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FEATURES OF BUSINESS INNOVATION IMPLEMENTATION IN THE EU ENTERPRISES IN THE CONTEXT OF ECONOMIC INSTABILITY AND RESOURCE CONSTRAINTS[1]

In the context of increased instability in the global economy due to the COVID-19 pandemic and the full-scale war in Ukraine, enterprises in various countries face significant resource constraints. As a result, the implementation of new organizational, managerial, and marketing methods – less costly compared to new products and technologies – becomes particularly important. The study of the specific features of business innovation implementation in EU enterprises was based on the results of the Community Innovation Survey and the recommendations of the Oslo Manual. The findings show that during the 2020 crisis, linked to the COVID-19 pandemic, EU enterprises reduced the implementation of product innovations, while simultaneously increasing their focus on implementing business process innovations, driven by a lack of funds to finance innovation activities. The most popular business process innovations were those related to information processing and communications, as well as organizational decision-making and the management of external relations. At the same time, innovations related to new methods of production (technological processes) and logistics, supply, or distribution of resources, goods, or services were in much less demand. Thus, enterprises sought to compensate for the temporary delay in introducing new products and technological processes by focusing on the implementation of modern information technologies and more cost-effective new organizational,

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managerial, and marketing methods. It is concluded that new organizational, managerial, and marketing methods can replace product innovations and new methods of production during economic instability and crises. Moreover, in times of economic instability and resource constraints, the introduction of less expensive new organizational, managerial, and marketing methods becomes a priority. A comparison of the innovation activities of EU enterprises during the 2020 COVID-19 crisis with those during the 2007-2009 financial and economic crisis led to the conclusion that the trend mentioned above is long-term. This trend should be taken into account when developing an innovation policy for Ukrainian enterprises, both under martial law and during the post-war recovery.

Keywords: economic instability, resource constraints, EU enterprises, business innovation, product innovation, business process innovation

JEL classification*: F29, O31, O52*

В умовах посилення нестабільності у світовій економіці під впливом пандемії COVID-19 і повномасштабної війни в Україні, підприємства різних країн відчувають суттєві ресурсні обмеження. Тому набуває особливого значення впровадження нових організаційних, управлінських і маркетингових методів, які є менш витратними порівняно з новими продуктами і технологіями. Дослідження особливостей впровадження бізнес-інновацій підприємствами країн ЄС здійснено на базі результатів міжнародних обстежень Community Innovation Survey та рекомендацій Керівництва Осло. Виявлено, що під час кризи 2020 р., викликаної пандемією COVID-19, під впливом нестачі коштів для фінансування інноваційної діяльності підприємства країн ЄС скоротили впровадження продуктових інновацій та більш активно впроваджували інновації бізнес-процесів. Найбільш затребуваними були інновації бізнес-процесу, пов'язані з обробкою інформації та засобами зв'язку, а також з прийняттям організаційних рішень і управлінням зовнішніми відносинами (з постачальниками, партнерами тощо). В той час як інновації, пов'язані з новими методами виробництва товарів і надання послуг (технологічними процесами), а також з логістикою, постачанням або розподілом ресурсів, товарів або послуг, були затребувані значно менше. Таким чином підприємства компенсували тимчасову відмову від нових продуктів і технологічних процесів за рахунок впровадження новітніх інформаційних технологій та менш витратних нових організаційних, управлінських і маркетингових методів. Зроблено висновок про те, що продуктові інновації та нові методи виробництва, з одного боку, і нові організаційні, управлінські та маркетингові методи, з іншого боку, під час економічної нестабільності та кризи втрачають комплементарний характер і стають субститутами. Таким чином, в періоди економічної нестабільності та ресурсних обмежень впровадження у діяльність підприємств менш витратних нових організаційних, управлінських і маркетингових методів набуває пріоритетного характеру. Порівняння особливостей впровадження інновацій підприємствами країн ЄС під час кризи 2020 року, пов'язаної з пандемією COVID-19, та в період фінансово-економічної кризи 2007-2009 років, дозволило виявити, що така тенденція є довготривалою. Таку тенденцію слід враховувати для розробки інноваційної політики на українських підприємствах в умовах воєнного стану та в період післявоєнного відновлення економіки.

Ключові слова: економічна нестабільність, ресурсні обмеження, підприємства країн ЄС, бізнес-інновації, продуктові інновації, інновації бізнес-процесу

JEL classification: *F29, O31, O52*

Introduction and problem statement. In times of economic instability, when enterprises have great resource constraints, the introduction of new organizational, managerial and marketing methods becomes especially relevant. During the 2007-2009 financial and economic crisis, the share of EU enterprises that introduced organizational and marketing innovations, which are less costly compared to new products and technologies, increased significantly. A similar trend was also observed in Ukraine. It is necessary to find out whether this trend is long-term, in particular, by analyzing the features of implementation the innovation at EU enterprises during the 2020 crisis associated with the COVID-19 pandemic. Revealed regularities will help to improve the approaches to implementation the innovation at Ukrainian enterprises during war period and post-war recovery.

