| | |
|---|---|
| *Project number* | 101127170 |
| *Project name* | Artificial Intelligence in the EU Financial Institutions |
| *Project acronym* | AIFEU |
| *Call* | ERASMUS-JMO-2023-HEI-TCH-RSCH |
| *Topic* | ERASMUS-JMO-2023-MODULE |
| *Type of action* | ERASMUS-LS |
| *Service* | EACEA/A/01 |
| *Project starting date* | 01.11.2023 |
| *Project duration* | 36 months |

# Deliverable D1.3 – Information about the project activities

| | |
|---|---|
| **Deliverable Number** | D1.3 |
| **Lead Beneficiary** | CPNU |
| **Deliverable Name** | Information about the project activities |
| **Type** | R – Document, report |
| **Dissemination Level** | PU – Public |
| **Due Date (month)** | 36 |
| **Work Package No** | WP1 |

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# Executive summary

This document is Deliverable D1.3 “Information about the project activities” of the Erasmus+ Jean Monnet Module “Artificial Intelligence in the EU Financial Institutions” (AIFEU, project No. 101127170), implemented by Chernihiv Polytechnic National University. It was prepared within Work Package 1 and presents the communication and dissemination outputs produced during the project.

The deliverable D1.3 consists of four parts:

1) *Information about the project activities on the Internet* – the online channels created for the project (pages on the websites of the University and of the Department of Finance, Banking and Insurance, and on Facebook, Instagram and Telegram) and a summary table of the key posts with links.

2) *Leaflets, brochures* – information materials about the project and its results, prepared in Ukrainian and English for different target audiences.

3) *Video interview with students* – a video in which students assess the quality of teaching and the content of the Module, recorded in Ukrainian with English subtitles.

4) *Research papers* – papers published by the project team in co-authorship with Ukrainian and European researchers, each containing an acknowledgement of EU funding and the disclaimer.

Together, these materials confirm that the dissemination activities planned in the Grant Agreement have been carried out and that the project results have been made available to students, academic staff, stakeholders and the general public.

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# 1. Information about the project activities on the Internet

To ensure wide dissemination of the project activities and results, the following online channels were created and maintained within the AIFEU project:

**1)** a dedicated project page on the official website of Chernihiv Polytechnic National University:

- in Ukrainian: https://stu.cn.ua/mizhnarodna-diyalnist/mizhnarodni-programy-ta-proekty/proyekt-aifeu/

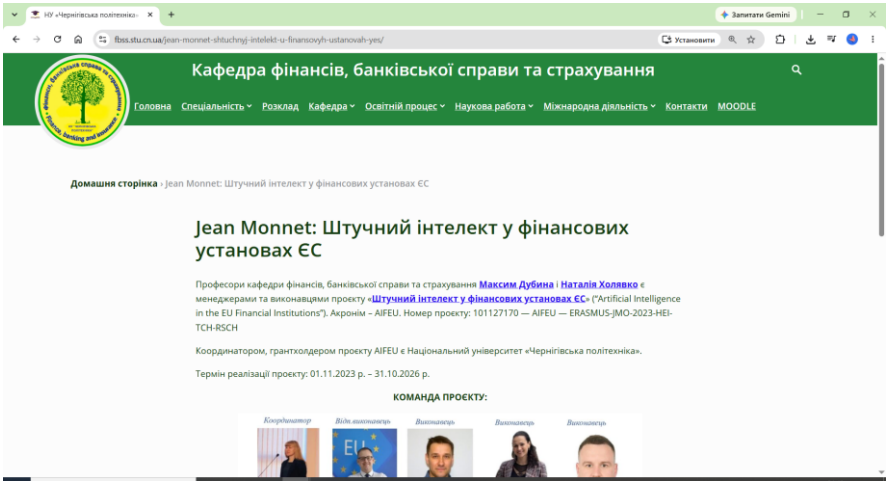
- in English: https://stu.cn.ua/en/international-activity/international-programs-and-projects/aifeu-rroject/





