

## ECO-INNOVATIONS, THEIR IMPACT AND IMPORTANCE ON THE SLOVAK ECONOMY

Martina JAKUBČINOVÁ

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### *Abstract*

*Eco-innovation is one of the important elements of today's eco-global revolution. They are an important tool for demonstrating progress and sustainable development of society. They have an undeniable impact in achieving a healthy balance of sustainable development in the modern global economy as well as in regional economies. This paper aims to identify the key aspects and position of eco-innovation in the SR environment. In addition to the theoretical background of the knowledge of eco-innovation policy, the focus will be on explaining the current status and results in the application of innovation policy. The research is based on standard metrics, analysis of the state of development of eco-innovation and the use of eco-innovation policy instruments in Slovakia. The paper highlights the importance of eco-innovation for the success of the economy.*

### **Key words:**

*eco-innovation, economic, performance, transformation, trends*

**JEL Classification** O30, O44, P27

<https://doi.org/10.52665/ser20230203>

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### INTRODUCTION

The need for eco-innovation is one of the most discussed issues today. Eco-innovation can be seen as a natural necessity for the superstructure of innovation policy. Companies and communities are discussing the issue of eco-innovation not only at a professional level, but also at a lay level. The professional community is aware that sustainable growth and development cannot be achieved without the environmental aspect of processes, practices, and technologies. The lay public is aware that changing lifestyle and respecting the needs of nature are essential for survival and increasing quality of life. Therefore, there is no doubt that eco-revolution in the form of eco-innovation is present everywhere. The turbulent socio-economic changes we are experiencing place eco-revolution, together with the concept of Smart Infrastructure and Industry 4.0, among the non-negotiables of economic growth and development. Solutions require a serious, responsible, and informed approach so that the effects and benefits can be felt by present and future generations. The actors who are driving the wave of eco-innovation, i.e., a responsible approach to innovation, are the State, business, and the public. Of the links that emerge between

these actors, the most significant is the producer-consumer link and the resulting corporate social responsibility.

The ambition of this article is not to provide an exhaustive picture of the eco-innovation status, but to identify trends in the field of eco-innovation, to analyse the current status and to highlight the impact of eco-innovation in relation to the economy. Here we would like to focus on identifying the impact and linkages of eco-innovation and eco-innovation policy on the Slovak economy. There are two reasons for formulating the objectives. The first reason is to identify developments, trends and manifestations that are currently demanded and promoted in the field of eco-innovation. The second reason is to identify the impact that eco-innovation has on the economy. For this reason, the first part of the article maps the views of the professional public and intentions related to the phenomenon of eco-innovation. The second part of the article presents a methodological approach to the design, collection and conduct of the research. The third part of the article is a discussion of the results. In the final part of the article, we present and formulate recommendations for practice or further research on the subject.

## LITERATURE OVERVIEW

The theoretical concept of eco-innovation has begun to permeate social science research since the beginning of the first decade of the 21st century (Platon et al., 2023; Al-Shami, Rashid, 2022; Pichlak, 2021). It has outlined a vision for policy makers, regional and global, to follow while maintaining the comfort to which society is accustomed (Tomashuk, Baldynyuk, 2023; Yunzhao, 2022). It is the actors at the local and global level, among which we include the European Union, that are expected to significantly change their behavior and approach to 'external' needs. These have so far been inadequately or marginally addressed, without a deeper sophisticated dimension.

The concept of eco-innovation is based on changes that include a systemic transformation of the way goods and services are produced, distributed, and consumed, i.e., patterns of production, trade and consumption behavior (Hojnik et al. 2023; Westman, Moores, & Burch, 2021; Pan, Sinha, & Chen, 2020). Thus, it is the modification of processes, systems, techniques, and schemes of technical and organizational characteristics of the production of goods and services in synergy with the environment. Respecting environmental needs and addressing environmental issues are prerequisites leading to achieving a faster rate of economic growth, eliminating environmental destruction, and building a prosperous modern society (Hajdukiewicz, Pera, 2023; Kowalska, Bieniek, 2022).

However, it should be noted that the introduction of eco-innovation needs to be seen as a complex endeavor requiring new approaches, knowledge, and skills. Compared to conventional innovation, society is expected to adopt a new eco-conscious mindset, taking into account not only economic gains but also environmental needs. The knowledge base is thus changing its form and nature, which is a fundamental difference between the concept of eco-innovation and innovation in the classical format.

