Sustainable Social Development (2023) Volume 1 Issue 2
doi: 10.54517/ssd.v1i2.2168

ORIGINAL RESEARCH ARTICLE

Migration of highly skilled workers: Modelling the relationships with business sustainability

Olena Oliinyk

National University of Water and Environmental Engineering, 33028 Rivne, Ukraine; o.o.oliynuk@nuwm.edu.ua

ABSTRACT

The research paper investigates the impact of international migration of highly skilled workers on business sustainability and models the relationships between them on this basis. The relationship between the migration of highly skilled workers and business sustainability was investigated using the example of 27 countries of the European Union in 2022, based on the use of the correlation analysis method by calculating the Pearson pairwise correlation coefficient. The results of the correlation analysis demonstrate that "brain drain" has a negative impact on the values of business sustainability indicators. Companies of all sizes, industries, and geographies are improving their sustainability management practices while being tolerant of workers from other countries. A significant positive impact of the arrival of highly skilled individuals from abroad for employment on the "business environment" indicator in the Global Innovation Index of the destination country has been proven. In order to detail the relationship between the migration of highly skilled workers and business sustainability, an economic and mathematical model of the form $y_4 = 26.114 - 2.039x_1 + 0.080x_3 - 0.090x_5 + 0.113x_6$ was developed, which proves that the creation of conditions for attracting and retaining highly qualified migrants is of primary importance for the formation of a sustainable business culture in the country.

Keywords: migration of highly skilled workers; brain drain; brain gain; business sustainability; business environment; business culture

1. Introduction

Along with globalisation, the intensity of people's movement has increased, and economic activity has become increasingly interconnected. Since today's society is increasingly based on knowledge, highly skilled workers play a decisive role in shaping the knowledge economy in modern conditions. Countries rely on highly skilled workers because they drive innovation and economic development and enable nations to successfully position themselves in a competitive global race[1]. The scope and research on international migration have reached an unprecedented level. The UN Global Compact on Safe, Orderly, and Legal Migration recognises that migration has been part of the human experience throughout history and is a source of prosperity, innovation, and sustainable development in our globalised world[2]. In light of aging populations and skill shortages, attracting highly skilled workers has become an important task for countries around the world. They push the boundaries of knowledge and stimulate economic growth. In this process, the international mobility of skilled workers becomes critical for increasing the competitiveness of the economy by ensuring business sustainability. At the same time, the separation of this group of migrants from their general population remains

ARTICLE INFO
Received: 8 June 2023 | Accepted: 20 September 2023 | Available online: 7 October 2023

CITATION
Oliinyk O. Migration of highly skilled workers: Modelling the relationships with business sustainability. *Sustainable Social Development* 2023; 1(2): 2168. doi: 10.54517/ssd.v1i2.2168

a debatable issue. The most obvious starting point for determining a highly skilled employee is the level of their education or the classification of their profession. A basic definition often used by economists to narrow the data for analysis is that a highly skilled migrant is someone with a tertiary (university) education, which usually means a formal college degree or more. This approach, which focuses on educational attainment, is often used by economists, so highly skilled professionals are easier to identify among a larger sample of migrants. This variable is also widely used among those who study the impact of emigration on countries of origin, in particular the "brain drain"[3]. Immigration, like any positive labour supply shock, should increase the return to capital and stimulate business investment. These changes should have a positive effect on the creation and expansion of businesses, especially in regions that receive a large influx of immigrants. This is explained by the fact that highly skilled professionals contribute to the acceleration of the accumulation of knowledge, the introduction of innovations, and the development of social and economic development at the expense of a higher level of economic activity. Despite this clear prediction, there is little empirical evidence of the impact of immigration on business dynamics[4]. Therefore, the study of the impact of international migration on the sustainability of businesses and modelling the interrelationships between them on this basis is an important research task.

2. Materials and methods

At the initial stage of the research, the author selected indicators that allow a comprehensive characterisation and quantitative assessment of the migration of highly skilled workers. Literature review[5–9] made it possible to substantiate the choice of the main indicators of highly skilled workers migration (**Table 1**). The first is the "Migrant stock" indicator, as the data on the scope and flows of international migration are necessary for understanding the patterns and trends of migrants, as well as for monitoring and evaluating international development plans related to migration[10].