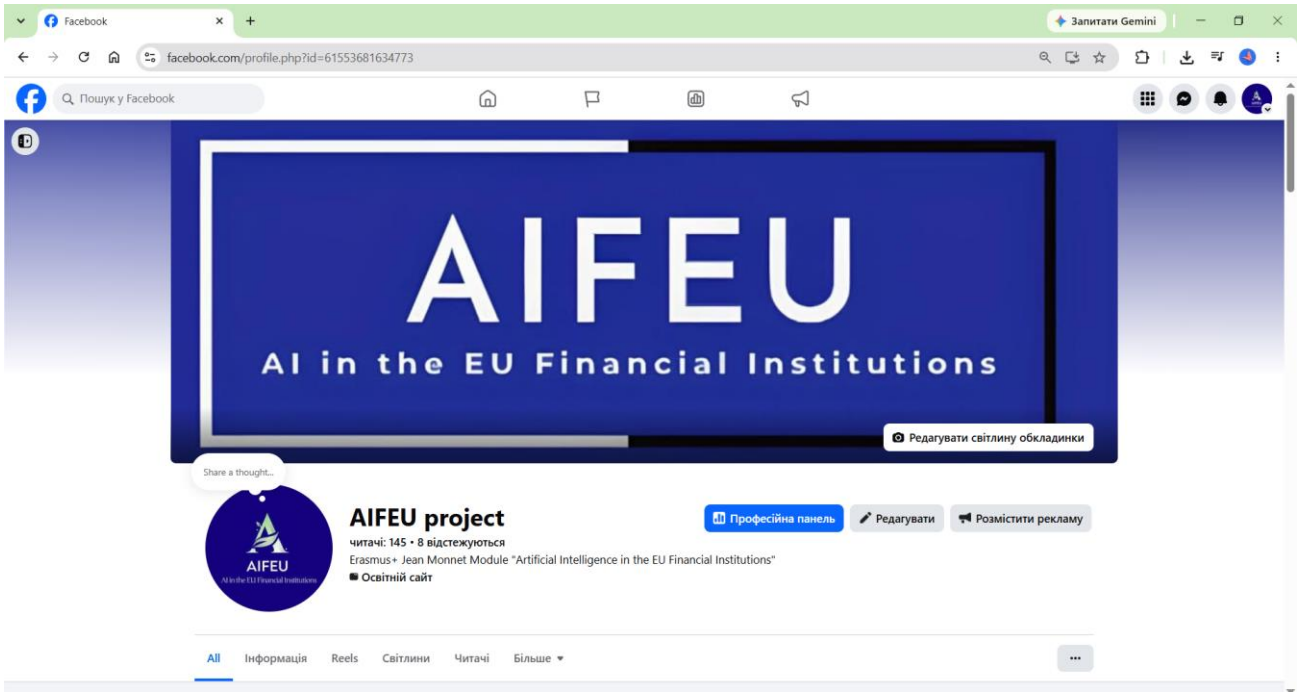


**2)** a dedicated project page on the official website of the Department of Finance, Banking and Insurance (in Ukrainian): https://fbss.stu.cn.ua/jean-monnet-shtuchnyj-intelekt-u-finansovyh-ustanovah-yes/