Ahmad and Wu (2022), Jermittiparsert (2021) and Chien et al. (2021) report a positive correlation between eco-innovation and economic growth, sustainable economic development, and high technological progress in

their findings. This finding supports the trend that Europe and the world needs to follow. It also supports the visions and intentions that the leaders of the world's stable economies, grouped together in the OECD or the EU, are ambitiously pursuing in the context of community policy.

The European Union's policies and ambitions place the issue of a climate-neutral economy and a green economy (Febregue, 2023; Auzina, Zvirbule, Lamberga, 2022; Terzic, 2022) at the top of its agenda. The promotion of eco-innovation and eco-innovation policies is one of its priority themes. In the context of achieving the objectives of the European Green Deal, they significantly contribute to the transition and the fulfilment of the commitment related to the achievement of a climate-neutral circular economy.

The transition to a carbon-neutral and sustainable economy (Mentes, 2023; Hedberg, Šipka, 2022) can be described as the most ambitious goal of the community in its history. Within the production of products and services, it calls on States to streamline processes that respect environmental value (Loučanová, Olšáková, Štofková, 2022). The impacts of the dominant classical industrial production, in synergy with the persistent trend of consumer behavior and the lack of flexibility of institutional capacities, clearly show the harmfulness and damage that society causes and transmits to the next generation. Therefore, the concept of eco-innovation and eco-innovation activities appears as a way out of the current stalemate.

Eco-innovation activity and the effects of eco-innovation application on the basis of regular evaluation can be monitored, compared and assessed through a number of indexes.

Measuring the success and effects of eco-innovation application (environmental indicators and indexes) in specific settings are indicators of EU Member States' performance in environmental innovation (Kemp, 2019), while the European Eco-Innovation Scoreboard quantifies an eco-innovation index. Based on the results, one of three conclusions can be drawn, i.e. whether a country is an eco-innovation leader, an average country or a catching-up country (MoEYS, 2018; MoEYS, 2021; European Commission, 2021).

As the literature analysis shows, there are several perspectives on the issue of eco-innovation. These can be assessed and qualified in several ways. National and international perspectives lead to a reflection on policy and environmental needs. Therefore, the purpose of this article is to identify and evaluate the impact of eco-innovation policy on the economy.

**GOAL AND METHODOLOGY**

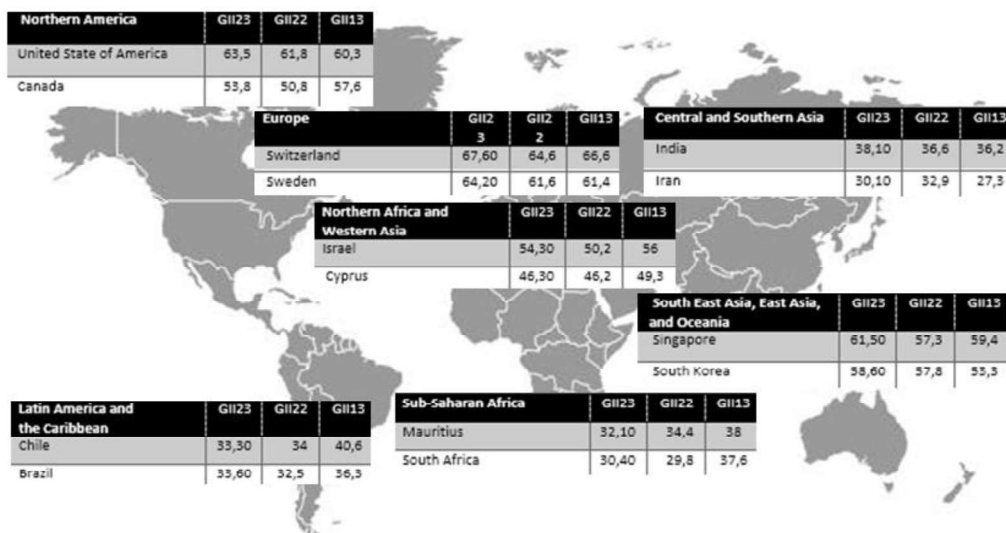
For the purpose of this output, sources meeting the criteria of timeliness, uniqueness, credibility, and quality of content were used. Studies published in reputed database platforms and data recorded in statistical database platforms formed the basis. The basis of the analysis was statistical data collected through the Global Innovation Index (GII) and the European Innovation Index (EII). This was motivated by the fact that the innovative nature of processes, as measured by innovation performance indexes, is essential to achieve economic growth and economic development. The choice of indicators

was based on the need to fulfil the objective and the need to clarify interlinkages. The scope consisted of EU Member States. The analysis focused in depth on a selected country of the "Eco-Innovation Catching-up group" category, namely Slovakia. The period covered is 2013 to 2023 (the latest year of data availability). Socio-economic outcomes of eco-innovations were a priority area of investigation.