Table 1. Indicators to evaluate highly skilled workers migration.

Indicator	Publisher, coverage of countries	Description	Unit of measurement	Conventional designation
"The Human Flight and Brain Drain" indicator in the Fragile States Index	The Fund for Peace, 177 countries	The Human Flight and Brain Drain indicator considers the economic impact of human displacement (for economic or political reasons) and the consequences this may have on a country's development.	score	x_1
"Brain gain" indicator in the Global Talent Competitiveness Index	INSEAD, 133 countries	Average answer to the question: to what extent does your country attract talented people from abroad? [1 = not at all; 7 = to a great extent—the country attracts the best and brightest from around the world]	score	x_2
"Brain retention" indicator in the Global Talent Competitiveness Index	INSEAD, 133 countries	Average answer to the question: to what extent does your country retain talented people? [1 = not at all—the best and brightest leave to pursue opportunities abroad; 7 = to a great extent—the best and brightest stay and pursue opportunities in the country]	score	x_3
"Migrant stock" indicator in the Global Talent Competitiveness Index	INSEAD, 133 countries	Adult migrant stock refers to the number of the migrant stock population above 25 years old as a percentage of the total population of the same age group.	score	x_4

Table 1. (*Continued*).

Indicator	Publisher, coverage of countries	Description	Unit of measurement	Conventional designation
"Tolerance of immigrants" indicator in the Global Talent Competitiveness Index	INSEAD, 133 countries	The percentage of respondents answering "Good place" to the question: is the city or area where you live a good place or not a good place to live for immigrants from other countries?	score	x_5
"Ease of finding skilled employees" indicator in the Global Talent Competitiveness Index	INSEAD, 133 countries	Average answer to the question: in your country, to what extent can companies find people with the skills required to fill their vacancies? [1 = not at all; 7 = to a great extent]	score	x_6

Source: compiled on the research of the Fund for Peace, INSEAD[11,12].

In this aspect of this research paper, it is worth focusing attention on indicators that directly relate to the migration of highly skilled workers. This is, in particular, the "brain drain"—a phenomenon when talented or skilled individuals leave the country due to limited educational opportunities, a lack of employment prospects, economic instability, etc., in their home country[13]. This is the movement of highly skilled individuals from one country to another on the basis of better remuneration, better living conditions, a wider range of career opportunities, etc.[14,15]. Economists use this term mainly to describe the negative effects of migration flows from less developed economies to more developed ones, which exacerbate existing global inequality[16]. Meanwhile, there is a loss of human capital in the donor country not only at the macro- and meso-levels but also at the corporate level, which directly affects business efficiency and its sustainability[17].

The phenomenon of "brain gain" is the exact opposite of "brain drain". Over the past few decades, many immigrant-receiving countries have focused their immigration policies on attracting highly educated and skilled immigrants. They did this because of the incredible intensity of knowledge in the field of technology, in response to the obvious shortage of skilled workers[8] and the general feeling that highly educated immigrants will integrate better in the host country in the long run than less educated immigrants[18].

Historically, companies have developed strategies to attract and retain talent. In today's competitive business environment, having talented and competent employees is more difficult than having physical resources because skills are considered the most valuable business asset[19]. Since the late 1990s, a highly skilled labour force has become a fundamental basis for successfully building a knowledge economy[20]. Today, talent is considered a key factor for companies to remain competitive, successful, and sustainable in their development. Therefore, the study also used indicators that allow assessing the level of retention of a highly skilled labour force ("brain retention") and the ease of finding an employee with the appropriate knowledge and competencies ("ease of finding skilled employees"). The last indicator becomes especially relevant due to the spread of modern global megatrends, such as technological progress, globalisation and population aging, which have changed the structure of labour markets in many countries around the world. These trends have led to changes in the demand for skills, both through changes in the content of existing jobs and differences in the skill requirements of new and lost jobs. At the same time, the supply of skills is changing due to factors such as rising education levels, international migration, and an aging population. These changes in the demand for and supply of knowledge and skills have led to skill imbalances in many countries around the world[21].

