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Analysis of The Domestic and International Innovation Market

Considering the Impact of COVID-19

Abstract. Introduction. The new virus of the XXI century has attracted considerable attention from scientists due to the current state of the world economy and the processes taking place under the influence of COVID-19.

Purpose. Investigate the impact of COVID-19 on the innovation market in Ukraine and the Republic of Slovenia by using data from the State Statistics Service of Ukraine and statistical data of the Republic of Slovenia from December 2019 to December 2021. Identify the causal links between the number of diseases and the socio-economic indicators of countries. This study systematizes the criteria affected by the global COVID-19 pandemic in the innovation aspect of each of them to identify possible correlations between selected determinants and answer questions about expanding socio-economic development of Ukraine.

Results. An analysis was conducted to identify a correlation between the number of diseases on COVID-19 and the CPI. Indicators were selected from March 2020 to January 2021. In this study, we can observe a nonlinear correlation between the CPI and the number of cases of COVID-19 in 2020.

The study found out what changes have taken place in the innovation market, considering the impact of the global pandemic and how these changes differ in Ukraine and the Republic of Slovenia. The next step was investigating the relationship between selected variables in Ukraine and the Republic of Slovenia.

The authors also analyzed funding indicators for innovative developments in the knowledge-intensive industry of Ukraine and the Republic of Slovenia. Results have shown that the Republic of Slovenia allocates at least 1% of the country's GDP to R&D funding. Also, Slovenia has more funding than Ukraine, based on the percentage of GDP. The results of the commercial sector show that 55.1% more active enterprises in Ukraine than in Slovenia, despite the reduction in the number of active enterprises during the global pandemic.

Conclusions. We analyzed the relationship between the number of officially registered COVID-19 cases and the consumer price index by Pearson's correlation analysis. As a result, we can remark a correlation between the above variables, although the correlation coefficient remains not so high.

Keywords: innovation, world economy, research, enterprises, COVID-19.

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Аналіз вітчизняного та міжнародного ринку інновацій

з урахуванням впливу COVID-19

Новий вірус XXI-го століття привернув значну увагу вчених, яка зумовлена сучасним станом світової економіки та процесами, що відбуваються під впливом COVID-19.

Метою статті є дослідити вплив COVID-19 на інноваційний ринок в Україні та республіці Словенія, використовуючи дані державної служби статистики України та статистичні дані республіки Словенія за грудень 2019-2021 років. Визначити причинно-наслідкові зв'язки між кількістю захворювань та соціально-економічні показники країн. У цьому дослідженні систематизовано критерії впливу глобальної пандемії COVID-19 в інноваційному аспекті кожного з них, щоб виявити можливі кореляції між обраними детермінантами та відповісти на питання про розширення соціально-економічного розвитку України.

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Проведено аналіз на виявлення кореляції між кількістю захворювань на COVID-19 та показниками ІСЦ, починаючи з березня 2020 р. по січень 2021 року. У ході проведеного дослідження спостерігаємо нелінійну кореляцію між ІСЦ та кількістю захворювань на COVID-19 у 2020 році.

Під час дослідження з'ясовано, які зміни відбулися на ринку інновацій з урахуванням впливу глобальної пандемії та яким чином відрізняються ці зміни в Україні та Республіці Словенії. Наступним кроком стало дослідження зв'язку між обраними змінними в Україні та Республіці Словенії.

Авторами також здійснено порівняльний аналіз показників фінансування інноваційних розробок в НМГ в Україні та Словенії. Дослідження показали, що Словенія виділяє на фінансування наукових досліджень не менше ніж 1% від ВВП країни та має більше фінансування, виходячи з відсотка ВВП, ніж Україна. Що до комерційного ж сектору то, попри скорочення кількості активних підприємств в плані інновацій під час світової пандемії, в Україні активних підприємств більше на 55,1% у порівнянні зі Словенією.

За допомогою кореляційного аналізу Пірсона здійснено аналіз взаємозв'язку кількості офіційно зареєстрованих випадків COVID-19 та індексу споживчих цін. У результаті можемо констатувати про наявність кореляційного зв'язку між вищеназваними змінними хоча й коефіцієнт кореляції залишається не високим.