**FINDINGS**

In assessing and capturing global innovation trends, we can conclude that innovation is transforming the world and the global economy. The current direction leads to reflect not only on investment efficiency and assess the pace of technological progress. Increasingly, attention is beginning to focus on assessing socio-economic impacts, trends, and the achievement of global values. Global innovation trends (Fig. 1.) and their impact on the socio-economic situation are portrayed through several indexes.

Fig. 1: Global leaders in innovation



Source: own processing according to the data of GII (2023,2022,2013)

Through GII, it is possible to identify strengths and weaknesses of innovation, monitor trends and make or draw concrete conclusions.

The GII tracks 81 indicators grouped into 7 categories (Business and Market Sophistication, Infrastructure, Human Capital, and Research,

Institution, Creative and Knowledge-Technology Outputs).

innovation uptake across countries and years (Tab. 1.).

On the basis of the observed results, we can see considerable diversity in the level of

Tab. 1: Global Innovation Index in 2013-2023

	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013
<b>Europe</b>											
Mean	44,53	42,96	45,02	44,66	46,42	47,12	47,09	46,95	47,84	47,30	47,57
Median	44,80	42,10	44,20	43,50	45,30	46,90	46,10	46,50	46,40	45,70	47,30
Maximum	67,60	64,60	65,50	66,10	67,20	68,40	67,70	66,30	68,30	64,80	66,60
Minimum	25,40	24,40	28,00	27,10	30,30	29,90	28,40	29,60	30,50	30,50	30,90
Standard Deviation	11,527	10,754	9,738	9,768	9,727	9,921	10,094	10,078	9,680	9,333	9,108
Coefficient of Variation	3,863	3,995	4,624	4,572	4,772	4,750	4,665	4,658	4,942	5,068	5,223
Skew	0,174	0,223	0,263	0,288	0,295	0,153	0,103	0,114	0,325	0,159	0,204
<b>Northern America</b>											
Mean	58,65	56,30	57,20	56,45	57,80	56,55	57,55	58,05	57,90	58,10	58,95
Median	58,65	56,30	57,20	56,45	57,80	56,55	57,55	58,05	57,90	58,10	58,95
Maximum	63,50	61,80	61,30	60,60	61,70	60,10	61,40	61,40	60,10	60,10	60,30
Minimum	53,80	50,80	53,10	52,30	53,90	53,00	53,70	54,70	55,70	56,10	57,60
Standard Deviation	6,859	7,778	5,798	5,869	5,515	5,020	5,445	4,738	3,111	2,828	1,909
Coefficient of Variation	1,180	1,217	1,154	1,159	1,145	1,134	1,143	1,122	1,079	1,071	1,047
<b>Latin America and the Caribbean</b>											
Mean	28,90	28,40	29,84	28,44	31,46	30,83	31,24	30,53	33,10	31,33	35,37
Median	27,40	28,15	29,70	28,90	31,50	31,80	31,60	30,40	32,55	32,35	34,40
Maximum	33,60	34,00	35,10	33,90	36,60	37,80	38,70	38,40	41,20	40,60	40,60
Minimum	21,40	20,30	23,40	22,40	24,80	22,90	25,60	22,30	22,80	20,30	27,30
Standard Deviation	5,412	5,226	4,263	3,955	4,639	4,506	4,491	4,999	5,385	5,517	4,358
Coefficient of Variation	1,304	0,983	1,068	1,088	1,052	1,026	1,449	1,120	1,078	1,072	1,089
<b>South East Asia, East Asia, and Oceania</b>											
Mean	40,47	39,04	41,24	40,72	43,97	44,50	44,03	44,59	45,41	45,04	43,90
Median	39,00	36,80	39,55	39,75	42,70	45,60	42,70	47,00	46,75	46,10	44,70
Maximum	61,50	57,80	59,30	56,60	58,40	59,80	58,70	59,10	59,40	59,20	59,40
Minimum	18,30	17,40	20,20	20,60	26,60	28,70	27,10	27,90	29,80	29,90	28,10