The study also used the "tolerance of immigrants" indicator as an indirect indicator of the country's attractiveness for highly skilled migrants, because the hostile attitude of the local population and discrimination in workplaces can significantly affect migration attitudes. Immigrant prejudice is based on the negative orientation of individuals towards other people because of their group membership or immigrant status. Such a negative orientation is multifaceted and involves cognitive (i.e., attributing negative traits to immigrants, such as aggressiveness or rudeness), affective (i.e., dislike of immigrants), and behavioural (i.e., demonstrating

negative behaviour: offensive language, discrimination, avoiding immigrants, etc.) components[22]. Studies show that a positive attitude towards immigration is often associated with a greater presence of immigrants at the local level and in regions with a higher level of socio-economic development[23].

The following indicators were chosen to assess business sustainability:

1) The Sustainability Risk and Performance Index (y_1) examines the sustainability performance of more than 46,000 companies assessed by EcoVadis and provides critical insights into sustainability trends across countries, regions and industries. Based on a comprehensive dataset of over 72,000 assessments, the index analyses sustainability performance on the following topics: environment, labour and human rights, ethics and green procurement[24].

2) "Business (Economic) Sustainability" sub-index in the Global Sustainable Competitiveness Index (y_2) reflects the ability to generate wealth, ensure sustainable and inclusive economic development. Economic sustainability is measured using a combination of economic and business indicators in the following areas: business environment, business competitiveness, female participation, financial markets, economic indicators[25].

3) "Business environment" indicator in the Global Innovation Index (y_3) takes into account two parameters: policies for doing business (the extent to which governments ensure a stable policy environment for doing business) and entrepreneurship policies and culture (average perception scores (five-year average) of experts on entrepreneurial policies and entrepreneurial culture)[26].

4) The Business Culture Complexity Index (y_4) assesses the potential complexity of the country's business culture, was formulated using economic, cultural and social data from 14 sources: Trust in Others; Happiness; Internet Use; Religiosity; Ease of Doing Business; Economic Freedom; Corruption; Press Freedom; Human Development Index; Tourist Arrivals; Literacy; Position in World Economy; Embeddedness (Schwartz); Egalitarianism (Schwartz)[27].

To assess the relationship between the migration of highly skilled workers and business sustainability, the author used the method of correlation analysis based on the calculation of the Pearson pairwise correlation coefficient[28]. The *t*-test formula was used to check its statistical significance[29].

$$t = r\sqrt{\frac{n-2}{1-r^2}} \quad (1)$$

where r is the value of the correlation coefficient; n is the total number of observations.

3. Results

The relationship between the migration of highly skilled workers and business sustainability was analysed on the example of 27 countries of the European Union (**Table 2**), because today, the EU is one of the most attractive destinations for intellectual migration flows. Its considerable wealth, as well as its social and welfare approach, is a target for many highly skilled migrants and asylum seekers from many countries[30]. Assessment based on taxonomic analysis helped identify the group of countries (Luxembourg, Ireland, Sweden, Finland, Denmark and the Netherlands) with the highest migration attractiveness in the EU[31].

Table 2. The results of the correlation analysis of the relationship between the migration of highly skilled workers and business sustainability in the EU countries in 2022.

