

## **Typology of the European Union Countries in Terms of Barriers Hampering Innovation Activities – the Perspective of Innovative Enterprises**

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### **Abstract**

The enterprises undertaking innovation activities in the European Union countries operate in a diverse environment, not always friendly to innovation processes. They are influenced by a number of internal and external factors constituting barriers for the implementation of innovations. As a result of diverse conditions for the development of innovation in the EU countries, the individual barriers to innovation processes may be of different significance for enterprises. The first part of the study presents an overview of the subject literature output focused on the systematics of key factors hampering or preventing the activities aimed at the implementation of innovation (e.g. deterrent and disclosed barriers, internal and external and also economic, knowledge-related, market and institutional ones). The second part discusses the results of empirical research focused on verifying the adopted hypothesis – the key barriers to innovation activities of enterprises in the EU countries create cost factors and their disclosure, along with other barriers, results in the interruption of innovation processes in their implementation phase (high intensity of obstacles to innovation activities is manifested in low values of the aggregate innovation indicator). The European Innovation Scoreboard data and the research results covering innovative enterprises as part of the last edition of the Community Innovation Survey constituted the information basis of the conducted analyses. The research used multi-dimensional statistical analysis methods, with particular emphasis on the classification methods.

**Keywords:** Innovation Activities, Innovative Enterprises, Barriers to Innovation Processes

### **Introduction**

Technological progress, the dynamically developing international competition and shorter product life cycles exert pressure on enterprises to implement innovations (Ajagbe and Ismail 2014). The capacity for creating and implementing innovations has become the essential success factor, determining the competitive position on the market (Calantone, Cavusgil and Zhao 2002; Jin, Hewitt-Dundas and Thompson 2004; Hult, Hurley and Knight 2004). The enterprises implementing new or significantly improved solutions – product, process, organizational and marketing oriented – achieve better results than the entities not involved in such activities (Crepon, Duguet and Mairesse 1998; Miozzo and Walsh 2006).

The need to intensify innovation activities seems undebatable, however, the research in this area does not follow a clearly defined path. Approaching the achievements of the subject literature in general terms, the factors facilitating and strengthening innovation processes, as well as the ones preventing or hampering these activities, i.e. barriers to innovation, can be analysed. The identification of innovation determinants was attempted in many studies (Montoya-Weiss and Calantone 1994; Cohen 1995; Henard and Szymanski 2001) to specify the driving forces responsible for the intensification of innovation processes and also to discover the existing correlations between them and, e.g., enterprise performance results. Much less attention was paid to the factors which either prevent or hamper innovation activities (Baldwin and Lin 2002; Silva, Leitão and Raposo 2007; Iammarino, Sanna-Randaccio and Savona 2007, Mohnen, Palm, Schim van der Loeff and Tiwari 2008). Such disproportion does not seem

justified. The intensification of innovation oriented processes cannot be limited to seeking innovation-friendly factors or identifying barriers to innovation. The complementarity of these approaches is demonstrated by, e.g., the research results indicating that a barrier for one company can simultaneously turn out an opportunity for another company (Duarte, Madeira, Moura, Carvalho and Moreira 2017).

The presented analyses and considerations address innovation barriers and put forward the following research hypothesis – the key barriers to innovation activities of enterprises in the EU countries create cost factors and their disclosure, along with other barriers, results in the interruption of innovation processes in their implementation phase (high intensity of obstacles to innovation activities is manifested in low values of the aggregate innovation indicator).

### **Barriers to innovation activities – the subject literature**

Any factor resulting in abandoning the innovation oriented processes as well as delaying or distorting their results remains a barrier to innovation activities (Mirow, Hölzle and Gemünden, 2007). It is clear from this definition that barriers to innovations can have different effects. In a positive case, their consequence is a delay in the implementation of innovation, whereas in a negative one – abandoning an innovation activity prior to its commencement, the interruption of an innovation process in its implementation phase, or an incomplete implementation of a new or a significantly improved solution. The spectrum of the aforementioned consequences does not take into account the possibility of overcoming barriers to innovation activities without some detrimental impact on this process (timely and full implementation of innovations despite the existing impediments), which seems to be a serious shortcoming. For this reason, it is worth adopting that barriers to innovations are created by the factors either hampering or preventing the activities aimed at implementing innovations.