Literature review.

System approach to innovation is highlighted by Jon-Arild Johanessen [1]. The researcher studied the role of innovation for firm competitiveness from a systemic point of view. He founded out what critical innovation factors hinder/promote innovation activity in the individual company and proposed the interactive innovation model on this basis.

The interpretation of the types of innovation is periodically revised by the international expert community, in accordance with changes in the business environment. The 4th edition of the Oslo Guidelines [2], the main methodological document of the OECD in the field of statistics of innovations, focuses on the innovation in the Business enterprise sector. This introduces the concept **of business innovation** – it is "*a new or improved product or business process (or combination thereof) that differs significantly from the firm's previous products or business processes and that has been introduced on the market or brought into use by the firm*" [2, p. 68].

Thus, there are **two major types of business innovations** by objects: **product innovations** that change the firm's products, and **business process innovations** that change the firm's business processes [2, p. 70].

A product innovation *is a new or improved good or service that differs significantly from the firm's previous goods or services and that has been introduced on the market* [2, p. 70].

A business process innovation, in turn, is a *new or improved business process for one or more business functions that differs significantly from the firm's previous business processes and that has been brought into use in the firm* [2, p. 72].

Product innovations are classified into two main types—goods and services—whereas business process innovations fall into six broad categories.

Business process innovations relate to the various functions of a firm. The classification of business functions provided by the Oslo Manual makes it possible to define the different types **of business process innovation** [2, p. 73]. A list of the six main business functions that may be the focus of innovation is provided below:

1. Production of goods or services. Activities that transform inputs into goods or services, including engineering and related technical testing, analysis, and certification activities to support production.

2. Distribution and logistics. This function includes:

a) marketing methods, including advertising (product promotion and placement, packaging of products), direct marketing (telemarketing), exhibitions and fairs, market research, and other activities to develop new markets;

b) pricing strategies and methods;

c) sales and after-sales activities, including help desks other customer support, and customer relationship activities.

3. Marketing and sales. This function includes:

a) marketing methods including advertising (product promotion and placement, packaging of products), direct marketing (telemarketing), exhibitions and fairs, market research, and other activities to develop new markets;

b) pricing strategies and methods;

c) sales and after-sales activities, including help desks other customer support, and customer relationship activities.

4. Information and communication systems. The maintenance and provision of information and communication systems, including:

a) hardware and software;

b) data processing and database;

c) maintenance and repair;

d) web-hosting and other computer-related information activities.

5. Administration and management. This function includes:

a) strategic and general business management (cross-functional decision-making), including organizing work responsibilities;

b) corporate governance (legal, planning, and public relations);

c) accounting, bookkeeping, auditing, payments, and other financial or insurance activities;

d) human resources management (training and education, staff recruitment, workplace organization, provision of temporary personnel, payroll management, health, and medical support);

e) procurement;

f) managing external relationships with suppliers, alliances, etc.

6. Product and business process development. Activities to scope, identify, develop, or adapt products or a firm's business processes.

Both new and improved business processes can be aimed at various goals, such as implementing business strategies, reducing costs, improving product quality or working conditions, or meeting regulatory requirements.

The Oslo Manual pays attention to what a single innovation can involve combinations of different types of product and business process innovations [2, p. 70]. Thus, product and business process innovations can be considered as complementary.

We find statements about the complementary nature of different types of innovations in the works of several authors. For example, Mahmutaj, Krasniki, and Rocheska [3] examined the complementary relationship between types of innovation in SMEs based on empirical case studies of innovative SMEs in Kosovo. They found that product and process innovations are complementary in most cases. A similar idea is presented by Reketty [4], who distinguishes between technological and non-technological innovations. The researchers argue that non-technological innovations (marketing and organizational) are closely linked and interact with technological innovations (product and process), generating a synergistic effect.

However, a study of more than 700 German companies led Bhargava, Chatterjee, Grimpe, and Sofka [5] to suggest that non-technological and technological innovations are not always complementary phenomena. They argue that in some cases, these types of innovations may substitute for one another. This assumption is particularly relevant for start-ups or financially unstable companies experiencing significant resource constraints, especially in the context of global recession and post-crisis instability.

Also, Grimpe, Sofka, Bhargava, and Chatterjee [6] investigate the role of marketing innovation in a firm's overall innovation strategy. They find that simultaneously investing in both innovative marketing and R&D has dissynergistic effects, which decrease innovation performance. The negative effects are particularly strong for small firms and those in high-tech industries.