Country	x_1	x_2	x_3	x_4	x_5	x_6	y_1	y_2	y_3	y_4
Belgium	2.6	71.81	56.74	67.05	60.0	55.47	55.4	52.1	59.0	26.764
Bulgaria	5.1	21.98	19.84	23.47	32.31	35.21	48.4	47.1	34.3	*
Czechia	3.4	37.1	48.32	41.74	35.38	13.36	51.2	52.6	42.1	20.949
Denmark	1.0	65.52	71.4	59.46	84.62	64.39	54.0	56.7	72.4	30.176
Germany	1.9	67.1	82.4	68.83	75.38	42.75	52.8	56.8	69.6	27.651
Estonia	4.4	62.15	40.83	65.78	35.38	38.58	50.6	50.5	78.0	*
Ireland	2.6	74.03	71.83	66.61	93.85	52.27	53.8	60.6	70.6	24.416
Greece	4.1	16.48	14.84	60.12	32.31	35.35	52.7	52.1	29.1	*
Spain	1.1	42.73	37.17	62.26	87.69	57.79	54.6	48.4	54.4	24.313
France	2.1	55.77	40.32	62.13	61.54	42.74	57.5	54.1	70.7	25.336
Croatia	5.8	9.6	2.92	62.81	23.08	19.04	48.3	53.2	17.9	*
Italy	2.3	34.29	27.75	55.68	73.85	45.06	56.2	53.5	35.7	22.841
Cyprus	3.4	51.63	50.99	64.2	50.77	50.96	41.6	42.9	46.3	*
Latvia	5.5	41.57	27.32	62.37	30.77	32.96	55.0	52.4	49.3	*
Lithuania	5.3	44.59	21.88	42.81	33.85	12.85	52.9	53.7	56.0	*
Luxembourg	1.6	93.04	88.13	89.43	95.38	25.16	56.4	51.5	81.4	*
Hungary	4.0	28.4	21.04	43.45	0	19.67	48.5	55.9	40.3	*
Malta	3.5	78.74	63.15	74.98	75.38	25.32	57.5	46.8	53.1	*
Netherlands	2.4	80.15	84.75	62.21	76.92	62.25	55.0	50.3	86.8	27.668
Austria	1.7	59.33	60.32	68.83	66.15	43.37	54.8	58.0	70.8	25.982
Poland	4.6	28.29	33.71	24.38	50.77	38.97	51.3	50.0	30.6	18.572
Portugal	3.0	53.53	38.81	54.49	92.31	61.96	54.0	55.5	33.0	*
Romania	5.3	15.22	2.8	26.11	35.38	28.19	50.5	51.6	26.8	15.703
Slovenia	3.7	22.73	31.77	61.75	15.38	30.02	53.6	61.6	42.0	*
Slovakia	4.1	14.45	15.67	34.67	38.46	31.87	51.7	52.3	22.5	*
Finland	1.5	47.65	77.44	47.11	76.92	56.41	59.2	57.8	63.1	28.231
Sweden	0.6	58.12	78.46	69.27	92.31	56.22	57.7	55.4	55.0	28.814
Correlation coefficient with y_1	−0.555	0.443	0.465	0.367	0.568	0.288				
Estimated value of student's criterion	|−3.333|	2.473	2.623	1.971	3.450	1.504				
The critical value of student's criterion	2.059									
Statistical significance $\alpha = 0.05$	+	+	+	−	+	−				
Correlation coefficient with y_2	−0.282	0.021	0.181	0.123	0.080	0.086				
Estimated value of student's criterion	|−1.472|	0.104	0.921	0.618	0.401	0.433				
The critical value of student's criterion	2.059									
Statistical significance $\alpha = 0.05$	−	−	−	−	−	−				
Correlation coefficient with y_3	−0.601	0,869	0.805	0.600	0.532	0.386				
Estimated value of student's criterion	|−3.762|	8.785	6.789	3.746	3.142	2.090				
The critical value of student's criterion	2.059									
Statistical significance $\alpha = 0.05$	+	+	+	+	+	+				
Correlation coefficient with y_4	−0.890	0.811	0.853	0.800	0.732	0.741				
Estimated value of student's criterion	|−6.779|	4.793	5.659	4.614	3.718	3.823				
The critical value of student's criterion	2.179									
Statistical significance $\alpha = 0.05$	+	+	+	+	+	+				

* missing data.
Source: author's calculations.

First of all, the obtained results of the correlation analysis allow highlighting the indicator of business sustainability, for which the international migration of highly skilled workers is not a driver of development—this is the "Business (Economic) Sustainability" sub-index in the Global Sustainable Competitiveness Index. This situation may be explained by the fact that economic and financial indicators reflect current economic success at best. They do not consider or explain what makes economic success possible. Nor do they take into account current financial and non-financial events that determine future success or failure[32].