Standard Deviation	14,104	13,923	12,850	12,335	10,827	10,652	10,973	11,451	11,077	10,615	10,875
Coefficient of Variation	2,957	2,795	2,535	2,633	2,195	2,084	2,166	2,118	1,954	1,980	2,114
Skew	-0,061	-0,043	-0,126	-0,226	-0,107	-0,081	-0,100	-0,198	-0,209	-0,152	0,067
<b>Central and Southern Asia</b>											
Mean	24,52	24,39	26,59	25,71	28,77	27,82	25,31	27,70	27,35	27,05	28,04
Median	21,75	23,60	24,80	24,45	28,40	26,50	23,80	28,90	27,75	25,65	27,15
Maximum	38,10	36,60	36,40	35,60	36,60	35,20	35,50	33,60	32,70	33,70	36,20
Minimum	18,30	17,60	20,20	20,40	23,30	23,10	17,90	22,60	21,10	23,70	23,30
Standard Deviation	6,100	6,097	4,910	4,630	4,473	4,559	5,933	4,086	3,932	3,713	4,232
Coefficient of Variation	2,027	2,080	1,618	1,459	1,470	1,479	1,467	1,455	1,550	1,416	1,448
Skew	1,286	1,108	0,977	1,236	0,715	0,581	0,616	-0,120	-0,127	0,993	0,761
<b>Northern Africa and Western Asia</b>											
Mean	31,44	30,96	32,41	32,11	34,65	35,74	32,36	34,91	36,08	36,63	37,07
Median	28,40	28,00	30,30	29,90	32,90	34,85	31,75	33,75	34,40	35,65	36,05
Maximum	54,30	50,20	53,40	53,50	57,40	56,80	53,90	52,30	53,50	55,50	56,00
Minimum	28,40	28,00	30,30	29,90	32,90	34,85	31,75	33,75	34,40	35,65	36,05
Standard Deviation	9,203	8,777	8,166	8,279	7,904	7,455	9,187	6,708	6,304	6,989	7,604
Coefficient of Variation	2,244	2,211	2,127	2,211	2,087	1,893	2,073	2,012	1,851	1,850	1,965
Skew	1,013	0,818	1,279	1,203	1,691	1,400	0,797	1,033	0,956	1,007	0,678
<b>Sub-Saharan Africa</b>											
Mean	18,04	17,82	21,98	26,61	24,24	24,81	24,91	25,29	27,02	27,67	27,59
Median	16,70	15,80	20,30	25,40	24,00	24,50	24,10	24,80	27,75	27,50	26,70
Maximum	32,10	34,40	35,20	45,80	34,00	35,10	35,80	35,90	39,20	40,90	38,00
Minimum	10,30	11,60	15,00	17,30	17,60	18,90	17,40	17,20	18,40	17,60	23,00
Standard Deviation	5,253	5,176	4,580	7,844	4,134	4,097	4,694	4,887	4,987	4,797	4,024
Coefficient of Variation	2,112	2,278	1,787	2,290	1,280	1,315	1,540	1,575	1,410	1,487	1,479
Skew	1,082	1,744	1,389	1,087	0,397	0,619	0,771	0,514	0,377	0,731	1,178

Source: own processing

So far, Switzerland achieved the highest score for innovation uptake across Europe in 2018 (GII = 68.4). Switzerland is a leader in innovation. For the last 11 years, it has been unrivalled in the top position in the GII ranking. Among the countries belonging to the European Union, the Scandinavian countries (Sweden, Finland, Denmark) are among the leaders. Among the V4 countries, the Czech Republic has the best approach to innovation and is the only country in this group to be ranked in the category „Performance in line with level of development“. Slovakia's ranking is unflattering.

Despite the ambitions and assumptions, it presents, it is on the tail of the European countries. Compared to 2013, the value of the current GII has dropped by 6 points.

Based on the results, we conclude that countries are showing interest in introducing innovations. The promotion of cooperation between industry and scientific research institutions, including universities, is one of the manifestations that are the pillars of innovation policy. A natural in this direction is the increase in spending in science and research (Tab. 2.).