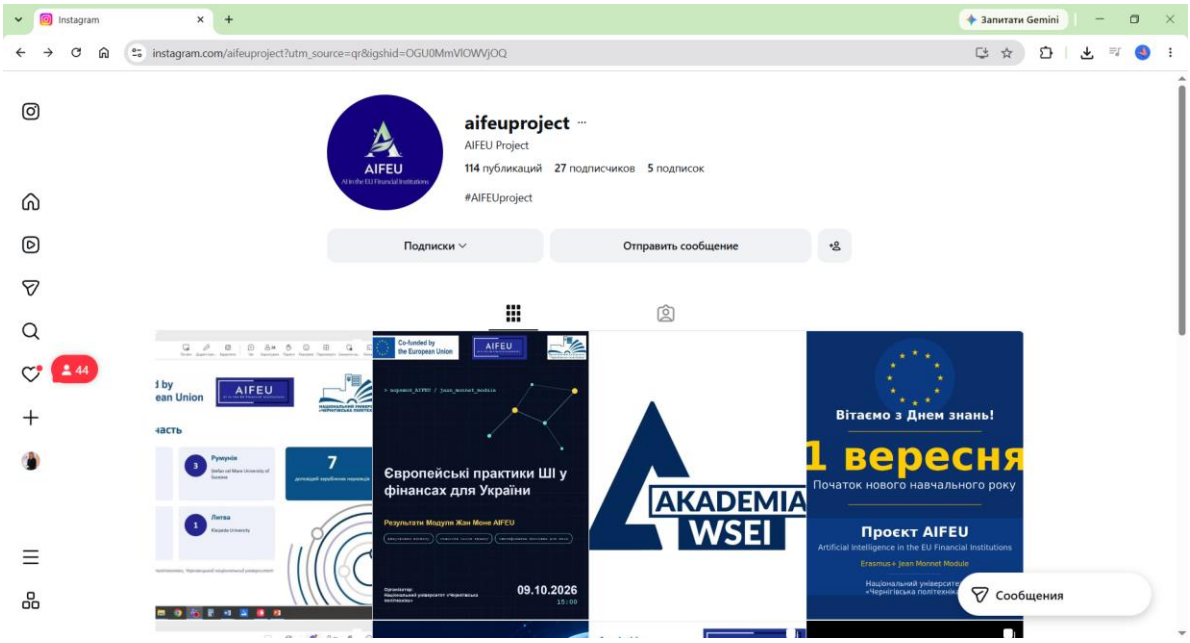



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**3)** a project page on Facebook (in Ukrainian and English): https://www.facebook.com/profile.php?id=61553681634773

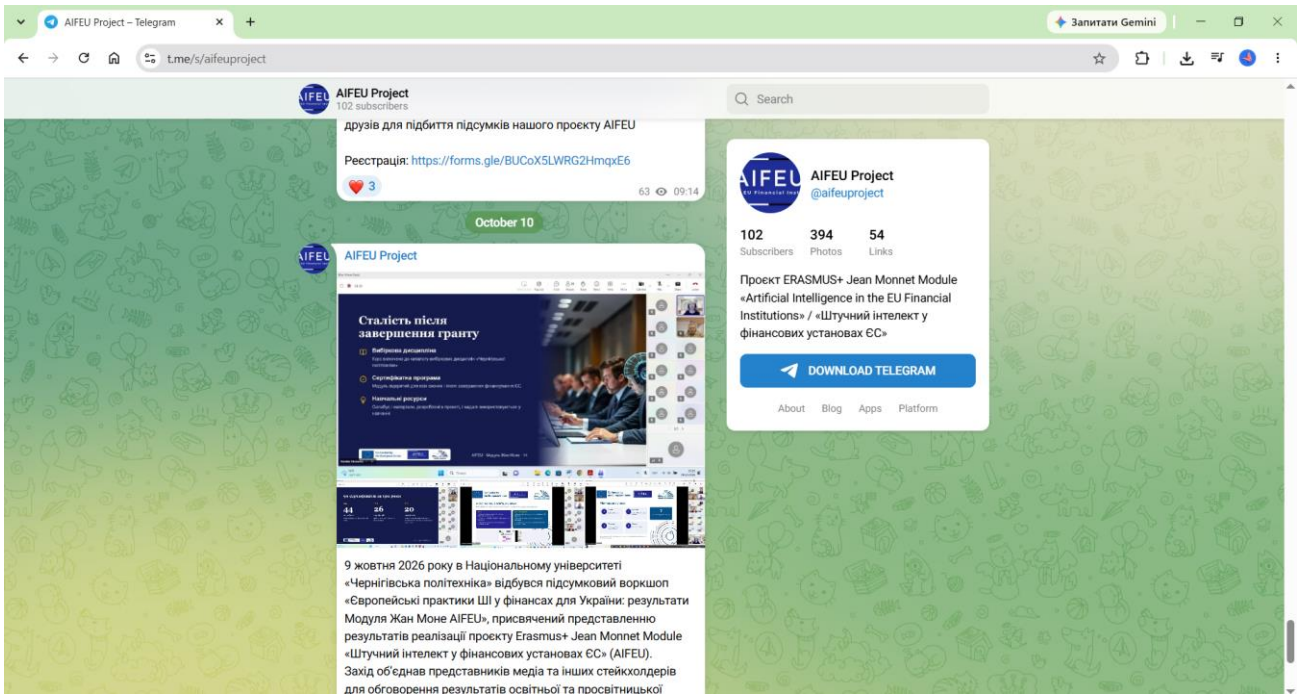



**4)** a project page on Instagram (in Ukrainian): https://instagram.com/aifeuproject




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**5)** a project channel on Telegram (in Ukrainian): [https://t.me/aifeuproject](https://t.me/aifeuproject)




These channels were used to regularly inform students, academic staff, stakeholders and the general public about the project events, outputs and results.