The factors hampering or preventing the activities focused on implementing new or significantly improved solutions can be classified in different ways. If the decisions made by enterprises, regarding the implementation of innovation activities, are adopted as the basis for their identification, the deterring and revealed barriers are distinguished (D'Este, Iammarino, Savona and Tunzelmann 2012). The first of them discourage enterprises from engaging in innovation processes. The absence of activities in this area may result from, e.g.: excessive costs of innovations in relation to the financial resources at the disposal and no possibility of obtaining them from external sources, insufficient qualifications of the enterprise employees, difficulties in attracting cooperation partners, or uncertain demand for innovative products or services. It is worth highlighting that these impediments are identified *ex ante*, prior to commencing the innovation activity and determine its abandoning (Ee Shiang and Nagaraj 2007). The enterprises involved in innovation activities have a different view on barriers to innovation. Among them there are entities identifying and solving specific problems (so-called revealed barriers). Recognizing barriers in due time increases the chance of facing them and overcoming the existing difficulties (Hueske, Endrikat and Guenther 2015). Following an optimistic scenario, one can assume that identifying specific barriers to innovations simultaneously determines the ways of overcoming them (Chen and Hove 2011).

The distinction between the revealed and deterring barriers to innovations is of utmost importance, because the innovating and non-innovating enterprises perceive the importance of individual impediments differently (Arundel 1997, Baldwin and Lin 2002; Galia and Legros 2004). Taking up actions aimed at implementing innovations increases the awareness of impediments that may either hamper or prevent the implementation of new or significantly improved solutions (Galia and Legros 2004). This knowledge is absent in the enterprises deterred by the barriers to innovation activities.

The location of factors hampering or preventing innovations remains yet another criterion for the division of barriers to innovation activities. These factors can be located in an enterprise itself or in its environment, which results in distinguishing internal and external impediments (Hadjimanolis 1999; Mohnen and Rosa 2002; Tourigny and Le 2004; Duarte, Madeira, Moura, Carvalho and Moreira 2017). Enterprises experience internal barriers when, e.g., their own funds for innovation activities are unavailable, they lack adequately qualified personnel or struggle with the organizational rigidities (negative attitude of the management and/or staff to changes). External barriers arise when enterprises

face problems in accessing external finance (bank loans, venture capital, public funding or subsidies), technological information, potential cooperation partners, etc. (Segarra-Blasco, García-Quevedo and Teruel-Carrizosa 2007).

The above mentioned division of barriers to innovations is supplemented by the classifications focused on a comprehensive systematics of the factors hampering or preventing innovation activities. An interesting proposal in this respect was presented by Szultka (2008, pp. 23-24) who identified the factors related to:

- funding innovation activities,
- internal potential of an enterprise,
- investment risk in new technologies,
- demand for new or improved products,
- information flow,
- R&D sphere potential,
- intermediary infrastructure,
- legal provisions and administrative procedures,
- public support.

These factors are substantiated by the, located within them, barriers to innovations. For example, the factors related to the internal potential of an enterprise include as follows: resistance of employees to changes, absence of the adequately qualified staff, insufficient qualifications of the management, lack of strategic planning, etc.

Another, generally known proposal for the systematics of barriers to innovations is presented in the Oslo Manual [OECD/European Communities 2005], which constitutes, among others, the basis for conducting research addressing the factors hampering and preventing innovation activities within the framework of the Community Innovation Survey (CIS). CIS results are presented in the EUROSTAT statistical data resources. According to the statistical nomenclature, the cost barriers (lack of internal finance, lack of external finance – credit or private equity, high costs, difficulties in obtaining public grants or subsidies), the knowledge-related ones (lack of qualified employees within enterprise, lack of cooperating partners) and also the market barriers (uncertain market demand, high competition) are listed among the potential barriers to innovation activities faced by the enterprises involved in the discussed processes.

## **Information Basis, Research Scope and Method**

The statistical data from the latest edition of the Community Innovation Survey (CIS 2016) constitute the information basis of the presented research. The Survey results were provided as part of the official statistics (Eurostat 2019; retrieved on November 29, 2019) and the European Innovation Scoreboard 2017 (The European Innovation Scoreboard 2017 provides statistical information covering 2016).

The comparative analysis of the European Union countries, in terms of barriers to innovation activities, was based on 6 indicators determining the percentage of innovative enterprises indicating high importance of (in a four-point grading scale: 1 – high, 2 – medium, 3 – low, 4 – irrelevant):

– cost barriers (% of innovative enterprises):

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C<sub>1</sub> – lack of internal finance,

C<sub>2</sub> – lack of external finance (credit or private equity),

C<sub>3</sub> – high costs,

C<sub>4</sub> – difficulties in obtaining public grants or subsidies;

– knowledge-related barriers (% of innovative enterprises):

K<sub>1</sub> – lack of qualified employees within enterprise,

K<sub>2</sub> – lack of collaboration partners;

– market barriers (% of innovative enterprises):

M<sub>1</sub> – uncertain market demand,  
M<sub>2</sub> – high competition.