Tab. 2: Science and innovation investments 2021

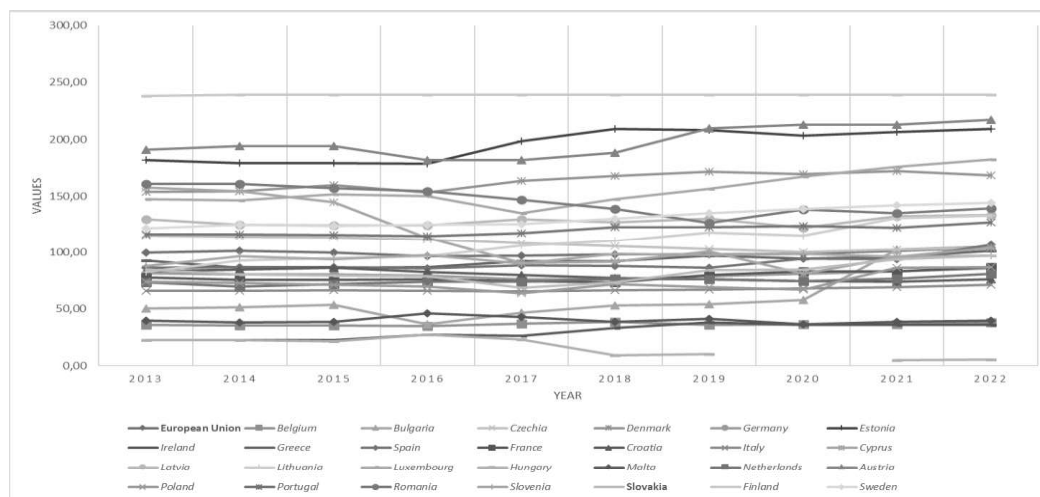
	Scientific publications	R&D expenditures	International patent filings	Venture capital deals	Venture capital value
Short term 2020 - 2021	8,3 %	3,3%	0,9%	46%	125,5%
Long term 2022-2021	5,7%	4,6%	4,3%	7,3%	23,6%

Source: WIPO (2022)

The specific of European dimension of innovation is to emphasize the environmental needs, sustainability, equity and improving the quality of life of society. The European strategy (Fig. 2.) leads to a modern digital economy dominated by smart solutions and the creation of a functional eco-innovation system in response to the needs of the global market. Among the leaders in eco-innovation are Luxembourg (EII -

179), Finland (EII -178) and Austria (EII - 173). These countries emphasize the need to respect environmental laws and necessities. Within the eco-innovation character of the policy, the results are much more positive in the case of Slovakia (EII - 94), but also in this case the Czech Republic (EII -110) is ranked higher and in a higher category.

Fig. 2: ECO-Innovation performance of the EU Members States in 2013-2022



Source: own processing according to the data of own by EC (2022)

One conclusion is that there are many new opportunities. These opportunities are about understanding and the need for synergy of economic and social goals and objectives. However, the results show that it is the social impact of innovation that has remained at a low level of attention for a long time. There is a need to deepen the linkages and the potential relating to hard and soft infrastructure. To sophisticate services and production by eliminating negative environmental, social and economic impacts. To promote the development of human resources and knowledge through institutions reflecting

new global needs and demands. To set policy objectives and targets to support and promote the idea of eco-innovation.

On the basis of the results, we can classify Europe as a global innovation hub. The innovation performance of the European Union countries shows a positive trend. Compared to previous years, there is a positive realignment of countries from lower to higher categories (Tab. 3.). More and more countries are catching up with the innovation leaders. In synergy with this, the value of EIIs is increasing.