The features of innovation implementation at EU enterprises in the context of economic instability, based on data from the Community Innovation Survey 2008 (CIS-6), were studied in [7; 8]. It is shown that the share of EU enterprises that introduced organizational and marketing innovations increased during the 2007–2009 financial and economic crisis [7, p. 60]. The authors concluded that in times of resource constraints, enterprises more frequently rely on less costly organizational and marketing innovations compared to new products, technologies, and similar innovations [8, p. 111].

In the works of a wide range of researchers, problems related to the nature, implementation, and impact of different types of innovations are considered. For example, Medda [9] assesses the relationship between firms' R&D expenditures relative to sales and innovation output, depending on whether firms have introduced product innovation, process innovation, or both types of innovations together. In turn, Markic focuses on process innovation as a precondition for business excellence, following a holistic approach to competitiveness [10].

Business process innovations at EU enterprises were studied by Antonucci and Pianta [11]. The EU innovation database drawn from the Community Innovation Survey 1994–1996 was analyzed across a number of European countries. A comparison of the results from CIS 1990–1992 and CIS 1994–1996 shows that technological change has had a major impact on the choice of enterprises' competitiveness strategies and productivity growth in the manufacturing industry. Parrilli, Balavac, and Radicic [12]

conducted a thorough analysis of business innovation modes across a range of regional contexts based on a cross-country analysis using CIS-Eurostat 2014 regional data. They considered the nature of innovation and various types of business innovation modes in the context of their impact on innovation outputs across EU regions.

At the same time, modern approaches to the implementation of business innovations in enterprises of EU countries under current conditions of economic instability have not been sufficiently studied and require more in-depth research.

The aim of the paper is to determine the features of the implementation of business innovations in enterprises of EU countries during the 2020 economic crisis caused by the COVID-19 pandemic, in order to apply the identified patterns to domestic enterprises during martial law and post-war recovery.

The main material of the study. We investigated the implementation of business innovations in enterprises of EU countries based on data from the Community Innovation Survey (CIS) provided by Eurostat [13]. Data from the two most recent surveys – CIS 11 (2018) and CIS 12 (2020) – were used.

According to the CIS methodology, the survey considers data on the innovation activities of enterprises that have implemented or have not implemented innovations over the past three years.

It was found that the share of innovation-active enterprises is highest among large enterprises with more than 250 employees. In 2020, this share was 79.4% in EU countries and 84.7% in the Eurozone. For medium-sized enterprises (50–249 employees), the figures were 65.2% and 78%, respectively. For small enterprises (10–49 employees), the corresponding values were 48.5% and 52.7%.

The available data made it possible to compare the dynamics of innovation implementation during 2018–2020 – including the deep crisis caused by the COVID-19 pandemic – with the previous, relatively stable period of 2016–2018. It should be noted that the GDP decline of -5.7% in 2020 [14] was the most severe in EU history.

For convenience and to facilitate comparison of statistics across different time periods, in this study, CIS 11 (2018) data are referred to as 2018 and CIS 12 (2020) data as 2020, unless otherwise stated.

We analyzed the dynamics of general indicators of innovation activity – particularly the shares of innovation-active enterprises and expenditures on innovation – both across the EU as a whole and by individual countries for the years 2018 and 2020 (Table 1). The results indicate that the share of innovation-active enterprises in the EU increased from 50.3% in 2018 to 52.7% in 2020. Growth was observed in 17 countries, with the most significant increases in the Czech Republic (from 46.8% to 56.9%), Ireland (from 45.5% to 57.6%), Greece (from 60.3% to 72.6%), Poland (from 23.7% to 34.9%), and Portugal (from 37.8% to 51.1%). However, in 10 EU countries, the share of innovation-active enterprises declined, most notably in Estonia (from 73.1% to 64.2%), Italy (from 63.2% to 55.7%), Romania (from 14.6% to 10.7%), Luxembourg (from 50.6% to 45.9%), Malta (from 46.5% to 41.1%), and Austria (from 62.6% to 60%). These reductions should be considered quite significant.

Expenditure on innovation (including R&D) increased between 2018 and 2020 in 12 EU countries, including Belgium, the Czech Republic, Ireland, Hungary, Lithuania, Austria, and others. However, spending on innovation decreased in 14 countries, including Denmark, Germany, Spain, France, Italy, Slovakia, Sweden, and others. Overall, total innovation expenditure by enterprises in EU countries decreased from 384 billion euros in 2018 to 374 billion euros in 2020. Thus, the reduction in total innovation expenditure for EU enterprises during this period was estimated at 10 billion euros.

Thus, the reduction in the share of innovation-active enterprises in 10 countries in 2020, along with the absolute decrease in innovation expenditure in 14 countries, indicates a slowdown in innovation activity among EU enterprises during the crisis recession.