As for the dependence of the Business Sustainability Risk and Performance Index on the migration of highly skilled workers, the correlation analysis revealed the average influence of the indicators "Human Flight and Brain Drain" (−0.555) and "Tolerance of Immigrants" (0.568). It is worth noting that "brain drain" has a negative impact on the value of business sustainability indicators. At the same time, companies of all sizes, industries, and geographies are improving their sustainability management practices while being more tolerant of workers from other countries.

The "business environment" indicator in the Global Innovation Index is the indicator of business sustainability, which is most significantly affected by the trends of international migration of highly skilled workers. This thesis is confirmed by the obtained values of the correlation coefficients, which range from |0.532| to |0.869|. The exception is the indicator "Ease of finding skilled employees", which currently does not affect the formation of a positive environment for sustainable business development (0.386).

The strongest positive influence on the "business environment" indicator in the Global Innovation Index is exerted by the "brain gain" indicator in the Global Talent Competitiveness Index—the value of the correlation coefficient is 0.869 and is statistically significant (the calculated value of the student criterion (8.785) is greater than the critical value (2.059)). In order to detail this relationship, the author developed an economic and mathematical model using the built-in function "Regression" in the Excel software (**Figure 1**).

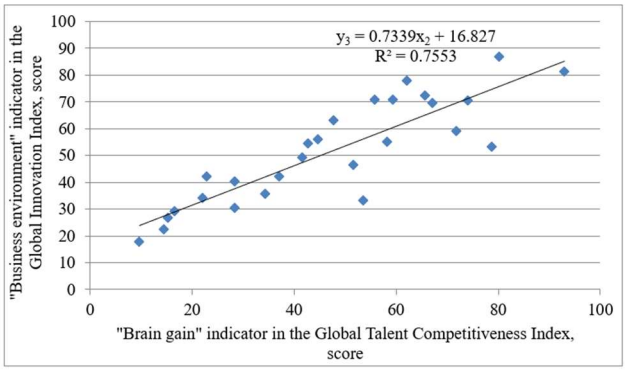

Figure 1. Dependence of "Business environment" indicator in the Global Innovation Index on the value of the "Brain gain" indicator in the Global Talent Competitiveness Index in 2022.
Source: author's calculations.

The mathematical model has the form $y_3 = 0.7339x_2 + 16.827$. Its statistical significance was confirmed using Fisher's test: the estimated value of Fisher's test (77.181) is greater than the critical value (4.24). The value of the coefficient of determination $R^2 = 0.7553$ demonstrates that the value of the "business environment" indicator in the Global Innovation Index is 75.53% explained by the arrival of highly skilled migrants to the country. The regression coefficient $b_0 = 0.7339$ means that with an increase in the value of the "brain growth" indicator in the Global Talent Competitiveness Index by one unit, the value of the "business environment" indicator in the Global Innovation Index will increase by an average of 0.7339 units.

At the same time, all the selected indicators of the migration of highly skilled workers exert the greatest influence on the Business Culture Complexity Index: the values of the calculated pairwise correlation coefficients exceed |0.7| and are statistically significant. For a more detailed study of the impact of highly skilled worker migration on the Business Culture Complexity Index, the author developed an appropriate economic and mathematical model using the built-in "Regression" function in the MS Excel software. This function allows for identifying the mathematical relationship between the model parameters and then evaluating its statistical significance, adequacy, and suitability for practical use. As a result of a step-by-step

assessment of the impact of indicators x_1–x_6, listed in **Table 1**, on the Business Culture Complexity Index based on a multifactor regression model, the author determined the following four-factor model:

$$y_4 = 26.114 - 2.039x_1 + 0.080x_3 - 0.090x_5 + 0.113x_6,$$

in which y_3 is the value of the Business Culture Complexity Index (score); x_1 is the value of the "The Human Flight and Brain Drain" indicator in the Fragile States Index (score); x_3 is the value of the "Brain retention" indicator in the Global Talent Competitiveness Index (score); x_5 is the value of the "Tolerance of immigrants" indicator in the Global Talent Competitiveness Index (score); x_6 is the value of the "Ease of finding skilled employees" indicator in the Global Talent Competitiveness Index.