Tab. 3: ECO-Innovation index of the EU Members States in 2013-2022

Category	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
European Union	100,00	103,52	105,33	106,16	107,94	109,44	111,05	112,39	115,84	121,47
Belgium	75,91	82,88	82,24	87,39	88,05	90,53	91,15	93,37	94,35	99,78
Bulgaria	25,18	29,42	31,65	29,52	30,60	36,94	39,13	44,41	55,85	57,73
Czechia	92,61	93,46	97,91	103,23	98,85	100,39	103,65	104,86	109,86	110,98
Denmark	151,84	159,14	158,30	155,34	158,41	156,50	157,40	164,11	160,93	167,49
Germany	109,83	113,43	115,90	120,16	121,85	123,16	128,37	130,93	135,76	141,18
Estonia	98,59	89,93	96,53	98,32	109,50	98,79	98,65	106,80	111,65	115,52
Ireland	77,28	78,38	82,84	87,63	98,89	101,26	100,44	100,26	100,82	110,39
Greece	55,94	60,59	70,30	69,10	76,62	73,10	92,07	85,77	93,32	101,59
Spain	104,47	106,29	105,62	104,55	105,04	107,65	106,56	108,56	112,88	116,43
France	109,58	109,07	111,89	113,62	117,72	116,09	122,33	125,06	124,64	130,65
Croatia	64,16	71,37	72,68	73,30	73,92	75,74	79,01	83,27	86,10	88,81
Italy	102,55	109,20	115,04	119,02	118,65	127,06	117,72	121,57	125,31	129,39
Cyprus	68,30	68,16	65,39	70,31	73,70	73,62	85,98	78,23	93,26	94,65
Latvia	80,06	81,25	87,35	95,80	99,44	97,75	97,80	97,15	102,07	105,37
Lithuania	66,24	71,09	73,13	78,46	85,48	81,73	87,79	92,77	98,48	103,75
Luxembourg	150,74	164,79	174,95	173,33	162,91	171,95	175,50	174,72	173,05	179,02
Hungary	52,64	60,33	77,62	58,92	58,93	64,79	63,97	65,21	69,56	81,15
Malta	51,58	50,77	57,81	60,06	68,55	93,54	79,84	79,22	78,79	79,76
Netherlands	95,10	100,04	102,99	103,14	104,34	109,65	112,29	118,23	116,03	118,78
Austria	137,27	144,80	147,84	145,08	148,90	153,12	156,52	159,63	157,23	173,86
Poland	46,45	49,34	51,07	55,25	56,52	59,07	60,98	60,49	63,88	67,37
Portugal	82,18	84,66	89,07	90,86	92,75	97,27	98,43	98,31	104,57	105,69
Romania	86,16	87,58	88,27	91,36	87,39	83,95	77,61	80,50	81,49	84,59
Slovenia	89,74	91,86	95,82	94,25	98,29	97,02	100,39	106,81	111,03	115,86
Slovakia	68,13	74,14	77,34	82,04	87,24	85,59	79,08	85,48	88,05	94,41
Finland	168,67	176,61	176,70	180,02	181,55	169,91	169,41	170,55	170,89	178,01
Sweden	152,99	157,90	156,95	159,94	161,08	163,96	168,19	163,91	157,59	160,95

Eco-Innovation Leaders group
  Average Eco-Innovation performers group
  Eco-innovation Catching-up group

Source: own processing according to the data of own by EC (2022)

The link is to be found in the fact that higher economic growth is usually associated with higher investment, which provides the impetus for eco-innovation activities (Tab. 4.). We can also conclude that, due to the need to achieve the

objectives of the Green Europe strategy, the eco-innovation has effect on the economy. The stronger and more stable countries are, the more they are able to invest and develop eco-innovation policies.