Table 1

Share of innovation-active enterprises and innovation expenditures in EU countries

Country	Innovation-active enterprises, %		Expenditure on innovation (including R&D), thousands of Euros	
	2018	2020	2018	2020
European Union*	50,3	52,7	n/a	n/a
Euro area**	56,0	57,1	n/a	n/a
Belgium	67,8	71,3	17 458 925	18 109 876
Bulgaria	30,1	36,2	595 965	672 725
Czechia	46,8	56,9	5 884 088	10 083 229
Denmark	57,1	57,7	9 740 657	8 239 467
Germany	67,8	68,8	167 306 172	166 293 782
Estonia	73,1	64,2	951 330	856 618
Ireland	45,5	57,6	5 454 815	6 995 580
Greece	60,3	72,6	2 629 672	2 958 378
Spain	31,1	33,4	17 172 969	15 526 469
France	51,5	54,8	60 547 524	57 151 983
Croatia	52,5	54,9	620 029	474 931
Italy	63,2	55,7	41 043 460	31 090 116
Cyprus	68,2	65,8	241 445	205 719
Latvia	32,9	32,0	201 763	162 371
Lithuania	50,5	53,0	1 055 724	1 528 743
Luxembourg	50,6	45,9	850 922	720 474
Hungary	28,7	32,7	2 629 537	3 299 943
Malta	46,5	41,1	158 947	151 406
Netherlands	49,7	55,8	n/a	n/a
Austria	62,6	60,0	9 789 360	11 104 609
Poland	23,7	34,9	8 561 179	8 727 759
Portugal	37,8	51,1	2 042 465	2 280 844
Romania	14,6	10,7	925 199	1 067 765
Slovenia	48,6	55,2	997 437	860 529
Slovakia	30,5	36,6	1 766 749	1 662 737
Finland	61,9	68,6	6 788 144	6 797 635
Sweden	63,1	65,2	18 606 162	16 886 122

* 27 countries (from 2020)
**19 countries (2015-2022)
n/a – not applicable
Source: Eurostat [13].

To understand the impact of resource constraints on the implementation of innovations, the reasons hindering innovation activity among EU enterprises are summarized based on the CIS 2020 survey. The main obstacles include limited financial and labor resources. For example, 19.2% of enterprises in the Czech Republic, 14.9% in Spain, 20.1% in France, 20.5% in Croatia, 18.8% in Cyprus, 16.4% in Latvia, 20.5% in Lithuania, 14.6% in Hungary, 15.9% in Portugal, and 23.7% in Slovakia cited the lack of own funds as the primary barrier to innovation. In addition, a lack of qualified personnel, high innovation costs, strong market competition, insufficient demand for innovative products, and the presence of other internal priorities were also identified as factors limiting innovation activity.

The methodology of the Community Innovation Survey is based on the approach outlined in the Oslo Manual. Enterprises are

asked to provide data on the implementation of **product innovations** and **business process innovations** in their activities. Specifically, the questions cover the following seven types of business process innovations:

1. New or improved methods for producing goods or providing services (technological processes);
2. Innovations in logistics;
3. New business practices for organising procedures or external relations;
4. New methods of organising work responsibility, decision making or human resource management;
5. New or improved methods for information processing or communication;
6. New methods for accounting or other administrative operations;
7. New marketing methods for promotion, packaging, pricing, product placement or after sales services.

It should be noted that these types of business process innovations used in the CIS methodology are based on the business functions set out in the Oslo Manual.

The results of the analysis of the percentage shares of EU enterprises that implemented **business innovations (both product innovations and business process innovations),** according to CIS 2018 and CIS 2020, are presented below.

As shown in Table 2, the percentage share of EU enterprises that implemented **product innovations** decreased from 29.8% in 2018 to 28.4% in 2020. A similar trend was observed in the Eurozone, where the share of enterprises that introduced product innovations dropped from 32.9% in 2018 to 30.4% in 2020. This reduction occurred in 15 EU countries, while 11 countries saw an increase in the indicator, and there were no changes in Slovakia.

The decline in the percentage of enterprises that introduced product innovations was greatest in the following countries: Estonia, from 49.5% to 27.8%; Latvia, from 28.6% to 14.5%; and Malta, from 31.3% to 19%. There was also a significant decrease in this indicator in Cyprus, from 48.6% to 39.5%; in France, from 53.9% to 46.9%; in Germany, from 40.2% to 36.8%; in Italy, from 36.4% to 30.3%; and in Sweden, from 42.6% to 38.9%.

On the contrary, an increase in the introduction of product innovations took place in Belgium, from 30% to 35.8%; in Bulgaria, from 18.4% to 22.8%; in the Czech Republic, from 26.8% to 36.5%; in Greece, from 42.5% to 48.4%; in Ireland, from 28.6% to 31.7%; and in Lithuania, from 28.6% to 31.4%.

The highest percentage of enterprises implementing product innovations in 2020 was 39.5% in Cyprus, 39.2% in Finland, 48.4% in Greece, and 38.9% in Sweden. The lowest was 7% in Romania, 14.5% in Latvia, and 15.4% in Poland and Slovakia.