**The key posts are summarised in the table below.**

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 1. | 02.11.2023 | We are learning and acquiring new skills for the effective management of the AIFEU project. | Instagram<br><br>Telegram | https://www.instagram.com/aifeuproject/p/CzJCV96sW8x/<br><br>https://t.me/aifeuproject/4 |
| 2. | 04.11.2023 | We invite you to join our Telegram community:<br>Telegram: https://t.me/aifeuproject | Instagram<br><br>Telegram | https://www.instagram.com/aifeuproject/p/CzOBm2ssBHC/<br><br>https://t.me/aifeuproject/5 |
| 3. | 07.11.2023 | About our AIFEU project under the EU Erasmus+ Jean Monnet Modules programme | Instagram | https://www.instagram.com/aifeuproject/p/CzWFx2psVz0/ |
| **4.** | 10.11.2025 | Information about the AIFEU Jean Monnet Module project | Website of the Department of Finance, Banking and Insurance | https://fbss.stu.cn.ua/wp-content/uploads/2025/10/m2-aifeu-info_eng_ua.pdf |
| 5. | 14.11.2023 | November 1, the Day of the European Union, we officially launched the project "Artificial Intelligence in the EU Financial Institutions" within the ERASMUS+ program, Jean Monnet Actions.<br>The project will be implemented in the period November 2023 - October 2026.<br>We invite everyone to cooperation and constructive dialogue! | Facebook<br><br>Instagram | https://www.facebook.com/share/p/19sUsTtcUq/<br><br>https://www.instagram.com/aifeuproject/p/CzHCsxgM57F/ |
| 6. | 17.11.2023 | We invite you to follow our AIFEU project page on Facebook | Telegram | https://t.me/aifeuproject/7 |
| 7. | 21.11.2023 | We share with you an interesting article "What is machine learning and how it affects business development" | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1GPshyJhSn/<br><br>https://www.instagram.com/aifeuproject/p/CzocS4Ts00C/<br><br>https://t.me/aifeuproject/6 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 8. | 22.11.2023 | On November 22, 2023, the XXIII International Scientific and Practical Conference "Entrepreneurship Development as a Factor of National Economy Growth" was held, dedicated to the 125th Anniversary of the Igor Sikorsky Kyiv Polytechnic Institute. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1JxPd53UoY/<br><br>https://www.instagram.com/aifeuproject/p/Cz84BIhMtDC/<br><br>https://t.me/aifeuproject/8 |
| 9. | 23.11.2023 | Presentation of the AIFEU project at Igor Sikorsky Kyiv Polytechnic Institute | University website | https://stu.cn.ua/news/prezentacziya-proyektu-aifeu-u-kpi-im-igorya-sikorskogo/ |
| 10. | 24.11.2023 | On November 24, 2023, Chernihiv Polytechnic National University hosted a presentation of the project of the European Union Erasmus+ Jean Monnet Module "Artificial Intelligence in the EU Financial Institutions" (AIFEU). The presentation was held as part of a roundtable organized by the University staff in an online format; the event was attended by researchers, academic staff and students of various levels. | Facebook<br><br>University website<br><br>Website of the Department of Finance, Banking, and Insurance<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1KGZ1cE1Pg/<br><br>https://stu.cn.ua/news/prezentacziya-proyektu-aifeu-u-chernigivskij-politehniczi/<br><br>https://fbss.stu.cn.ua/prezentacziya-proyektu-aifeu-u-chernigivskij-politehniczi/<br><br>https://www.instagram.com/aifeuproject/p/C0E6CX6sOMi/<br><br>https://t.me/aifeuproject/13 |
| 11. | 01.12.2023 | 10 Neural Networks for Finance | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/19KmocaVpd/<br><br>https://www.instagram.com/aifeuproject/p/C0Z7W5MLCqW/<br><br>https://t.me/aifeuproject/17 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 12. | 09.12.2023 | Preparing to teach the Jean Monnet Module of the AIFEU, we are deepening our knowledge of artificial intelligence in education. | Facebook<br><br>Instagram<br>Telegram | https://www.facebook.com/share/p/1H9C598sM3/<br><br>https://www.instagram.com/aifeuproject/p/C0oJO7HrnmH/<br>https://t.me/aifeuproject/18 |
| 13. | 12.12.2023 | On December 12, 2023, a kick-off meeting of Jean Monnet Erasmus+ project coordinators took place online. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1BbfjwWF1W/<br><br>https://www.instagram.com/aifeuproject/p/C0ybsaCLnor/<br><br>https://t.me/aifeuproject/19 |
| 14. | 13.12.2023 | Information Days of the EU Erasmus+ Program in Ukraine: BOOK YOUR DATE! | Facebook | https://www.facebook.com/share/p/19dDhmjqCs/ |