Indicators confirming the statistical significance and adequacy of this four-factor model are given in **Table 3**.

Table 3. The results of monitoring the adequacy of the economic and mathematical model according to the main statistical indicators.

	coefficient	**std. error**	***t*-ratio**	***p*-value**
const	26.1140	2.06093	12.67	4.84×10^{-7}***
x_1	−2.03917	0.300155	−6.794	7.96×10^{-5}***
x_3	0.0796965	0.0124976	6.377	0.0001***
x_5	−0.0896462	0.0268316	−3.341	0.0086***
x_6	0.113318	0.0290091	3.906	0.0036***
Mean dependent var		24.81543	S.D. dependent var	4.106966
Sum squared resid		5.941303	S.E. of regression	0.812493
R-squared		0.972905	Adjusted R-squared	0.960862
F (4, 9)		80.78983	P-value(F)	4.77×10^{-7}
Log-likelihood		−13.86524	Akaike criterion	37.73047
Schwarz criterion		40.92576	Hannan-Quinn	37.43469
White's test for heteroskedasticity-				
Null hypothesis: heteroskedasticity not present				
Test statistic: LM = 8.08543				
with *p*-value = P (Chi-square(8) > 8.08543) = 0.42517				

Source: author's calculations.

The obtained results of statistical indicators allow stating that the built four-factor economic and mathematical model is characterised by high theoretical capacity and is suitable for practical application. Therefore, creating conditions for attracting and retaining highly skilled migrants is of primary importance for the formation of a sustainable business culture in the country.

4. Conclusion

In recent decades, the phenomenon of international migration of highly skilled workers has attracted the attention of researchers, politicians, and representatives of the business environment all over the world. The negative impact of "brain drain" can be traced to 3 out of 4 selected indicators that assess business sustainability. If a country loses its best professionals through migration, this can lead to a loss of brainpower and a decrease in competitiveness in the long run. Managers of business structures may find it difficult to replace lost knowledge and skills.

At the same time, the immigration of highly skilled workers can help the business environment attract talented specialists from other countries, which contributes to the development of innovations and increased productivity. This can have a positive impact on business sustainability, especially in areas where knowledge and creativity are key success factors. Experts from different cultures, languages, and professional fields can bring fresh ideas and perspectives that contribute to sustainable business development. The diversity of views and experiences helps the emergence of new ideas, approaches, and ways of solving problems, which increases the creativity and innovative potential of business.

Immigration of highly skilled workers can also help save money on training new workers. If companies employ already-trained professionals with the appropriate level of knowledge and skills from other countries, this reduces the cost of various trainings and personnel training.

The results of this study prove that highly skilled migrants choose countries with favourable regulatory, cultural, and social norms, as well as support for foreigners, to realize their intellectual capital. Therefore, governments need to create optimal business environment conditions so that people can start and develop their own businesses, because when interpreting the results, it should be borne in mind that the selected indicators for assessing business sustainability study favourable national conditions for all types of entrepreneurs: indigenous and immigrant.

5. Discussion

The impact of highly qualified worker migration on business sustainability should be considered in conjunction with general economic, socio-cultural, and political factors. Thus, the arrival of a highly skilled labour force from abroad can exert additional competitive pressure on the labour market and increase the struggle for jobs[33]. This can have a negative impact on local workers, especially those with less competitiveness or skills[34]. Differences in culture, language, and communication can also create difficulties in communication and cooperation between local and foreign workers[35]. Misunderstanding each other can lead to errors in work, conflicts in social and labour relations, and a decrease in efficiency and productivity in general. Highly skilled immigrants may face legal problems related to obtaining visas, legal restrictions, and the legality of their stay in the destination country. This can make it difficult for them to integrate into the business environment and lead to uncertainty about their belonging to the team.