To determine the profiles of developed classes covering the EU countries, the Summary Innovation Index (SII) and 10 indicators describing the dimensions of innovation processes according to the European Innovation Scoreboard 2017 were used: Human resources, Research systems, Innovation-friendly environment, Finance and support, Firm investments, Innovators, Linkages, Intellectual assets, Employment impacts and Sales impacts (*European..., 2017*).

The time range of the research covers 2016 and the spatial scope includes 22 countries of the European Union. Denmark, Ireland, United Kingdom, Sweden, Netherlands, Spain are not included in the research due to the total unavailability of statistical information. In the case of Czechia and France the data were partially unavailable, which was supplemented using the step regression method.

The research was carried out in accordance with the adopted research scheme:

Stage I of the research – detailed analysis of barriers to innovation activities in the individual EU countries.

1. Identification of 3 key barriers to innovation activities within the individual EU countries and seeking general regularities in this respect.
2. Identification of the dominant indications identifying barriers to innovation activities in the cross-section of the EU countries (analysis of the distribution of indicator values regarding the “difficulties” in innovation development).
3. Identification of outliers among the EU countries in terms of the indicated barriers to innovation activities using box plot.

Stage II of the research – identification of the EU countries with similar indications of the innovative enterprises for barriers to innovation activities of high importance.

1. Classification of the EU countries in terms of the revealed barriers to innovation activities. The output statistical information regarding barriers to innovation processes was subjected to classical standardization, the distances between countries were determined using the Euclidean squared distance, then Ward’s hierarchical agglomerative clustering method. The criterion of the first clear increase in agglomeration distance was used to determine the number of classes by analysing the dendrogram of connections, the integration distances and the classification stages. The description of classification methods is presented in the following studies: Ward (1963), Johnson (1967), Anderberg (1973), Hartigan (1975), Sneath, Sokal (1973), Aldefender Blashfield (1984), Basiura, Sokołowski (2007).
2. Typology of the developed classes covering the EU countries using the *Summary Innovation Index* (SII) and the indicators representing 10 dimensions of innovation in accordance with the European Innovation Scoreboard 2017 (*European ..., 2017*) as the profile variables.

## Results of Empirical Research

### *The leading, peripheral and key barriers to innovation activities in the environment of innovative enterprises*

Table 1 presents the key barriers to innovation activities, listed at three initial positions, in terms of the highest percentage of indications related to high importance of a specific factor in a given country. In 8 countries only cost barriers were indicated in all positions. In the next group (10 countries), two cost factors were included among the key barriers. In Luxembourg and Malta, among the key barriers only one cost factor was identified, in the second and third position, respectively – lack of internal finance (C<sub>1</sub>) and high costs (C<sub>3</sub>). In Italy and Lithuania, none of the cost barriers were listed among the three most frequently identified obstacles to innovation activities. Italian enterprises were mainly struggling with external barriers (2 market factors). In turn, in Lithuania, the biggest concerns are raised by the knowledge-related factors (K<sub>1</sub> and K<sub>2</sub>).