| 15. | 13.12.2023 | KICK-OFF MEETING JEAN MONNET ACTIONS – CALLS 2023 | University website | https://stu.cn.ua/news/kick-off-meeting-jean-monnet-actions-calls-2023/ |
| 16. | 15.12.2023 | Information Days of the EU Erasmus+ Program in Ukraine in the fields of education, youth and sports: REGISTRATION IS OPEN! | Facebook | https://www.facebook.com/share/p/1BrpEjmWYZ/ |
| 17. | 17.12.2023 | Having started the implementation of the AIFEU project, the team is making every effort to develop competencies in the project management (the AIFEU Project Coordinator Nataliia Kholiavko took part in the Jean Monnet International Winter School "Academic Project Management and Effective Communication"). | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1CdVLvcRwJ/<br><br>https://www.instagram.com/aifeuproject/p/C09RGvhMWoT/<br><br>https://t.me/aifeuproject/32 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 18. | 18.12.2023 | The responsible executor of the AIFEU project, Doctor of Economics, Professor Maksym Dubyna, took part in the interactive webinar on "Artificial Intelligence in the Educational Process". | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1E88CK5MqR/<br><br>https://www.instagram.com/aifeuproject/p/C1AQQw5rEAv/<br><br>https://t.me/aifeuproject/33 |
| 19. | 20.12.2023 | INFORMATION DAY OF THE EU ERASMUS+ PROGRAM: OPPORTUNITIES IN EDUCATION. | Facebook | https://www.facebook.com/share/p/1DHU3BFwVp/ |
| 20. | 21.12.2023 | INFORMATION DAY for representatives of the international cooperation departments of Ukrainian higher education institutions - implementers of the international academic mobility projects of the EU Erasmus+ Program. | Facebook | https://www.facebook.com/share/p/1CfaFdmihu/ |
| 21. | 30.12.2023 | We are actively preparing for the new competition and improving our skills. | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1EwokesS4t/<br><br>https://t.me/aifeuproject/36 |
| 22. | 05.01.2024 | On January 5, 2024, a regular working meeting of the AIFEU project team "Artificial Intelligence in the EU Financial Institutions", funded under the ERASMUS+ program, Jean Monnet Module, took place. | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1FXW9u7rEf/<br><br>https://stu.cn.ua/news/robocha-zustrich-komandy-proyektu-aifeu/<br><br>https://www.instagram.com/aifeuproject/p/C1u9pzOr6rc/<br><br>https://t.me/aifeuproject/41 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 23. | 07.01.2024 | In 2024, artificial intelligence will continue to conquer the world and actively develop. It will be present at every stage of the lesson: from creating a lesson plan ideal for specific students to assessing learning outcomes. Experts predict that there will be more and more AI-based tools developed specifically for education. | Facebook | https://www.facebook.com/share/p/1JHRWpkYt2/ |
| 24. | 09.01.2024 | To deepen their knowledge and skills in facilitation, on January 9, 2024, representatives of the AIFEU project team took part in the webinar "Facilitation for Beginners: Simple Tools and Tips" | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1PgQipvtBL/<br>https://www.instagram.com/aifeuproject/p/C14i23kM_GX/<br>https://t.me/aifeuproject/42 |
| 25. | 12.01.2024 | Dear friends, we are sharing with you an interesting infographic on digital literacy in the field of artificial intelligence | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/19SKPYFgq1/<br>https://www.instagram.com/aifeuproject/p/C2AXZUHsNOv/<br>https://t.me/aifeuproject/48 |
| 26. | 18.01.2024 | The Jean Monnet Module "Artificial Intelligence in the EU Financial Institutions" (AIFEU) involves an in-depth study of European best practices. Project executors carefully deepen their knowledge in this field. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/19Yhs1k2E2/<br>https://www.instagram.com/aifeuproject/p/C2QPykcr4At/<br>https://t.me/aifeuproject/52 |
| 27. | 19.01.2024 | Friends, we share with you a selection of interesting resources about artificial intelligence and its practical use. | Facebook<br>Telegram | https://www.facebook.com/share/p/1DG9zm8GGa/<br>https://t.me/aifeuproject/54 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 28. | 25.01.2024 | Ranked: The Most Popular AI Tools (This visual is part of our 2024 Global Forecast Series with insights curated from 700+ expert predictions). | Facebook | https://www.facebook.com/share/p/19Mbpran3k/ |
| 29. | 27.01.2024 | Top AI Tools of 2024 | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/19NHqcxnGB/<br><br>https://www.instagram.com/aifeuproject/p/C2puJJmr_gn/<br><br>https://t.me/aifeuproject/55 |