The introduction of **business process innovations** in the EU countries during the study period, in contrast to product innovations, showed a tendency to grow. In 2018, 41% of enterprises in the EU implemented business process innovations. By 2020, the share of such enterprises increased to 43.5%. Enterprises in the Eurozone also demonstrated this trend, with the percentage of enterprises implementing business process innovations increasing from 46.1% to 47.5%.

Considering the identified trend towards more active implementation of business process innovations compared to product innovations, let's examine them in more detail.

The share of enterprises that implemented business process innovations increased in 19 out of 27 EU countries (Table 2). The growth was greatest in the following countries: the Czech Republic from 40.3% to 53.6%, Portugal from 32.6% to 44.2%, and Ireland from 38.5% to 50.3%. However, there was also a significant reduction in the percentage of enterprises that introduced business process innovations in Austria from 55.2% to 51.7%, Italy from 53.9% to 46.9%, Luxembourg from 40.2% to 36.8%, Malta from 40.6% to 36.6%, and Romania from 8.0% to 5.7%. At the same time, in Cyprus, Denmark, and Latvia, this indicator remained almost unchanged, decreasing by only 0.1% to 0.6%. The highest percentage of enterprises implementing business process

Table 2

Share of enterprises that have implemented innovations, by EU countries, %

Country	Share of enterprises that implemented product innovations, %		Share of enterprises that have implemented business process innovations, %	
	2018	2020	2018	2020
European Union*	29,8	28,4	41,0	43,5
Euro area**	32,9	30,4	46,1	47,5
Austria	34,6	32,3	55,2	51,7
Belgium	30,0	35,8	58,1	64,4
Bulgaria	18,4	22,8	20,8	25,8
Croatia	38,7	35,5	46,3	48,2
Cyprus	48,6	39,5	65,9	65,3
Czechia	26,8	36,5	40,3	53,6
Denmark	32,3	32,2	46,6	46,1
Estonia	49,5	27,8	53,2	53,6
Finland	36,8	39,2	47,5	55,1
France	33,6	28,4	40,5	45,5
Germany	40,1	35,6	55,4	56,2
Greece	42,5	48,4	55,2	67,5
Hungary	20,4	20,8	19,8	24,3
Ireland	28,6	31,7	38,5	50,3
Italy	36,4	30,3	53,9	46,9
Latvia	28,6	14,5	25,9	25,8
Lithuania	28,6	31,4	44,5	46,4
Luxembourg	28,6	24,7	40,2	36,8
Malta	31,3	19,0	40,6	36,6
Netherlands	27,4	28,4	40,0	43,6
Poland	13,4	15,4	18,8	26,9
Portugal	28,1	25,9	32,6	44,2
Romania	9,9	7,0	8,0	5,7
Slovakia	15,4	15,4	22,6	27,6
Slovenia	36,9	36,3	37,4	42,9
Spain	14,6	18,8	23,8	27,0
Sweden	42,6	38,9	48,2	52,0

* 27 countries (from 2020)
**19 countries (2015-2022)
Source: Eurostat [13].

innovations was in Belgium (64.4%), Cyprus (65.3%), Greece (67.5%), and Germany (56.2%). The lowest percentages were in Romania (5.7%), Hungary (24.3%), and Latvia (25.8%).

The introduction of different types of business process innovations in enterprises, in the context of individual countries (Table 3), showed trends similar to those identified earlier.

Table 3

Dynamics of implementation of different types of business process innovations at enterprises in the EU countries