**Table 1: Key factors hampering enterprise innovation activities in the individual EU countries**

No.	Types of key barriers to innovation activities	Countries	Ranking position of the key barriers (% of innovative enterprises' indications)		
			1	2	3
1.	Three cost barriers (8 countries)	Bulgaria	C <sub>3</sub> (27,0)	C <sub>4</sub> (23,0)	C <sub>1</sub> (21,1)
		Greece	C <sub>1</sub> (35,9)	C <sub>4</sub> (34,0)	C <sub>2</sub> (32,0)
		France	C <sub>1</sub> (24,7)	C <sub>4</sub> (21,5)	C <sub>3</sub> (18,1)
		Croatia	C <sub>1</sub> (35,5)	C <sub>3</sub> (31,1)	C <sub>4</sub> (29,4)
		Latvia	C <sub>3</sub> (30,0)	C <sub>1</sub> (23,8)	C <sub>4</sub> (21,6)
		Poland	C <sub>3</sub> (26,3)	C <sub>1</sub> (19,3)	C <sub>4</sub> (18,4)
		Romania	C <sub>3</sub> (28,6)	C <sub>1</sub> (24,8)	C <sub>4</sub> (21,6)
		Slovakia	C <sub>1</sub> (29,0)	C <sub>3</sub> (25,9)	C <sub>4</sub> (22,1)
2.	Two cost barriers (10 countries)	Belgium	C <sub>3</sub> (14,1)	K <sub>1</sub> (13,3)	C <sub>1</sub> (11,6)
		Czechia	C <sub>3</sub> (21,3)	C <sub>1</sub> (20,0)	M <sub>2</sub> (17,1)
		Germany	C <sub>3</sub> (19,9)	K <sub>1</sub> (14,2)	C <sub>1</sub> (12,1)
		Estonia	C <sub>3</sub> (19,9)	C <sub>1</sub> (16,5)	K <sub>1</sub> (15,9)
		Cyprus	M <sub>2</sub> (47,3)	C <sub>3</sub> (36,1)	C <sub>1</sub> (35,2)
		Hungary	C <sub>3</sub> (26,8)	C <sub>4</sub> (24,1)	K <sub>1</sub> (22,0)
		Austria	K <sub>1</sub> (25,2)	C <sub>4</sub> (20,4)	C <sub>1</sub> (20,2)
		Portugal	C <sub>3</sub> (30,8)	M <sub>2</sub> (25,3)	C <sub>1</sub> (23,8)
		Slovenia	C <sub>1</sub> (40,1)	K <sub>1</sub> (33,1)	C <sub>3</sub> (30,3)
		Finland	C <sub>1</sub> (14,3)	C <sub>3</sub> (12,2)	K <sub>1</sub> (12,0)
3.	One cost barrier (2 countries)	Luxembourg	M <sub>2</sub> (14,0)	C <sub>1</sub> (12,6)	K <sub>1</sub> (12,5)
		Malta	M <sub>2</sub> (19,8)	K <sub>1</sub> (16,6)	C <sub>3</sub> (14,9)
4.	Non-cost barriers (2 countries)	Italy	M <sub>1</sub> (26,7)	K <sub>1</sub> (21,2)	M <sub>2</sub> (20,2)
		Lithuania	K <sub>2</sub> (30,9)	K <sub>1</sub> (26,6)	M <sub>1</sub> (26,4)

Source: authors' compilation based on the Eurostat database.

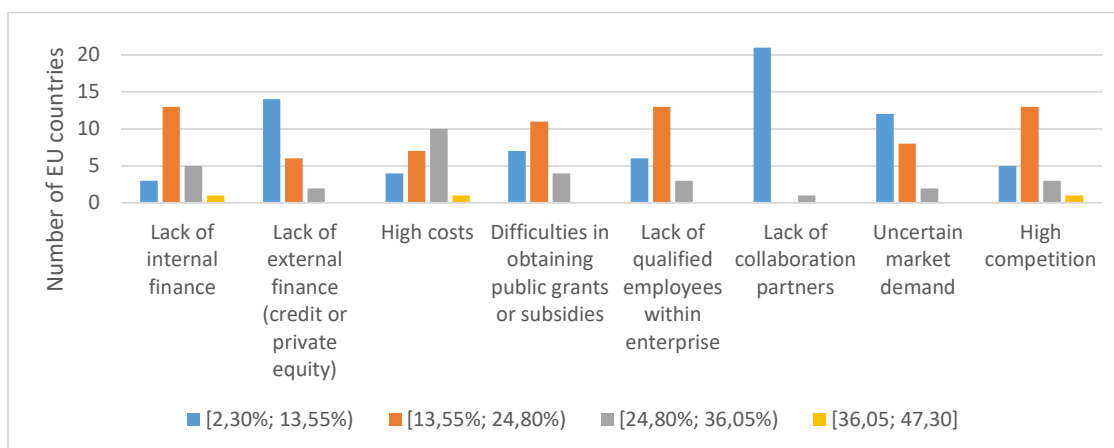
Table 2 and Fig. 1 present the distribution of indications identified by the innovative enterprises regarding the individual barriers hampering innovation activity in the EU countries. Their analysis shows that a very high percentage of enterprises – [36,05%; 47,30%) – indicating the same significant barriers refers to individual countries. A different situation is observed in the case of high percentage of indications – [24,8%; 36,05%) – which groups as many as 10 countries under the high costs factor (C<sub>3</sub>). In this perspective, it can be adopted that the extensively high costs of innovation activities are – in general – the most often recognized obstacle to innovation in the EU countries.