__Ключові слова__: інновації; світова економіка; наукові дослідження; підприємства, COVID-19.

Formulation of the problem. Considering the changes that have taken place from the spring of 2020 to 2021 under the influence of COVID-19, the current state of the external environment, there is a need to conduct a study to reflect the impact of the global pandemic on the innovation market. We can trace trends that occurred before and during the pandemic by determining several factors and quantitative indicators of individual countries, comparing them with each other, and finding possible correlations between indicators.

Analysis of recent research and publications. Many researchers have investigated the impact of COVID-19 on the innovation market and innovation activities of the enterprise, in particular, foreign: Xin Jin [1], T. Augustine [2], L. Yanshuang [3], M. Emmanuel [4], H. Inegbedion [5], D. Kong [6], A. Rose [7], I.P. Cassar [8], Y. Qing [9], Nguyen Thi Khanh Chi [10], A. Zimmerling [11], D. Gavilan [12], J. Amankwah-Amoah [13], Alexander Brem, Eric Viardot [14], Amy Wenxuan Ding [15], Yonggui Wang [16], J.M. Blazy, F. Causeret, S. Guyader [17], I. Coopmans [18], Stefan Markovic [19], Yuriy Gankin, Alina Nemira [20], Dariusz Grabara [21]. Ukrainian scientists focused their research mainly on the ways of spreading the virus S. V. Komisarenko [22], the impact on higher education of Ukraine N. V. Stukalo, A. O. Simakhova [23], on the psychological reaction of the population L. O. Anyshhenko [24], on the impact of the pandemic on the world economy D. V. Dolbnjeva [25], and not on the state of innovation, considering the impact of COVID-19. Thus, the issues of innovation development during the pandemic caused by COVID-19 are insufficiently paid attention to.

Formulation of research goals. Investigate the impact of COVID-19 on the innovation market in Ukraine and the Republic of Slovenia by using data from the State Statistics Service of Ukraine and statistical data of the Republic of Slovenia from December 2019 to December 2021. Identify the causal links between the number of diseases and the socio-economic indicators of countries. This study systematizes the criteria affected by the global COVID-19 pandemic in the innovation aspect of each of them to identify possible correlations between selected determinants and answer questions about expanding socio-economic development of Ukraine.

Outline of the main research material. Nguyen Thi Khanh Chi [10] and Amanda Zimmerling [11] investigated the relationship between COVID-19 and the ability to strengthen management effectiveness in companies' innovative activities. Nguyen found that the direct effect of science management increased by 0.425 and in the long term by 0.011. The authors note that COVID-19 is a positive driver of innovation due to the identified enhanced impact. As a result, CRM has been introduced in enterprises, new technologies have appeared, online consultations, artificial intelligence for the analysis of man's physical and psychological state and the reorientation of marketing policy to consumers.

To determine the general impact of COVID-19 on innovation markets, it is necessary to abstract from the general picture of the impact and summarizes the innovation processes that have taken place, which will improve our lives in the long term.

D. Gavilan [12], J. Amankwah-Amoah [13], A. Brem, E. Viardot [14], Amy Wenxuan Ding [15], Y. Wang [16], J.M. Blazy, F. Causeret, S. Guyader [17], S. Markovic [19], Y. Gankin, A. Nemira [20] and D. Grabara [21] are identified the following positive aspects that occurred under the influence of COVID-19:

- integration of artificial intelligence into microbiological research;

- development of conceptual models of decision-making in an uncertain environment;

- dissemination of the values of open science and openness to change;

- increasing technologies for distance learning;

- growing demand for digital content;

- reorientation of marketing policy to the concept of human-centeredness and open partnership;

- COVID-19 has become a catalyst for an agri-environmental approach. Individuals have become more responsible for their health and have started eating organic food;

- strengthening cooperation with competitors to mitigate and effectively overcome the consequences;

- the use of e-commerce tools has helped large companies overcome the negative impact of the pandemic;

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- creation of universities and non-formal education courses based on existing enterprises to form the necessary skills for their employees.

Innovations influenced by COVID-19, J. Amankwah-Amoah calls "CoviNovation" [13, p.2].

Thus, the author forms a relatively wide theoretical range for further research, the definition of principles, and functions, improving the essence of "CoviNovation".

J. Amankwah-Amoah notes that responding to crisis challenges through innovative processes in marketing, product policy, and management increases companies' competitiveness and chances of survival [13, p. 4-6]. In such cases, in our opinion, market participants and individuals need to look at some difficulties that arise in terms of opportunities to improve their activities. It is advisable to implement a Win-Win strategy in communication policy with consumers and the development of innovative products.