| 30. | 05.02.2024 | Characteristics of 21st Century Learners | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1DPyV3EqUy/<br><br>https://www.instagram.com/aifeuproject/p/C2-PTtEMWIK/<br><br>https://t.me/aifeuproject/56 |
| 31. | 07.02.2024 | We invite you to participate in the round table on the topic "Digitalization of financial sector: new technologies and required competencies", which will be held on February 23, 2024 at 11:00 am (Kyiv time) at the Chernihiv Polytechnic National University in online format | Facebook<br><br>University website<br><br>Website of the Department of Finance, Banking, and Insurance<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1EiMZSUxWa/<br><br>https://stu.cn.ua/announcements/kruglyj-stil-zi-stejkholderamy-zaproshennya/<br><br>https://fbss.stu.cn.ua/wp-content/uploads/2024/02/kruglyj-stil__czyfrovizacziya-finansovogo-sektoru.pdf<br><br>https://www.instagram.com/aifeuproject/p/C3DXx90MUEd/<br><br>https://t.me/aifeuproject/57 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 32. | 16.02.2024 | WHAT? Round table "Digitalization of financial sector: new technologies and required competencies" | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1Acji7y9bx/<br><br>https://www.instagram.com/aifeuproject/p/C3Z9ap2spUT/<br><br>https://t.me/aifeuproject/58 |
| 33. | 19.02.2024 | The round table "The role and contribution of women scientists in the restoration and development of the community: achievements, challenges, prospects" was held in Chernihiv. | Facebook | https://www.facebook.com/share/p/1DGFDHXsGC/ |
| 34. | 19.02.2024 | Dear students, we invite you to the course within the Jean Monnet Module AIFEU "Artificial Intelligence in the EU Financial Institutions" | University website<br><br>Instagram<br><br>Telegram | https://stu.cn.ua/announcements/ogoloshuyetsya-nabir-na-kurs-shtuchnyj-intelekt-u-finansovyh-ustanovah-yes/<br><br>https://www.instagram.com/aifeuproject/p/C3hV57WMMOK/<br><br>https://t.me/aifeuproject/59 |
| 35. | 20.02.2024 | Dear students, we invite you to the course within the Jean Monnet Module AIFEU "Artificial Intelligence in the EU Financial Institutions" | Facebook<br><br>Website of the Department of Finance, Banking, and Insurance | https://www.facebook.com/share/p/1DqThnw3a9/<br><br>https://fbss.stu.cn.ua/wp-content/uploads/2024/02/ogoloshennya.pdf |
| 36. | 22.02.2024 | Friends, colleagues and students! We will be waiting for you tomorrow at our round table within the framework of the AIFEU project. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/19UuvZc6AD/<br><br>https://www.instagram.com/aifeuproject/p/C3pj7JBsuoe/<br><br>https://t.me/aifeuproject/61 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 37. | 23.02.2024 | Dear friends! We would like to remind you about the course within the framework of the project AIFEU Erasmus+ Jean Monnet Module | Facebook<br><br>Website of the Department of Finance, Banking, and Insurance | https://www.facebook.com/share/p/1HmDHWQN72/<br><br>https://fbss.stu.cn.ua/wp-content/uploads/2024/02/zaproshennya.pdf |
| 38. | 26.02.2024 | Round table with stakeholders "Digitalization of financial sector: new technologies and required competencies" was held at the Chernihiv Polytechnic National University. | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/19FidrnGWp/<br><br>https://stu.cn.ua/news/kruglyj-stil-czyfrovizacziya-finansovogo-sektoru-novi-tehnologiyi-ta-neobhidni-kompetencziyi/<br><br>https://www.instagram.com/aifeuproject/p/C30ISDqLYXQ/<br><br>https://t.me/aifeuproject/62 |
| 39. | 28.02.2024 | On February 26, 2024, was held a working meeting of the team of AIFEU project "Artificial intelligence in the EU Financial Institutions", which is implemented as part of the ERASMUS+ program, Jean Monnet Module. | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1FoS63yUfX/<br><br>https://stu.cn.ua/news/aifeu-robocha-zustrich-komandy-26-02-2024/<br><br>https://www.instagram.com/aifeuproject/p/C34iclKrGkb/<br><br>https://t.me/aifeuproject/68 |
| 40. | 01.03.2024 | Dear students of Chernihiv Polytechnic National University! Registration for the course "Artificial Intelligence in the EU Financial Institutions" has closed. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1cZgygjcvp/<br><br>https://www.instagram.com/aifeuproject/p/C39uZHUr1Vc/<br><br>https://t.me/aifeuproject/71 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 41. | 11.03.2024 | Dear students, we remind that tomorrow classes in the course "Artificial Intelligence in the EU Financial Institutions " are starting. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1KCrroGBJQ/<br>https://www.instagram.com/aifeuproject/p/C4YjnoBMtM4/<br>https://t.me/aifeuproject/72 |