The identification of outliers among the EU countries regarding the indicated barriers to innovation activities using box plot was the next step of the conducted analysis. Fig. 2 presents the descriptive parameter values of individual indicators determining the percentage of enterprises' indications identifying particular barriers to innovation processes. Lithuania and Cyprus turned out to be the outliers, definitely standing out from the others. As many as 30,90% of the Lithuanian innovative enterprises point to the lack of collaboration partners (K<sub>2</sub>) as a highly significant barrier, whereas the median of indications to this factor in the EU countries is only 6,2%, and the minimum value amounts to 2,30% (Finland). In the case of Cyprus, an unusually high percentage of responses (47,30) refers to high competition (M<sub>2</sub>). The median for this innovation barrier in the EU countries reaches 19,30% and the minimum value presents the level of 7,60% (Belgium).

**Table 2: The distribution of indications to barriers hampering innovation activities of enterprises in the European Union (number and percentage of countries)**

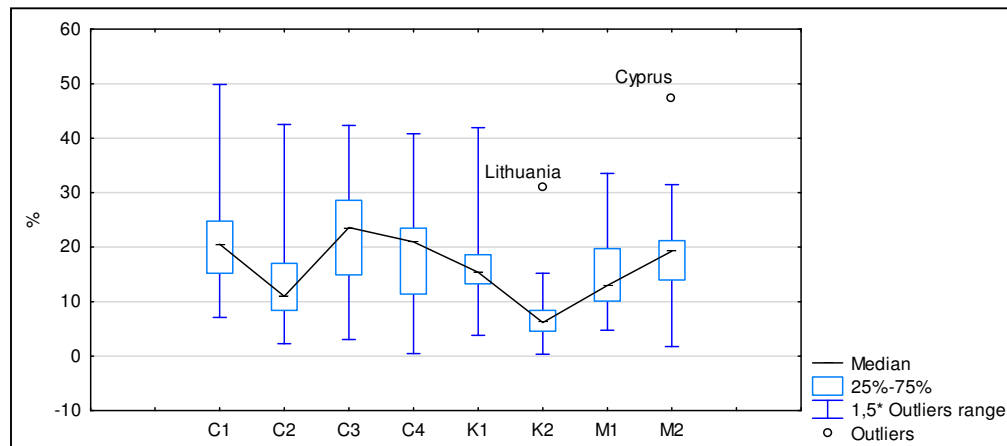
No.	% of innovative enterprises' indications	Barriers to innovation activities							
		C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	K <sub>1</sub>	K <sub>2</sub>	M <sub>1</sub>	M <sub>2</sub>
1.	Low [2,3; 13,55)	3 (13,6%)	14 (63,6%)	4 (18,2%)	7 (31,8%)	6 (27,3%)	21 (95,5%)	12 (54,5%)	5 (22,7%)
2.	Medium [13,55; 24,80)	13 (59,1%)	6 (27,3%)	7 (31,8%)	11 (50%)	13 (59,1%)	0 (0%)	8 (36,4%)	13 (59,1%)
3.	High [24,80; 36,05)	5 (22,7%)	2 (9,1%)	10 (45,5%)	4 (18,2%)	3 (13,6%)	1 (4,5%)	2 (9,1%)	3 (13,6%)
4.	Very high [36,05; 47,3]	1 (4,5%)	0 (0%)	1 (4,5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (4,5%)
Total		22 (100%)	22 (100%)	22 (100%)	22 (100%)	22 (100%)	22 (100%)	22 (100%)	22 (100%)

Source: authors' compilation based on the Eurostat database.



**Fig. 1: The histograms of innovative enterprises' indications identifying significant barriers to innovation activities in the European Union countries**

Source: authors' compilation based on the Eurostat database.



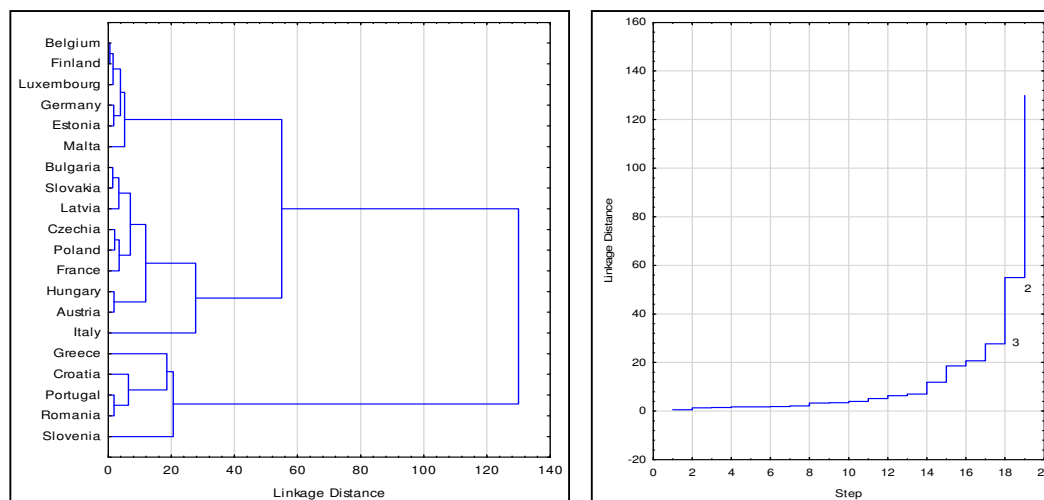
**Fig. 2: Box plot for barriers hampering innovation activities (% of indications to a given barrier by innovative enterprises)**