In conclusion, we can say that COVID-19 is increasingly attracting attention to study the effects of sensitization and possible negative consequences in the future. Thus, despite the noticeable changes that have occurred since the introduction of appropriate measures in response to COVID-19, there is a need to analyze the domestic and international innovation market's current state considering the impact of COVID-19. Although

domestic and foreign researchers and employees of leading analytical companies pay considerable attention to studying changes that have occurred since the global pandemic, this aspect is not sufficiently studied in the context of the innovation market of the studied countries.

We have identified the main determinants directly or indirectly affected by the global pandemic to achieve the research goal effectively. We have segmented them into the following sectors and groups:

Public sector: Objects are government support programs.

Quantitative Variable:

- H2 indicators of financing of innovative developments (fid_k);
- H3 % of GDP for research (GDP_s).

Commercial sector: Objects are private organizations and certain groups of people.

Quantitative Variable:

- H4 number of operating enterprises.

In the aspect of the researched question, it is essential to analyze the state financial resources provided to support innovative developments and explore the changes that have taken place with companies (legal entities).

Research hypotheses:

H_0: $\overline{X} = \overline{Y}$;
H_1: $\overline{X} \neq \overline{Y}$;
H_2: $\overline{Y} \leq \overline{X}$;
where, $\overline{X}$ – Republic of Slovenia;
$\overline{Y}$ – Ukraine.

Thus, to confirm or refute the hypotheses, collecting and analyzing data is necessary (Table 1).

H_3: $\overline{Y} \leq \overline{X}$;
H_4: $\overline{Y} \geq \overline{X}$.

Table 1. **Key indicators between countries**

Year	Public sector				Commercial sector	
	*fid_k		GDP_s,%		q_ae	
	UA	SI	UA	SI	UA	SI
2010	1018,2	574,15	0,75	1,19	-	-
2011	1053,1	598,27	0,65	1,16	-	-
2012	1178,5	494,03	0,67	1,06	-	-
2013	160,4	382,48	0,70	0,79	-	-
2014	601	420,08	0,60	0,84	341001	186433
2015	486,4	362,14	0,55	0,84	343440	191863
2016	460,4	375,93	0,48	0,87	306369	196072
2017	511,6	437,14	0,45	0,9	338256	195756
2018	597,9	520,20	0,47	0,96	355877	200174
2019	701,4	568,94	0,43	1,05	380597	205139
2020	596,0	556,88	0,41	1,04	373822	206220

Source: built by the author based on data [26, 27, 28, 29]

* Note: million dollars at the rate of the appropriate year

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The authors focused on research funding within the R&D (Research & Development) by analyzing the public sector. We singled out funding analysis for basic, applied, and scientific studies as an opportunity for further research.

The authors highlighted the number of existing enterprises and their growth rate by analyzing the commercial sector. We singled out an analysis of the number of open and closed enterprises as an opportunity for further research.

We consider it necessary to indicate that data conversion in monetary terms was carried out by the exchange rate of UAH-USD and EUR-USD of a particular year. The inflation rate was not considered.

Therefore, there is a need to determine the growth rate of each criterion to the previous year. Relevant data will be entered in tables 2, 3, 4, and 5.

Table 2. **The growth rate of the public sector between countries**

| Year | Public sector | | | | | | | |
| | fid_k | | | | GDP_s,% | | | |
	UA	UA growth rate, %	SI	SI growth rate, %	UA	UA growth rate, %	SI	SI growth rate, %
2010	1018,2	-	574,15	-	0,75	-	1,19	-
2011	1053,1	+3,42	598,27	+4.20	0,65	-13.33	1,16	-2.52
2012	1178,5	+11,9	494,03	-17.42	0,67	+3.07	1,06	-8.62
2013	160,4	-86,3	382,48	-22.58	0,70	+4.47	0,79	-25.47
2014	601	+274,6	420,08	+9.83	0,60	-14.28	0,84	+6.32
2015	486,4	-19,06	362,14	-13.79	0,55	-8.33	0,84	0
2016	460,4	-5,34	375,93	+3.81	0,48	-12.72	0,87	+3.57
2017	511,6	+11,12	437,14	+16.28	0,45	-6.25	0,9	+3.44
2018	597,9	+16,86	520,20	+19.00	0,47	+4.44	0,96	+6.66
2019	701,4	+17,31	568,94	+9.37	0,43	-8.51	1,05	+9.37
2020	596,0	-15.02	556,88	-2.12	0,41	-4.65	1,04	-0.95