At the same time, the arrival of professionals from abroad for the purpose of employment has a positive effect on the formation of the country's business culture, while when the intellectuals leave the country, it may have a detrimental effect. An open, trustworthy, and transparent business culture, with the rule of law, attracts highly skilled migrants. Ease of doing business, economic freedom, freedom of the press, and the absence of corruption are excellent components that represent a more transparent business environment with minimal barriers for foreigners.

Conflict of interest

The author declares no conflict of interest.

References

1. Burmann M, Perez MH, Hoffmann V, et al. Highly skilled labour migration in Europe. *ifo DICE Report* 2018; 16: 42–52.
2. Global compact for safe, orderly and regular migration. Available online: https://www.ohchr.org/en/migration/global-compact-safe-orderly-and-regular-migration-gcm (accessed on 4 September 2023).

3. Weinar A, Klekowski von Koppenfels A. Highly skilled migration: Concept and definitions. In: *Highly Skilled Migration: Between Settlement and Mobility*. Springer Cham; 2020. pp. 9–35.
4. Orrenius PM, Zavodny M, Abraham AT. The effect of immigration on business dynamics and employment. Available online: https://docs.iza.org/dp13014.pdf (accessed on 4 September 2023).
5. Shimada A. Does the host country experience the brain drain or the brain gain by accepting study migrants? *Economy & Business Journal* 2021; 15(1): 260–277.
6. Li W, Lo L, Lu Y, et al. Intellectual migration: Considering China. *Journal of Ethnic and Migration Studies* 2021; 47(12): 2833–2853. doi: 10.1080/1369183X.2020.1739393
7. Lulle A, Janta H, Emilsson H. Introduction to the special issue: European youth migration: Human capital outcomes, skills and competences. *Journal of Ethnic and Migration Studies* 2021; 47(8): 1725–1739. doi: 10.1080/1369183X.2019.1679407
8. Iqbal K, Wang Y, Khurshaid K, et al. Current trend and determinants of intentions to migrate: Evidence from China. *SAGE Open* 2021; 11(1). doi: 10.1177/21582440211001371
9. Oliinyk O, Bilan Y, Mishchuk H, et al. The impact of migration of highly skilled workers on the country's competitiveness and economic growth. *Montenegrin Journal of Economics* 2021; 17(3): 7–19. doi: 10.14254/1800-5845/2021.17-3.1
10. Abel GJ, Cohen JE. Bilateral international migration flow estimates for 200 countries. *Scientific Data* 2019; 6(1): 82. doi: 10.1038/s41597-019-0089-3
11. Fragile States Index. Available online: https://fragilestatesindex.org/ (accessed on 4 September 2023).
12. INSEAD. *The Global Talent Competitiveness Index 2022: The Tectonics of Talent: Is the World Drifting Towards Increased Talent Inequalities?* INSEAD; 2022.
13. Vazzana CM, Rudi-Polloshka J. Appalachia has got talent, but why does it flow away? A study on the determinants of brain drain from rural USA. *Economic Development Quarterly* 2019; 33(3): 220–233. doi: 10.1177/0891242419844320
14. Vega-Muñoz A, Gónzalez-Gómez-del-Miño P, Espinosa-Cristia JF. Recognizing new trends in brain drain studies in the framework of global sustainability. *Sustainability* 2021; 13(6): 3195. doi: 10.3390/su13063195
15. Yunitasari D, Khotimah K, Fathorrazi M. The implication of brain gain on brain drain phenomenon in overcoming the problem of educated unemployment in Indonesia. *Sosiohumaniora* 2021; 23(1): 133–140. doi: 10.24198/sosiohumaniora.v23i1.26749
16. Ette A, Witte N. Brain drain or brain circulation? Economic and non-economic factors driving the international migration of German citizens. In: Erlinghagen M, Ette A, Schneider NF, et al. (editors). *The Global Lives of German Migrants: Consequences of International Migration Across the Life Course*. Springer Cham; 2021. pp. 65–83
17. Xue S, Zhang B, Zhao X. Brain drain: The impact of air pollution on firm performance. *Journal of Environmental Economics and Management* 2021; 110: 102546. doi: 10.1016/j.jeem.2021.102546
18. Banerjee R, Verma A, Zhang T. Brain gain or brain waste? Horizontal, vertical, and full job-education mismatch and wage progression among skilled immigrant men in Canada. *International Migration Review* 2019; 53(3): 646–670. doi: 10.1177/0197918318774501
19. Săniuţă A, Jianu MM. Brain gain-return migration stimulation public policies. An innovative approach using corporate managerial tools strategies. *Romanian Journal of Society and Politics* 2022; 16(1).
20. Wang H, Miao L. China's talent attraction policies in the present age. In: *China's Domestic and International Migration Development.* Springer; 2019. pp. 169–184.
21. Organization for Economic Co-operation and Development (OECD). *Creating Responsive Adult Learning Opportunities in Japan (Getting Skills Right)*. Organization for Economic Co-operation and Development (OECD); 2021.
22. Crocetti E, Albarello F, Prati F, Rubini M. Development of prejudice against immigrants and ethnic minorities in adolescence: A systematic review with meta-analysis of longitudinal studies. *Developmental Review* 2021; 60: 100959.
23. Hoxhaj R, Zuccotti CV. The complex relationship between immigrants' concentration, socioeconomic environment and attitudes towards immigrants in Europe. *Ethnic and Racial Studies* 2021; 44(2): 272–292. doi: 10.1080/01419870.2020.1730926
24. EcoVadis. Business Sustainability Risk and Performance Index 5th Edition 2022. Available online: https://resources.ecovadis.com/sustainability-impact/business-sustainability-risk-performance-index-2021
25. SolAbility. Business sustainability: World map. Available online: https://solability.com/solability/the-global-sustainable-competitiveness-index/economic-sustainability-index (accessed on 4 September 2023).
26. WIPO. Global innovation index 2022. What is the future of innovation driven growth? Available online: https://www.wipo.int/edocs/pubdocs/en/wipo-pub-2000-2022-en-main-report-global-innovation-index-2022-15th-edition.pdf (accessed on 4 September 2023).