Source: authors' compilation based on the Eurostat database.

The identification of outliers completes the first research stage, simultaneously commencing further analyses addressing the separation of the relatively homogeneous classes covering the EU countries in terms of barriers to innovation activities indicated by the innovative enterprises.

***Classification of the European Union countries in terms of barriers to innovation activities of high importance for innovative enterprises***

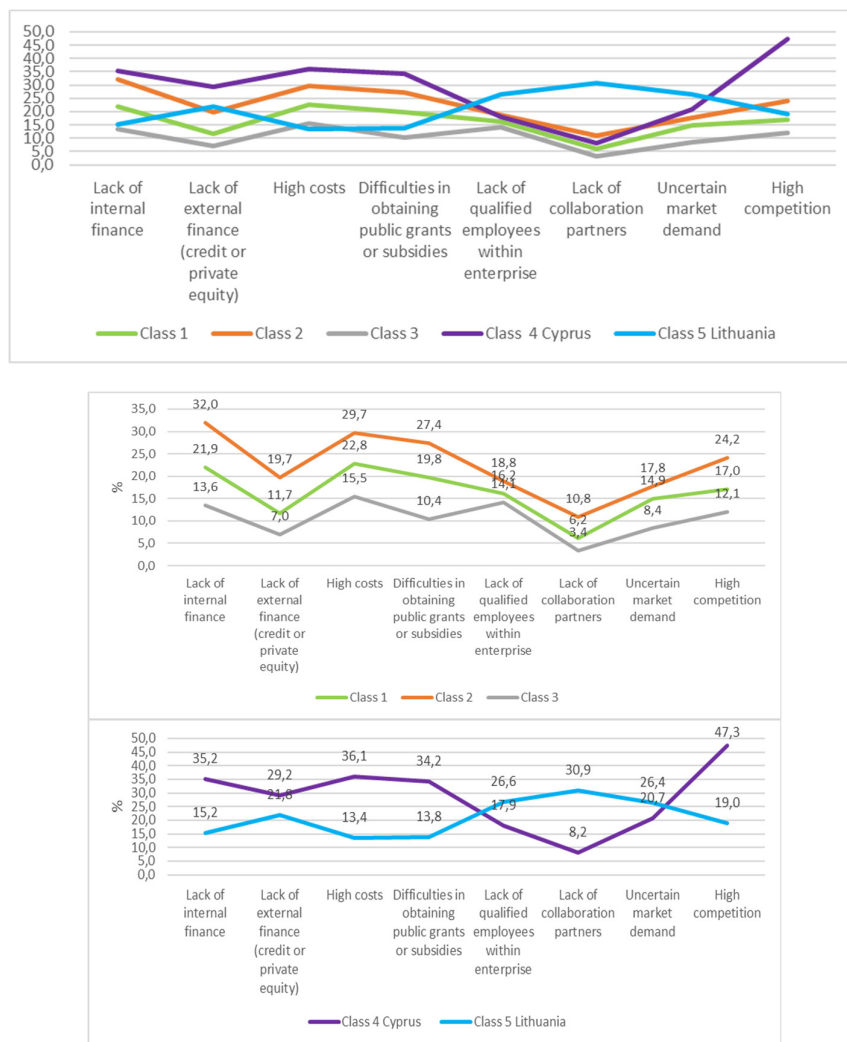
As a result of identifying the outliers regarding the indicated barriers to innovation activities by the innovative enterprises, it was decided that Cyprus and Lithuania will constitute specific one-element classes. Other European Union countries were subject to Ward's classification. Fig. 3 illustrates the results of the hierarchical classification covering 20 EU countries using spanning trees and integration distance diagrams with regard to classification stages. On its basis, a decision was made to separate 3 relatively homogeneous classes of countries.