Source: built by the author based on data from the Table 1

Analyzing the public sector, namely the indicators of funding for innovation in NMG, we can say that despite the impact of COVID-19 in 2020 and a decrease in the growth rate of 15.02% compared to 2019, Ukraine has more funding for innovation development in monetary terms by 6.56% compared to Slovenia (Fig. 1). At the same time, the percentage of GDP expenditures on research in Ukraine is lower by 60.57% compared to Slovenia as of 2020. On the one hand, this indicates different volumes of gross domestic product, and on the other hand, Slovenia allocates more funding for research as a percentage.
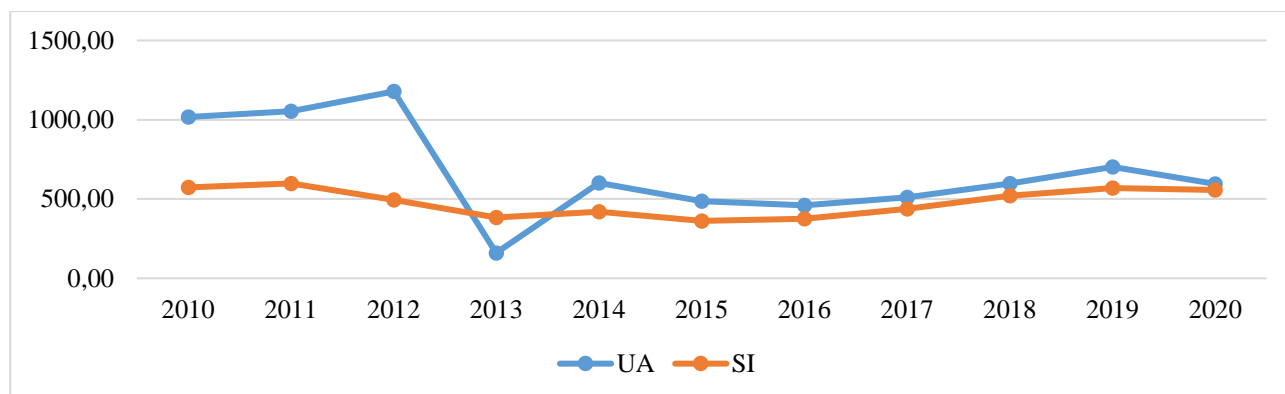

Figure 1 – **Indicators of financing of innovative developments in NMG between Ukraine and Slovenia**

Source: built by the author based on data from the Table 1

Thus, we refute this hypothesis H2: $Y \leq X$ that in Ukraine, the funding for innovative developments is less than in the Republic of Slovenia, considering the quarantine restrictions of 2020, and we prove that despite the relatively small amount of GDP and the impact of COVID-19, Slovenia allocates at least 1% of the

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country's GDP to research funding (Fig. 2). Slovenia has more funding, based on the GDP percentage, confirmed by the data obtained.
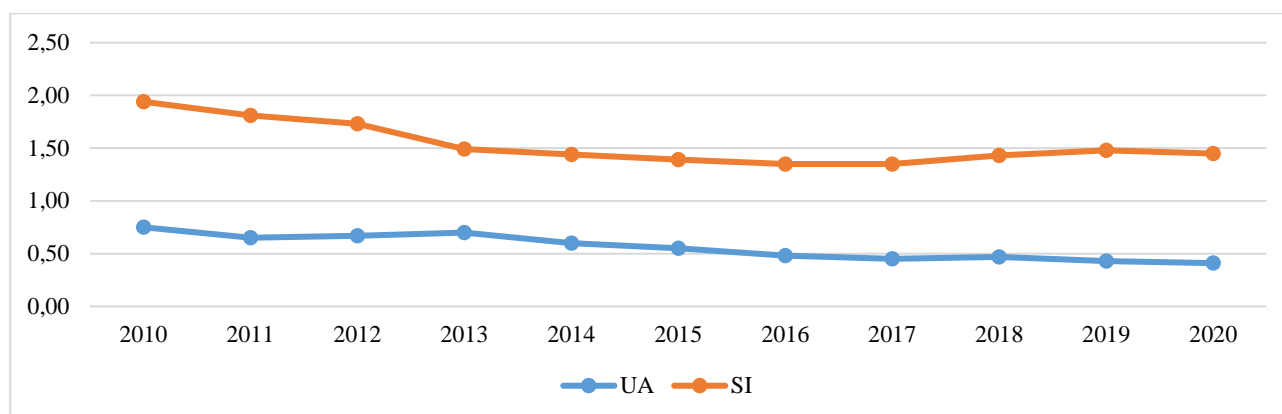