Country	Share of enterprises that implemented business process innovations, %													
	New or improved methods for producing goods or providing services		Innovations in logistics		New business practices for organising procedures or external relation		New methods of organising work responsibility, decision making or human resource management		New or improved methods for information processing or communication		New methods for accounting or other administrative operations		New marketing methods for promotion, packaging, pricing, product placement or after sales services	
Year	2018	2020	2018	2020	2018	2020	2018	2020	2018	2020	2018	2020	2018	2020
European Union **	20,9	21,1	12,9	13,1	15,2	16,9	20,5	21,5	22,8	24,9	17,6	19,3	16,6	17,6
Euro area*	23,5	22,8	14,4	13,8	17,3	17,6	23,4	24,1	26,4	27,9	20,2	21,6	18,4	18,8
Austria	29,1	25,3	20,2	17,2	31,4	25,7	33,2	26,5	34,8	34,8	27,5	26,8	23,8	21,4
Belgium	29,6	34,4	15,6	21,3	25,8	33,3	10,1	19,3	29,5	40,0	28,1	37,1	13,0	23,2
Bulgaria	11,6	14,0	5,2	7,5	9,2	10,5	8,3	11,0	8,9	12,5	6,0	8,2	8,6	10,1
Croatia	26,5	26,0	20,3	18,4	16,8	18,7	23,3	24,3	26,5	27,2	19,0	20,9	20,3	20,3
Cyprus	43,3	35,0	60,4	37,7	39,2	36,4	39,0	38,1	60,7	62,0	51,3	57,5	39,3	30,4
Czechia	19,8	30,1	10,9	22,0	13,5	38,6	19,2	20,4	18,0	29,7	14,9	23,7	22,2	34,8
Denmark	17,2	18,5	13,1	9,2	23,9	22,9	13,8	16,6	29,1	26,1	16,8	16,2	17,8	19,3
Estonia	27,9	39,4	16,6	13,0	14,6	14,1	25,6	24,3	23,6	18,5	19,5	15,0	22,9	18,6
Finland	24,4	28,3	14,6	14,9	16,1	17,6	25,1	27,0	27,5	32,2	21,7	21,9	19,7	22,7
France	22,9	20,5	11,0	11,5	14,6	17,5	20,6	25,0	19,3	22,8	15,6	18,3	14,7	14,5
Germany	23,9	21,2	14,7	12,9	19,8	19,6	32,1	30,7	34,2	35,0	25,5	27,0	23,1	23,1
Greece	34,8	38,9	24,4	30,2	31,6	37,3	36,9	43,9	32,8	45,4	31,2	42,0	28,7	33,7
Hungary	11,3	13,5	6,7	7,0	6,3	9,0	8,4	9,1	12,0	14,1	8,6	12,0	8,7	9,9
Ireland	19,8	23,0	9,5	12,9	22,6	21,1	20,9	16,1	23,9	26,0	18,1	19,9	16,8	9,8
Italy	30,3	26,4	20,7	17,5	21,0	18,6	27,7	25,6	32,4	28,3	23,0	19,7	22,4	20,3
Latvia	14,2	12,9	7,9	9,0	7,7	7,9	12,3	13,7	10,7	14,5	8,6	10,0	10,0	8,7
Lithuania	29,0	30,3	12,0	14,4	11,4	15,3	13,9	16,3	18,7	20,7	17,0	18,6	14,8	15,5
Luxembourg	17,2	15,8	13,0	10,0	16,3	12,7	17,4	14,4	27,1	25,7	17,9	16,4	14,9	11,1
Malta	21,9	18,7	15,0	13,3	19,4	18,3	27,2	24,6	25,6	22,8	20,9	19,7	20,3	17,4
Netherlands	17,6	19,0	10,5	11,2	12,3	12,5	13,6	16,1	19,2	22,3	19,5	22,7	12,5	15,3
Poland	9,7	13,6	6,9	9,7	8,8	14,2	10,5	14,4	8,9	13,3	8,8	11,4	8,2	10,6
Portugal	22,1	27,9	13,8	17,7	18,2	20,8	22,2	29,9	19,6	25,3	15,1	18,5	16,5	19,9
Romania	4,5	2,9	2,7	2,8	2,8	2,2	4,2	3,6	3,6	3,6	1,9	2,0	4,9	3,3
Slovakia	11,7	15,7	7,6	9,8	10,0	12,7	8,5	10,7	11,9	16,0	8,5	9,9	8,7	11,0
Slovenia	20,9	21,9	13,4	18,0	10,4	14,7	13,9	16,4	19,5	26,7	11,3	14,9	13,2	16,8
Spain	11,3	15,0	5,2	5,4	4,3	4,3	6,8	7,0	10,9	12,5	7,7	8,7	7,9	8,0
Sweden	23,2	21,9	15,8	17,2	6,8	6,6	16,4	16,9	18,0	20,4	14,3	17,2	14,5	16,7

* 27 countries (from 2020)

**19 countries (2015-2022)

\- - growth

\- - decrease

\- - no change

Source: Eurostat [13].

In most EU countries, specifically in seventeen countries such as Belgium, Bulgaria, the Czech Republic, Finland, France, Hungary, Lithuania, the Netherlands, Slovakia, Spain, and others, there was an increase in the percentage share of enterprises across 5-7 types of innovations, indicating full coverage of business process innovations. Three countries, namely Croatia, Denmark, and Ireland, showed an increase in the percentage share of enterprises across 3-4 types of innovations, representing moderate coverage. However, in Italy, Luxembourg, and Malta, there was a reduction in the percentage share of enterprises across all seven types of business process innovations. Austria and Estonia saw a reduction in six types, while Cyprus experienced a reduction in five types. Germany and Romania showed a decrease in four types of business process innovations, while for one type of innovation, the indicator in these countries remained at the level of the previous year.

We also investigated the number of countries where the percentage share of enterprises implementing each type of business process innovation changed in 2020 compared to 2018. It was found that for each type of innovation, the percentage share of enterprises that implemented it increased in most EU countries (Table 3), namely:

1. New or improved methods for producing goods or providing services (technological processes) – growth in 16 countries;
2. Innovations in logistics – growth in 18 countries;
3. New business practices for organising procedures or external relations – growth in 15 countries;
4. New methods of organising work responsibility, decision making or human resource management – growth in 18 countries;
5. New or improved methods for information processing or communication – growth in 22 countries;
6. New methods for accounting or other administrative operations – growth in 22 countries;
7. New marketing methods for promotion, packaging, pricing, product placement or after sales services – growth in 15 countries.