Tab. 4: GDP of the EU Members States in 2013-2022

	2013		2014		2015		2016		2017		2018		2019		2020		2021		2022	
	GDP	GDP	grow	GDP	grow	GDP	grow	GDP	grow	GDP	grow	GDP	grow	GDP	grow	GDP	grow	GDP	grow	
European Union	25060	25430	1,6	25960	2,3	26410	2,0	27110	2,8	27620	2,1	28060	1,8	26450	-5,6	28050	6,00	28950	3,40	
Belgium	33490	33870	1,6	34360	2,0	34620	1,3	35040	1,6	35510	1,8	36110	2,2	34050	-5,3	36230	6,90	37040	3,00	
Bulgaria	5390	5470	0,9	5700	3,4	5910	3,0	6120	2,7	6330	2,7	6630	4,0	6400	-4,0	6950	7,70	7680	3,90	
Czechia	15160	15480	2,3	16290	5,4	16670	2,5	17490	5,2	17990	3,2	18460	3,0	17400	-5,5	18020	3,60	18460	2,40	
Denmark	44410	44890	1,6	45630	2,3	46720	3,2	47740	2,8	48450	2,0	48970	1,5	47680	-2,4	50740	6,80	51660	2,70	
Germany	33330	33920	2,2	34130	1,5	34610	2,2	35410	2,7	35650	1,0	35950	1,1	34550	-3,8	35630	3,20	36010	1,80	
Estonia	12540	12960	3,0	13230	1,9	13620	3,2	14410	5,8	14920	3,8	15450	4,0	15260	-1,0	16350	7,20	16250	-0,50	
Ireland	37080	40070	8,8	49420	24,5	49730	1,8	53750	9,3	57610	8,5	59840	5,3	63120	6,6	72110	15,10	77430	9,40	
Greece	16630	16830	0,5	16900	-0,2	16890	-0,5	17110	1,1	17430	1,7	17780	1,9	16150	-9,3	17600	8,40	18710	5,60	
Spain	21850	22220	1,4	23090	3,8	23780	3,0	24440	3,0	24890	2,3	25180	2,0	22250	-11,2	23690	6,40	24910	5,80	
France	31170	31320	1,0	31540	1,1	31770	1,1	32360	2,3	32800	1,9	33250	1,8	30630	-7,5	32490	6,40	33180	2,50	
Croatia	10480	10480	-0,4	10810	2,5	11290	3,6	11800	3,4	12250	2,8	12740	3,4	11700	-8,6	13610	13,80	14660	6,30	
Italy	25620	25620	0,0	25860	0,8	26240	1,3	26730	1,7	27030	0,9	27230	0,5	24910	-9,0	27120	8,30	28220	3,70	
Cyprus	20450	20310	-1,8	21120	3,4	22410	6,6	23470	5,7	24500	5,6	25510	5,5	24360	-3,4	26530	9,90	27490	5,10	
Latvia	9980	10270	1,9	10760	3,9	11110	2,4	11590	3,3	12140	4,0	12300	0,6	11940	-3,5	12870	6,70	13280	3,40	
Lithuania	10810	11290	3,5	11620	2,0	12070	2,5	12760	4,3	13400	4,0	14060	4,7	14060	0,0	14870	6,30	15100	2,40	
Luxembourg	82700	82880	2,6	82810	2,3	84840	5,0	84090	1,3	83510	1,2	84280	2,9	82130	-0,9	86690	7,20	86130	1,40	
Hungary	10330	10790	4,2	11220	3,7	11500	2,2	12020	4,3	12690	5,4	13310	4,9	12730	-4,5	13690	7,10	14350	4,60	
Malta	17650	18610	7,6	19920	9,6	20130	3,4	21700	10,9	22510	7,4	23170	7,1	20840	-8,1	23270	12,30	24320	6,90	
Austria	36180	36130	1,4	36140	2,0	36390	2,2	36980	2,9	37690	2,4	38070	2,0	35390	-3,9	36740	6,20	38080	4,30	
Netherlands	38180	38580	0,7	39170	1,0	39810	2,0	40730	2,3	41450	2,2	41980	1,5	40130	-6,6	42390	4,20	43800	3,80	
Poland	10030	10420	3,8	10890	4,4	11220	3,0	11800	5,1	12500	5,9	13070	4,4	12810	-2,0	13770	6,90	14620	5,30	
Portugal	16050	16260	0,8	16620	1,8	17010	2,0	17650	3,5	18190	2,8	18670	2,7	17100	-8,3	18090	5,70	19310	6,80	
Romania	6860	7160	4,1	7420	3,2	7680	2,9	8360	8,2	8910	6,0	9300	3,9	9000	-3,7	9600	5,70	10080	4,60	
Slovenia	17160	17620	2,8	17990	2,2	18550	3,2	19440	4,8	20240	4,5	20780	3,5	19770	-4,2	21350	8,20	21860	2,50	
Slovakia	13300	13640	2,7	14340	5,2	14590	1,9	15000	2,9	15580	4,0	15960	2,5	15400	-3,3	16200	4,80	16340	1,80	
Finland	34660	34390	-0,4	34460	0,5	35330	2,8	36380	3,2	36740	1,1	37150	1,2	36220	-2,4	37290	3,20	37780	1,60	
Sweden	40510	41180	2,7	42580	4,5	42920	2,1	43430	2,6	43760	2,0	44180	2,0	42910	-2,2	45280	6,10	46250	2,80	

Source: own processing according to the data of own by EC (2022)

When assessing the Slovak economy, it is nothing new that Slovakia lags behind the EU average to a large extent. This places Slovakia in the group of countries with the lowest eco-innovation performance. It is possible to change this situation if the idea of eco-innovative development and growth is fully addressed and promoted. In Slovakia, the first efforts to apply eco-innovation and to change traditional production processes are beginning to emerge.

Important are the possibilities of drawing on aid and support through operational programs. The ideas of green innovation are also embedded in other documents produced by various ministries, ranging from agriculture, economy, environment, and education. Within the framework of the Recovery and Resilience Plan of the Slovak Republic (2022), EUR 6.4 billion are earmarked for this purpose (Tab. 5).