Figure 2 – **% of GDP for research between Ukraine and Slovenia**

Source: built by the author based on data from the Table 1

Analyzing the data in Table 3, we note that due to quarantine restrictions in 2020, the number of active enterprises in Ukraine decreased by 1.78%. In addition, in the Republic of Slovenia, in 2020, enterprises increased by 0.52%, indicating the state's support of the entrepreneurial activity. Entrepreneurs have successfully used the opportunities created by the global pandemic.

Table 3. **The growth rate of the public sector between countries**

Year	Commercial sector			
	q_ae			
	UA	UA growth rate, %	SI	SI growth rate, %
2013	-		-	
2014	341001	-	186433	-
2015	343440	+0.71	191863	+2.91
2016	306369	-10.79	196072	+2.19
2017	338256	+10.40	195756	-0.16
2018	355877	+5.20	200174	+2.25
2019	380597	+6.94	205139	+2.48
2020	373822	-1.78	206220	+0.52

Source: built by the author based on data from the Table 1

Thus, this study confirms the hypothesis H4: $\overline{Y} \geq \overline{X}$ and proves that, despite the reduction in the number of active enterprises during the global pandemic, there are 55.1% more active enterprises in Ukraine than in Slovenia. We present the growth rate for all sectors in table 4.

Table 4. **The Growth rate in all sectors between countries considering COVID-19 restrictions**

Year	Public sector				Commercial sector	
	fid_k		GDP_s, %		q_ae	
	UA	SI	UA	SI	UA	SI
2019	+17.31	+9.37	-8.51	+9.37	+6.94	+2.48
2020	-15.02	-2.12	-4.65	-0.95	-1.78	+0.52

Source: built by the author based on data from the Tables 2 and 3

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In the next stage of the study, we will conduct a correlation analysis of the relationship between the number of officially registered cases of COVID-19 and the Consumer Price Index (CPI) in Ukraine. The data will be taken for the next period from March 2020 to January 2021. We used the Pearson coefficient to measure the strength of the association between variables and analyze the linear connections correlation and closeness (Table 5).

We accompany our calculations with a confidence interval, within which the actual value is with a given probability. Before calculating the confidence interval limits, we make a Fisher transform. The next step is to calculate the indicator that we use to calculate the confidence interval (use the normal distribution property). Most scientists use a 95% confidence interval, so we calculate the indicators for the normal distribution. Determine the lower and upper limits of the confidence interval for the correlation coefficient by the inverse Fisher transform.

Table 5. **Initial data for Pearson's correlation analysis**

2020	Number of diseases	CPI
March	645	100,8
April	10406	100,8
May	23672	100,3
June	44334	100,2
July	69884	99,4
August	121215	99,8
September	208959	100,5
October	387481	101,0
November	732625	101,3
December	1055047	100,9

Source: built by the author based on data [26, 27]

Therefore, we enter the obtained data in IBM SPSS Statistics version 28.0 and analyze it with the help of a specific tool, and we will highlight the results in table 6.

Table 6. **The result of Pearson's correlation analysis**

Pearson's correlation coefficient (r)	0,54
n	10
z	0,60
se	0,37
c_95%	1,95
Lower limit 95% zL	-0,13
Upper limit 95% zL	1,35
Lower limit 95% rL	-0,13
Upper limit 95% rU	0,87

Source: built by the authors

* r_{xy} = from 0 to 1

**p=0,95 (0,05)

Thus, the analysis results indicate a nonlinear correlation between the CPI and the number of COVID-19 cases in 2020. There is no complete correlation, but the relationship is not high enough because "r" = 0.54 at "r" ± 1, due to the impact of many secondary external factors.

Conclusions. We can conclude that the pandemic and other force majeure situations (for example, military action) impact economic development differently. On the one hand, force majeure situations may inhibit the economic development of the individual country or the global business community. On the other hand, force

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majeure situations sometimes push innovative development forward and the search for new opportunities. By analyzing the trends of innovation development in the public and commercial sectors of Ukraine and the Republic of Slovenia, we figured that the funding of innovation activities under quarantine restrictions in 2020 decreased.