However, for certain types of business innovations, there was a decrease compared to the previous period (Table 3).

Thus, the greatest reduction was seen in the innovation ‘New or improved methods for producing goods or providing services,’ which was less implemented by enterprises in 11 countries, including Croatia, Cyprus, France, Germany, Italy, Latvia, and others.

‘Innovations in logistics’ have reduced enterprises in 9 countries: Austria, Croatia, Cyprus, Estonia, Germany, Luxembourg, Malta, etc.

‘New business practices for organising procedures or external relations’ were significantly reduced in 7 countries: Austria, Cyprus, Denmark, Ireland, Italy, Luxembourg, and Malta. There was also a slight decrease in 4 countries: Estonia, Germany, Romania, and Sweden, while in Spain the figure remained unchanged.

Fewer enterprises implemented ‘New methods of organising work responsibility, decision-making, or human resource management’ in 2020 compared to 2018 in 9 countries: Austria, Estonia, Germany, Italy, Norway, and others.

The implementation of the innovation ‘New or improved methods for information processing or communication’ decreased among enterprises in only 3 countries: Italy, Luxembourg, and Malta, while in Austria and Romania the figure remained unchanged.

The implementation of ‘New methods for accounting or other administrative operations’ decreased in 5 countries: Austria, Estonia, Italy, Luxembourg, and Malta.

On the other hand, ‘New marketing methods for promotion, packaging, pricing, product placement, or after-sales services’ were less implemented by enterprises in 10 countries, including Austria, Cyprus, Ireland, Italy, Latvia, Luxembourg, Malta, Romania, and others, while in Croatia and Germany the indicator remained the same.

According to Table 3, the percentage shares of EU enterprises that implemented ‘New or significantly improved methods of production of goods or services’ and

'Innovations in logistics' increased by only 0.2% for each of the named types of innovation. However, for the Eurozone, there was a reduction in the percentage of enterprises that implemented these innovations.

At the same time, the percentage of EU enterprises implementing 'New or improved methods for information processing or communication' increased by 2.1%; 'New business practices for organising procedures or external relations' by 1.7%; 'New methods of organising work responsibility, decision-making, or human resource management,' 'New methods for accounting or other administrative operations,' and 'New marketing methods for promotion, packaging, pricing, product placement, or after-sales services' by 1% for each named type of innovation.

Thus, during the economic downturn of 2020, the percentage of enterprises that implemented business process innovations related to information processing or communication, as well as business practices for organizing procedures or external relations, increased the most. At the same time, enterprises became more active than before in implementing innovations related to decision-making or human resource management, as well as marketing methods for promotion, packaging, pricing, product placement, or after-sales services.

In contrast, the introduction of business process innovations related to new methods of production of goods and services (technological processes), as well as logistics, supply, or distribution of resources, goods, or services, significantly decreased.

The results of the study showed that during the 2020 crisis associated with the COVID-19 pandemic, EU enterprises reduced the implementation of product innovations but, conversely, more actively adopted business process innovations.

The most widely adopted were business process innovations related to information processing and communication, as well as organizational decision-making and the management of external relations (with suppliers, partners, etc.).

In addition, enterprises actively implemented business process innovations related to internal decision-making, human resource management, and marketing methods involving promotion, packaging, pricing, product placement, and after-sales services.

At the same time, innovations related to new methods of production of goods and services (technological processes), as well as logistics, supply, or distribution of resources, goods, or services, were significantly less in demand.

Based on CIS 2020 data, the reasons hindering the innovation activity of EU enterprises were identified. It can be assumed that the primary reason for the reduced implementation of new products and production methods during the crisis was the enterprises' aim to minimize costs amid resource constraints and insufficient funding for innovation activities.

In turn, the continuous updating of information technologies essential for successful business operations, along with the implementation of less costly new organizational, managerial, and marketing methods, enables enterprises to compensate for the temporary suspension of new products and technological processes.

In other words, while product innovations and new production methods, on the one hand, and new organizational, managerial, and marketing methods, on the other, are typically complementary during periods of stability and economic growth, they can act as substitutes during times of economic instability and crisis.

Conclusions. It was found that, in the context of the economic downturn in 2020 caused by the COVID-19 pandemic, the following changes occurred in the implementation of business innovations by enterprises in EU countries.

1. Against the backdrop of a long-term trend of moderate innovation growth in the EU, 2020 saw a decrease in the share of innovation-active enterprises in 10 EU countries and an absolute reduction in innovation expenditures in 14 countries. This indicates a slowdown in innovation activity amid a sharp decline in GDP.