**Fig. 3: Dendrogram of connections, integration distances and classification stages using Ward's method for the EU countries**

Source: authors' compilation based on the Eurostat database using STATISTICA 13.1 statistical package

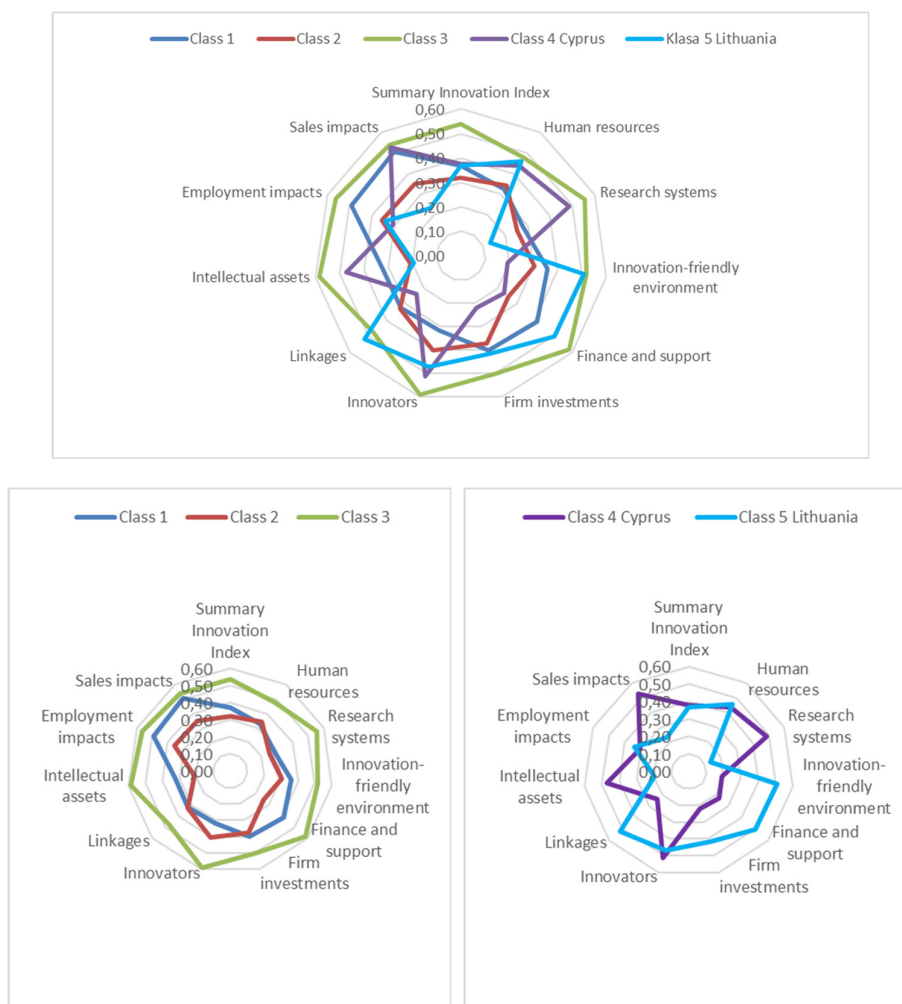
Fig. 4 presents the average values of innovative enterprises' indications as barriers to innovation activities, and Fig. 5 the average values of the Summary Innovation Index and the dimensions of innovation in accordance with EIS 2017 for each of the identified classes of the European Union countries. Table 3 presents the composition and profiles of the received classes.



**Fig. 4: Average values of innovative enterprises' indications to barriers of innovation activities in the individual classes of European Union countries**

Source: authors' compilation based on the Eurostat database





**Fig. 5: Class profiles of the EU countries according to the Summary Innovation Index and the innovation dimensions in line with EIS 2017 (average values in individual classes of the European Union countries).**

Source: authors' compilation based on the Eurostat database

**Table 3: Classification of the European Union countries in terms of the intensity of barriers to innovation activities and class profiles according to the Summary Innovation Index and the dimensions of innovation**

Class number	Class characteristics (intensity of barriers to innovation activities)	Class composition	Class profile
1.	Average	Bulgaria, Czechia, France, Italy, Latvia, Hungary, Austria, Poland, Slovakia	The lowest values in Human Resources and Innovators dimensions
2.	High	Greece, Croatia, Slovenia, Portugal, Romania	The lowest value of the Summary Innovation Index (SII)
3.	Low	Belgium, Germany, Estonia, Luxembourg, Malta, Finland	The highest values in all innovation dimensions (except Linkages)
4.	Very high for barriers:	Cyprus	The lowest values in the following

	high competition (M <sub>2</sub> ) and cost (C <sub>1</sub> , C <sub>2</sub> , C <sub>3</sub> , C <sub>4</sub> )		dimensions: Innovation-friendly environment, Finance and support, Firm investments, Linkages, Employment impact
5.	Very high for barriers: lack of collaboration partners (K <sub>2</sub> ) and lack of qualified employees within enterprise (K <sub>1</sub> )	Lithuania	The lowest values in the following dimensions: Research system, Intellectual Assets, Sales impact

Source: authors' compilation based on the Eurostat database.