Given the analysis of the commercial sector of these countries, we observe that the number of active enterprises did not decrease significantly during the global pandemic in Ukraine 2020 but slightly increased in the Republic of Slovenia. In both countries, entrepreneurs have successfully used the opportunities created by force majeure. It indicates a relatively high-stress resilience of business in the studied countries, which has become the key to doing business in the current conditions of hostilities in Ukraine.

We plan to deepen our research in the future. Also, investigate the companies that have improved their innovation in the post-quarantine world; the relationship between the region's innovative development and the activity of its population; how does the amount of foreign direct investment affect the number of innovative products?

References:

1. Xin Jin, Min Zhang, Guanghua Sun, Lixin Cui. The impact of COVID-19 on firm innovation : Evidence from Chinese listed companies. (2021). Finance Research Letters. doi: https://doi.org/10.1016/j.frl.2021.102133 [in English].

2. Augustine Tarkom. Impact of COVID-19 exposure on working capital management : The moderating effect of investment opportunities and government incentives. (2021). Finance Research Letters. doi: https://doi.org/10.1016/j.frl.2021.102666 [in English]/

3. Li, Ya., Zhuang, X., Wang, J. & Dong Z. Analysis of the impact of COVID-19 pandemic on G20 stock markets. (2021). *The North American Journal of Economics and Finance*. 58. doi: https://doi.org/10.1016/j.najef.2021.101530 [in English].

4. Mogaji, E., Adekunle, I., Aririguzoh, S. & Oginni, A. Dealing with impact of COVID-19 on transportation in a developing country : Insights and policy recommendations. (2022). *Transport Policy*. 116. 304-314. doi: https://doi.org/10.1016/j.tranpol.2021.12.002 [in English].

5. Inegbedion, H. Impact of COVID-19 on economic growth in Nigeria : opinions and attitudes. (2021). Heliyon. 7. 5. doi: https://doi.org/10.1016/j.heliyon.2021.e06943 [in English].

6. Liu, F., Kong, D., Xiao, Z., Zhang, Z., Zhou, A. Qi, & J. Effect of economic policies on the stock and bond market under the impact of COVID-19. (2022). *Journal of Safety Science and Resilience*. 3. 1. 24-38. doi: https://doi.org/10.1016/j.jnlssr.2021.10.006 [in English].

7. Rose, A. COVID-19 economic impacts in perspective : A comparison to recent U.S. disasters. (2021. International *Journal of Disaster Risk Reduction*. 60. doi: https://doi.org/10.1016/j.ijdrr.2021.102317 [in English].

8. Deriu, S., Cassar, I. P., Pretaroli, R., & Socci, S. The economic impact of Covid-19 pandemic in Sardinia. (2021). *Research in Transportation Economics*. doi: https://doi.org/10.1016/j.retrec.2021.101090 [in English].

9. Chengying, H., Yali Chang, Yinghe Qing, & Jianwu Lin. The comparison of economic impacts of COVID-19 between China and the United States. (2021). *Procedia Computer Science*. 187. 307-315. doi: https://doi.org/10.1016/j.procs.2021.04.067 [in English].

10. Nguyen Thi Khanh Chi. Innovation capability : The impact of e-CRM and COVID-19 risk perception. (2021). *Technology in Society*. 67. doi: https://doi.org/10.1016/j.techsoc.2021.101725 [in English].

11. Zimmerling, A., Chen, X. Innovation and possible long-term impact driven by COVID-19: Manufacturing, personal protective equipment, and digital technologies. (2021). *Technology in Society*. 65. doi: https://doi.org/10.1016/j.techsoc.2021.101541 [in English].

12. Gavilan, D., Balderas-Cejudo, A., Fernández-Lores, S., & Martinez-Navarro, G. Innovation in online food delivery: Learnings from COVID-19. (2021). *International Journal of Gastronomy and Food Science*. 24. doi: https://doi.org/10.1016/j.ijgfs.2021.100330 [in English].

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13. Amankwah-Amoah, J. COVID-19 pandemic and innovation activities in the global airline industry : A review. (2021). *Environment International*. 156. doi: https://doi.org/10.1016/j.envint.2021.106719 [in English].