27. Commisceo Global Consulting. The business culture complexity index. Available online: https://www.commisceo-global.com/resources/bcci (accessed on 4 September 2023).
28. Edelmann D, Móri TF, Székely GJ. On relationships between the Pearson and the distance correlation coefficients. *Statistics & Probability Letters* 2021; 169: 108960. doi: 10.1016/j.spl.2020.108960
29. Alsaqr A. Remarks on the use of Pearson's and Spearman's correlation coefficients in assessing relationships in ophthalmic data. *African Vision and Eye Health* 2021; 80(1). doi: 10.4102/aveh.v80i1.612
30. Gryshova I, Kofman B, Petrenko O. Migration cultures and their outcomes for national security. *Journal of Security & Sustainability* 2019; 8(3): 521–530. doi: 10.9770/jssi.2019.8.3(18)
31. Oliinyk O, Mishchuk H, Bilan Y, Skare M. Integrated assessment of the attractiveness of the EU for intellectual immigrants: A taxonomy-based approach. *Technological Forecasting and Social Change* 2022; 182: 121805. doi: 10.1016/j.techfore.2022.121805
32. SolAbility. *The Sustainable Competitiveness Report*, 11th ed. SolAbility; 2022.
33. Edo A. The impact of immigration on the labor market. *Journal of Economic Surveys* 2019; 33(3): 922–948. doi: 10.1111/joes.12300
34. Piyapromdee S. The impact of immigration on wages, internal migration, and welfare. *The Review of Economic Studies* 2021; 88(1): 406–453. doi: 10.1093/restud/rdaa029
35. Aragona M, Barbato A, Cavani A, et al. Negative impacts of COVID-19 lockdown on mental health service access and follow-up adherence for immigrants and individuals in socio-economic difficulties. *Public Health* 2020; 186: 52–56. doi: 10.1016/j.puhe.2020.06.055