2. The share of EU enterprises that implemented product innovations decreased

from 29.8% in 2018 to 28.4% in 2020. A decline in this indicator was also recorded in 15 of the 27 EU countries.

3. In contrast, the implementation of business process innovations showed an upward trend. While in 2018 approximately 41% of enterprises introduced business process innovations, by 2020 this share had increased to 43.5%. Growth was observed in 19 out of 27 EU countries.

4. In 2020, the percentage of enterprises that implemented 5 to 7 types of business process innovations increased, indicating a broad or full coverage of business process innovation activities. Additionally, in three countries, more enterprises than in 2018 implemented 3 to 4 types of business process innovations. Overall, the reduction in the share of enterprises introducing business process innovations during the study period was relatively minor.

5. The percentage of enterprises that implemented business process innovations related to information processing and communications, as well as organizational decision-making and the management of external relations, increased the most. Enterprises also actively implemented innovations related to internal decision-making, human resource management, and marketing methods involving promotion, packaging, pricing, product placement, and after-sales services.

6. The percentage of enterprises that implemented business process innovations related to new methods of production of goods and services (technological processes), as well as logistics, supply or distribution of resources, goods or services, decreased slightly in the Eurozone, and increased a little in the EU countries.

The CIS 2020 data on the factors hampering innovation activity among EU enterprises suggest that the reduction in the implementation of new products and production methods during the crisis was primarily driven by enterprises' efforts to reduce costs amid resource constraints and limited funding for innovation activities.

To compensate for the temporary suspension of new products and technological processes, enterprises focused on adopting the latest information technologies and implementing less costly new organizational, managerial, and marketing methods.

It is concluded that product innovations and new methods of production, on the one hand, and new organizational, managerial, and marketing methods, on the other, lose their complementary nature during periods of economic instability and crisis, and can instead be considered substitutes.

Thus, the results of the study fully confirm the previously identified pattern [7, p. 60; 8, p. 111], according to which, in times of economic instability and resource constraints, the implementation of less expensive new organizational, managerial, and marketing methods becomes a priority. A comparison of the innovation activities of EU enterprises during the 2020 COVID-19 crisis with those during the 2007–2009 financial and economic crisis leads to the conclusion that this trend is long-term.

This pattern should be taken into account when developing innovation policy for Ukrainian enterprises, both under martial law and during the post-war recovery.

Further research should be aimed at prioritizing various types of innovations for Ukrainian enterprises and improving approaches to their implementation under resource constraints, during martial law and post-war recovery.

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FEATURES OF BUSINESS INNOVATION IMPLEMENTATION IN THE EU ENTERPRISES IN THE CONTEXT OF ECONOMIC INSTABILITY AND RESOURCE CONSTRAINTS

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In the context of increased instability in the global economy due to the COVID-19 pandemic and the full-scale war in Ukraine, enterprises in different countries face significant resource constraints. Therefore, the implementation of new organizational, managerial, and marketing methods, which are less costly compared to new products and technologies, is of particular importance.

The study of the specific features of business innovation implementation in EU enterprises was conducted based on the results of the Community Innovation Survey and the Oslo Manual recommendations. It was found that during the 2020 crisis associated with the COVID-19 pandemic, and in the context of limited funds for financing innovation activities, EU enterprises reduced the implementation of product innovations and, conversely, more actively implemented business process innovations. The most popular business process innovations were related to information processing and communications, as well as organizational decision-making and the management of external relations. In addition, enterprises have been actively implementing business process innovations related to decision-making and human resource management, as well as marketing methods such as promotion, packaging, pricing, product placement, and after-sales service. At the same time, innovations related to new methods of producing goods and services (technological processes), as well as logistics, supply, or distribution of resources, goods, or services, were much less in demand.

Based on the CIS 2020 data, the reasons for the hampering of innovation activity by EU enterprises were revealed. It can be assumed that the most important reason for the reduced implementation of new products and production methods by enterprises during the crisis is their desire to reduce costs in the face of resource constraints and lack of funds to finance innovation activities. In turn, the continuous updating of information technologies necessary for successful business, as well as the implementation of less expensive new organizational, managerial, and marketing methods, allows enterprises to compensate for the temporary halt in the introduction of new products and technological processes.

It is concluded that new organizational, managerial, and marketing methods can replace product innovations and new production methods during periods of economic instability and crisis. Therefore, these types of innovations can be considered substitutes. Moreover, during times of economic instability and resource constraints, the introduction of less expensive new organizational, managerial, and marketing methods becomes a priority. A comparison of the innovation activities of EU enterprises during the 2020 COVID-19 crisis with those during the 2007-2009 financial and economic crisis led to the conclusion that the trend mentioned above is long-term. This trend should be taken into account when developing an innovation policy for Ukrainian enterprises, both under martial law and during post-war recovery.

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