14. Brem, A., Viardot, E., & Nylund, Petra A. Implications of the coronavirus (COVID-19) outbreak for innovation : Which technologies will improve our lives? (2021). *Technological Forecasting and Social Change*. 163. doi: https://doi.org/10.1016/j.techfore.2020.120451 [in English].

15. Amy, Wenxuan Ding, & Shibo, Li. National response strategies and marketing innovations during the COVID-19 pandemic. (2021). *Business Horizons*. 64. Is. 2. 295-306. doi: https://doi.org/10.1016/j.bushor.2020.12.005 [in English].

16. Wang, Y., Hong, A., Li, X., & Gao, J. Marketing innovations during a global crisis: A study of China firms` response to COVID-19. (2020). *Journal of Business Research*. 2020. 116. 214-220. doi: https://doi.org/10.1016/j.jbusres.2020.05.029 [in English].

17. Blazy, J. M., Causeret, F., & Guyader, S. Immediate impacts of COVID-19 crisis on agricultural and food systems in the Caribbean. (2021). *Agricultural Systems*. 190. doi: https://doi.org/10.1016/j.agsy.2021.103106 [in English].

18. Coopmans, I., Bijttebier, Jo., Marchand, F., Mathijs, E., Messely, E., Rogge, E., Sanders, & A., Wauters, E. COVID-19 impacts on Flemish food supply chains and lessons for agri-food system resilience. (2021). *Agricultural Systems*. 190. doi: https://doi.org/10.1016/j.agsy.2021.103136 [in English].

19. Markovic, S., Koporcic, N., Arslanagic-Kalajdzic, M., Kadic- Maglajlic, S., Bagherzadeh, M., & Islam, N. Business-to-business open innovation : COVID-19 lessons for small and medium-sized enterprises from emerging markets. (2021). *Technological Forecasting and Social Change*. 170. doi: https://doi.org/10.1016/j.techfore.2021.120883 [in English].

20. Gankin, Yu., Nemira, A., Koniukhovskii, V., Chowell, G. Thomas A. Weppelmann, Skums, P., & Kirpich, A. Investigating the first stage of the COVID-19 pandemic in Ukraine using epidemiological and genomic data. (2021). *Infection, Genetics and Evolution*. 95. doi: https://doi.org/10.1016/j.meegid.2021.105087 [in English].

21. Grabara, D. iPhone 11 premium mobile device offers on e-commerce auction platform in the context of Marketing Mix framework and COVID-19 pandemic. (2021). *Procedia Computer Science*. 192. 1720-1729. doi: https://doi.org/10.1016/j.procs.2021.08.177 [in English].

22. Komisarenko, S. V. Hunting scientists for the coronavirus SARS-COV-2, which causes COVID-19: scientific strategies to overcome the pandemic. (2020). Visnyk NAN Ukrayiny. https://doi.org/10.15407/visn2020.08.029 [in Ukrainian].

23. Stukalo, N., & Simakhova, A. COVID-19 impact on Ukrainian higher education. COVID-19 impact on Ukrainian higher education. *Universal Journal of Educational Research* 8.8. 2020: 3673-3678. https://doi.org/10.13189/ujer.2020.080846 [in English].

24. Anishchenko, L. A. Study of some aspects of the impact of the COVID-19 pandemic on the psychosomatic manifestations of the inhabitants of the northern regions of Ukraine. Dosvid perezhyvannya pandemiyi covid-19 : dystantsiyni psykholohichni doslidzhennya, dystantsiyna psykholohichna: 83. Kyyiv 23 kvitnya 2020 r. Natsional'na akademiya pedahohichnykh nauk Ukrayiny. Kyyiv.n121 83-91 [in Ukrainian].

25. Dolbneva, D. V. The impact of COVID-19 on the economies of the world. (2020). Problemy ékonomyky. 1 (43). 20-26. https://doi.org/10.32983/2222-0712-2020-1-20-26 [in Ukrainian].

26. Ministry of Finance - all about finance : news, exchange rates, the bank. Official web-site. Retrieved from : https://minfin.com.ua/ua/ [in Ukrainian].

27. State Statistics Service of Ukraine. Official web-site. Retrieved from : http://www.ukrstat.gov.ua/ [in Ukrainian].

28. Republic of Slovenia Statistical office. Retrieved from: https://www.stat.si/StatWeb/en [in English].

29. Home – Eurostat. Official web-site. Retrieved from : https://ec.europa.eu/eurostat [in English].

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