The intensity of barriers to innovation activities, measured by the percentage of enterprises' indications identifying barriers to high-profile innovation processes, distinguishes three relatively homogeneous classes of countries and two outlier one-element classes. Within the framework of multi-element classes, the best climate for innovation is present in Belgium, Germany, Estonia, Luxembourg, Malta and Finland. The enterprises operating in these countries (class 3) are the least likely to encounter cost, market and knowledge-related difficulties in their activities focused on implementing innovations (reference base – classes 1 and 2; Fig. 4). This situation translates into the highest average value of the Summary Innovation Index in class 3, as well as the components of this indicator (the highest values in all dimensions of innovation in classes 1– 3, and also 1– 5 except Linkages; Fig. 5). Completely different observations refer to Greece, Croatia, Slovenia, Portugal and Romania (class 2). A group of these countries is assigned the lowest average value of the Summary Innovation Index (Fig. 5), and their enterprises most often face the analysed difficulties (reference base – classes 1 and 3, Fig. 4). It can be adopted that these difficulties result in an incomplete implementation of the new or significantly improved solutions, which explains low SII value. The second position in terms of the average Summary Innovation Index value is taken by the countries grouped in class 1 (Bulgaria, Czechia, France, Italy, Latvia, Hungary, Austria, Poland, Slovakia), which seems to result from the average intensity of barriers to innovation activities (Fig. 5). In this class profile, the lowest values of both Human Resources and Innovators dimensions – SII components are worth highlighting. Cyprus and Lithuania were outside the identified classes (1–3). The specificity of Cyprus (class 4) is manifested in the highest percentage of indications – against the background of other classes (1–3 and 5) – to the factors hampering innovation activities of cost nature and also to high competition barriers (Fig. 4). The aforementioned obstacles definitely have impact on such SII components as innovation-friendly environment as well as finance and support (the lowest values in 1–5 classes). Another peculiarity can be observed in the case of Lithuania (class 5). An unusually high percentage of enterprises indicating knowledge-related barriers to innovation activities should be noted (Fig. 4) while referring Lithuania to other classes, which seems to correlate with the lowest, among the distinguished classes, values of SII components in the dimensions of research system and intellectual assets.

## Discussion and conclusions

Summing up the conducted research, it is worth noting that:

- the key barriers to innovation activities, identified based on the percentage of innovative enterprises' indications to high importance of specific barriers (top 3 positions), are associated with cost factors; among the 3 most important barriers to innovation activities, 3 or 2 cost barriers are listed in 8 and 10 EU countries, respectively, and, in addition, the high costs barrier groups as many as 10 countries presenting high indication percentage of all enterprises in the range [24,8%; 36,05%],
- the intensity of revealed barriers to innovation activities, measured by the percentage of enterprises' indications to the specific types of obstacles, translates into the value of the Summary Innovation Index and its components; in general, it can be adopted that the smaller the percentage of enterprises indicating difficulties in innovation activities of cost, market or knowledge-related nature, the higher the value of SII and its components,
- among the EU countries covered by the analysis, in terms of SII, the leading position is taken by the countries grouped in class 1 (Belgium, Germany, Estonia, Luxembourg, Malta, Finland), where the enterprises – generalizing – come across the difficulties in innovation processes the least often,

- the outliers in terms of the distribution of the indications' percentage to individual barriers of innovation activities (Cyprus, Lithuania) are characterised by a similar level of SII as the ones grouped in class 1 (average intensity of difficulties in innovation activities), which seems to be confirmed by their effectiveness in overcoming the revealed barriers to innovations.

The conducted research should be taken into account in the future assumptions of the European Union innovation policy. Their results reveal the key directions of the actions aimed at improving the climate for innovation. The need to reduce the impact of cost factors is of particular importance. Solving this problem may result in the intensification of innovation oriented processes.

## Acknowledgements

The project is financed by the Ministry of Science and Higher Education in Poland under the programme "Regional Initiative of Excellence" 2019-2022 project number 015/RID/2018/19 total funding amount 10 721 040,00 PLN.

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