| 42. | 12.03.2024 | On March 12, 2024, the first lecture was held within the framework of the course "Artificial Intelligence in the EU Financial Institutions", which is taught within the AIFEU Project under the ERASMUS + JEAN MONNET Module. This year the course is taught for two groups of students of the Chernihiv Polytechnic National University. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1QNoe3FyGD/<br>https://www.instagram.com/aifeuproject/p/C4a8sfnrM54/<br>https://t.me/aifeuproject/74<br>https://t.me/aifeuproject/89 |
| 43. | 14.03.2024 | On March, 14, students of the Chernihiv Polytechnic National University had an opportunity to listen to the second lecture on the role of artificial intelligence in the development of modern society. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1GbLX5DNU7/<br>https://www.instagram.com/aifeuproject/p/C4gAllrMUMO/<br>https://t.me/aifeuproject/90 |
| 44. | 18.03.2024 | On March 18, 2024, Ph.D., Associate Professor Serhii Ivanets, held first practical lesson in the course "Artificial Intelligence in the EU Financial Institutions", which is taught within the AIFEU Project under the ERASMUS + JEAN MONNET Program. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1EnmcvHqrP/<br>https://www.instagram.com/aifeuproject/p/C4qTOrjs0P7/<br>https://t.me/aifeuproject/96 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 45. | 19.03.2024 | On March 19, 2024, teaching was completed within the framework of the technical unit of the course "Artificial Intelligence in the EU Financial Institutions". | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1cephu8FbB/<br>https://www.instagram.com/aifeuproject/p/C4tBvatrJzw/<br>https://t.me/aifeuproject/99 |
| 46. | 21.03.2024 | This week began teaching in the framework of the economic block of AIFEU Project "Artificial Intelligence in the EU Financial Institutions" (Teacher - Doctor of Economics, Prof. Nataliia Kholiavko). | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1DXKLCwKUH/<br>https://www.instagram.com/aifeuproject/p/C4yZpZDrEC7/<br>https://t.me/aifeuproject/101 |
| 47. | 29.03.2024 | During the week, two seminars and lecture classes (topic "Modern trends of digitalization of EU financial institutions") were conducted as part of the course "Artificial Intelligence in the EU Financial Institutions". | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1CPqAaNzu6/<br>https://www.instagram.com/aifeuproject/p/C5GTGSTrNWT/<br>https://t.me/aifeuproject/108 |
| 48. | 01.04.2024 | Start April and New Working Week Active - from another practical lesson within the framework of the course "Artificial Intelligence in the EU Financial Institutions". | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/19kV1WZM2J/<br>https://www.instagram.com/aifeuproject/p/C5Ok9FCryV_/<br>https://t.me/aifeuproject/116 |
| 49. | 04.04.2024 | Lectures of the current week of the AIFEU Projects have been devoted to the analysis of modern tendencies of digitalization of financial institutions in Ukraine. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1KKCBrGa79/<br>https://www.instagram.com/aifeuproject/p/C5WZrbHru8Q/<br>https://t.me/aifeuproject/118 |
| 50. | 09.04.2024 | On April 9, 2024, within the seminars, higher education students analyzed the activities of leading Fintech companies in Ukraine. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1FQrfvrgCQ/<br>https://www.instagram.com/aifeuproject/p/C5i9OMFs5I1/<br>https://t.me/aifeuproject/123 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 51. | 11.04.2024 | Today, teaching the course of "Artificial Intelligence in the EU Financial Institutions" has been launched by a Doctor of Economic Sciences, Professor, Head of the Department of Finance, Banking and Insurance of Chernihiv Polytechnic National University, Mr. Maksym Dubyna. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1C4tTLRCxh/<br>https://www.instagram.com/aifeuproject/p/C5n__HRsls1/<br>https://t.me/aifeuproject/125 |