Tab. 5: Recovery and Resilience Plan of the Slovak Republic

AREA AND COMPONENT	ALOCATION
<b>GREEN ECONOMY</b>	<b>2,1 billion €</b>
Renewable energy and energy infrastructure	207 mil. €
Buildings renovation	620 mil. €
Sustainable transport	759 mil. €
Decarbonisation of industry	368 mil. €
Adaptation to climate change	149 mil. €
<b>QUALITY EDUCATION</b>	<b>818 mil. €</b>
Availability, development and quality of inclusive education at all levels	210 mil. €
Education for the 21st century	449 mil. €
Improving the performance of Slovak universities	159 mil. €
<b>SCIENCE, RESEARCH AND INNOVATION</b>	<b>670 mil. €</b>
More effective management and strengthening of funding for research, development, innovation and the digital economy	576 mil. €
Attracting and retaining talents	94 mil. €
<b>BETTER HEALTH</b>	<b>1,4 billion €</b>
<b>EFFICIENT PUBLIC ADMINISTRATION AND DIGITALISATION</b>	<b>1,0 billion €</b>
Digital Slovakia (State on the move, cybersecurity, fast internet for everyone, digital economy)	561 mil. €
<b>REPowerEU</b>	<b>403 mil. €</b>
Energy and permitting processes	150 mil. €
Renovation and management of buildings	149 mil. €
Green skills development	15 mil. €
Sustainable transport	85 mil. €
Communication and coordination	3,5 mil. €
<b>Total</b>	<b>6,4 billion €</b>

Source: own processing according to the data of own by Plan obnovy (2022)

## DISCUSSION AND CONCLUSION

The objective set out in the introduction of the article can be considered to have been met. The author has identified the key aspects and position of eco-innovation in the current global environment.

Evaluatins and comparisons of eco-innovation performance of countries lead to serious steps and reflection on the further being of society. The results and rankings based on both European and global indexes indicate that society is keen to address these issues and to be closer to energy carbon neutrality again. The eco-innovation indexes illustrate the desire to be more efficient but in synergy with the application of eco-innovation in production and consumption.

There has also been a repositioning of the status quo. All countries, but especially those of the European Union, are placing emphasis on a

green and sustainable economy, energy and life. Eco-innovation is thus current and alive.

As the data presented shows, there is a link between eco-innovation and the success of the economy. The link between eco-innovation, or eco-innovation policy, and GDP has been identified, based on cross-country data comparisons. Therefore, we conclude, that the more stable and developed countries are more smoothly fulfilling the intentions of an eco-green society. However, the efforts of less developed countries to move closer to the leaders and move forward together cannot be denied either. In case of Slovakia, we can state that the Slovak economy is far below average in this area, however, the initiative to modernise the environment and create favourable conditions cannot be denied.

Political efforts to introduce eco-innovation, financial and legislative support, process sophistication and much more are ways to achieve the objectives and grow economically at



the same time. A favourable environment allows the environmental dimension to develop more quickly to meet commitments. We consider the Recovery Plan to be important, but also other schemes will help small and medium-sized enterprises to cover the high costs of introducing innovation.

In the context of new opportunities and challenges for the business environment, we also need to think innovatively in the field of education. The most sensitive approach to this issue is needed in the question of workforce training for industries. The intensity of change is strongest in the IT and automotive industries. In case of the automotive industry, countries that are categorised as 'assembly workshop' (e.g. Slovakia) are proving problematic.

As the issue of eco-innovation is complex and challenging, a number of facts and

circumstances need to be analysed. For this reason, it is necessary to further focus on identifying key elements, actors and attitudes, thereby eliminating gaps and identifying opportunities. To participate together in the renewal and growth of society life quality, to progress economically and socially, to develop ideas for a better and healthier civilisation, and last but not least to preserve and enhance higher values and aims.

### Acknowledgments

The research was supported by the Scientific Grant Agency of the Ministry of Education, Science, Research, and Sport of the Slovak Republic and the Slovak Academy Sciences (VEGA), project No 1/0364/22: Research on eco-innovation potential of SMEs in the context of sustainable development.

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### Contact

Martina, Jakubčinová, Ing., PhD., MBA  
 Faculty of Social and Economic Relations  
 Alexander Dubček University of Trenčín,  
 Študentská 3, Trenčín  
 e-mail: [martina.jakubcinova@tnuni.sk](mailto:martina.jakubcinova@tnuni.sk)