises in our description. In subsequent papers we are going to expand this type of description so as to include additional factors. In doing this, we shall go into more detail as to how policy levels and enterprises levels come together into a distinct whole.

CONCLUSION

It derives from the author's findings that it is necessary to further develop an innovative policy environment in Belarus by using existing infrastructure in combination with new models, possibly related to an innovation council. Improvements are also needed at enterprise level, particularly in areas from figure 3. The authors outlined the EU performance towards innovations and EU's innovation management system by means of introducing an innovation council. The key reasons for establishing such systems are discussed and recommendations for the most appropriate coordination model in Belarus innovative environment were suggested.

The new NIS could consist of traditional elements for all countries and those which are tailored and improved specifically for Belarus. The promising direction in advancement of the NIS lies in the improvement cooperation in development and dissemination of innovations, i.e. strengthening partnerships for interaction between science and innovations which are areas in which innovation leaders such as Finland, Portugal and the Netherlands performed well after introducing an innovation council. This opens a new hypothesis, which requires future additional research, that in countries which recently introduced innovation councils such as Poland and Romania business process innovations and innovative collaboration can also advance as table 2 suggests.

It should be noted that presently the development level of science and innovations in Belarus doesn't facilitate monitoring active innovations, which could also be an area for involvement of an innovation council. In fact, in the period 2011-2019 the total number of R&D organisations in Belarus decreased by 8.2%, the total number of employees engaged in R&D – by 11.2%, the total number of organisations engaged in innovations – by 0.9%. In the structure of the scientific complex, 64.3% were commercial organisations and 90.5% of the total volume of scientific and technical work in 2019 was performed in-house which proves the thesis of authors that an open innovation model is not used. This conclusion coincides with the correlation analysis which reveals that there is potential for SMEs to introduce business process innovations by innovatively collaborating with others.

The above analysis highlights the prospects of the NIS in Belarus through strengthened horizontal coordination mechanisms, strengthened transfer of

technologies between public institutions and the private sector, restructuring the fragmented and weakly supportive innovation infrastructure, improving the innovation support sub-system including financing. Second, this would provide qualitative conditions for organizational learning modelled in figure 3, and using culture as enabler of economic competitiveness and growth, leading to elevation of the development level of the Republic of Belarus which is a long-term vision.

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