| 52. | 16.04.2024 | The current week within the framework of the AIFEU course is devoted to the study of theoretical aspects and development of practical principles of application of the artificial intelligence technologies in the activities of banking institutions of the European Union. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1CDCq2NiEK/<br>https://www.instagram.com/aifeuproject/p/C51HC80rGQM/<br>https://t.me/aifeuproject/128 |
| 53. | 23.04.2024 | We continue to deepen our knowledge in application of artificial intelligence technologies in education. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/19ipT2PQJN/<br>https://www.instagram.com/aifeuproject/p/C6F8O_TM93X/<br>https://t.me/aifeuproject/134 |
| 54. | 24.04.2024 | As part of the AIFEU course "Artificial Intelligence in the EU Financial Institutions", Doctor of Economics, Professor Maksym Dubyna paid considerable attention concerning the role of artificial intelligence in the development of banking institutions of Ukraine (Theme 6). | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/19VvWUqv15/<br>https://www.instagram.com/aifeuproject/p/C6JFbgZLNIL/<br>https://t.me/aifeuproject/135 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 55. | 25.04.2024 | Today, a new stage in our course is launched, namely "Artificial Intelligence in the EU Financial Institutions"- the classes started by the Ph.D., Associate Professor Artur Zhavoronok.<br>On April 25, 2024, a teaching theme "Directions of the artificial intelligence use in the activities of EU non-bank institutions" within AIFEU Project began. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/19Wn1duZPx/<br>https://www.instagram.com/aifeuproject/p/C6MYnMhrATK/<br>https://t.me/aifeuproject/140 |
| 56. | 27.04.2024 | Executor of the AIFEU Project, Doctor of Economics, Prof., Maksym Dubyna took part in the All-Ukrainian Scientific and Practical Conference "Modern Challenges and Trends for the Development of the Financial System", which took place in the Precarpathian National University named after Vasyl Stefanyk (Ivano-Frankivsk). | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1EwL4xUeVv/<br>https://www.instagram.com/aifeuproject/p/C6Ql6C_LINv/<br>https://t.me/aifeuproject/146 |
| 57. | 30.04.2024 | As part of the AIFEU Project (Erasmus + Program Jean Monnet Module), scientific and pedagogical workers of Chernihiv Polytechnic National University are investigating various aspects of the implementation and use of the artificial intelligence technology in the activities of EU financial institutions and Ukraine. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/195VXGmiE6/<br>https://www.instagram.com/aifeuproject/p/C6Y6Ky3Lh5L/<br>https://t.me/aifeuproject/149 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 58. | 02.05.2024 | During the week, groups of students of the JM-231 and JM-232 had lectures on the topic “Directions of the use of artificial intelligence in the activities of EU non-bank institutions” together with the PhD in Economics, Associate Professor Artur Zhavoronok. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/19qYxziBfw/<br>https://www.instagram.com/aifeuproject/p/C6eOmiQMQVl/<br>https://t.me/aifeuproject/150 |
| 59. | 08.05.2024 | On May 7, 2024 at a seminar session with PhD in Economics, Associate Professor Artur Zhavoronok, promising directions for the use of artificial intelligence technologies in the activities of non-banking institutions of the European Union and Ukraine were considered.<br>Practical classes were creative, lively, interesting and rich thanks to the energy of students and the synergy of joint work. | Facebook<br>Telegram | https://www.facebook.com/share/p/19atn2fATD/<br>https://t.me/aifeuproject/154 |
| 60. | 09.05.2024 | On May 9, 2024, teaching within the Management unit of the course “Artificial Intelligence in the EU Financial Institutions”. Together with the Doctor of Economic Sciences, Associate Professor, Professor of the Department of Management and Administration of Chernihiv Polytechnic National University Olha Popelo students have discussed the basic aspects of the managerial activity. Great attention was paid to the disclosure of the key features of managing organizational changes, as well as ensuring organizational development of financial institutions. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1Hz9R1G6wB/<br>https://www.instagram.com/aifeuproject/p/C6wUBuKsgso/<br>https://t.me/aifeuproject/158 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 61. | 13.05.2024 | On May 13, 2024, despite numerous and prolonged air alarms, final lectures began in the course of the AIFEU Project “Artificial Intelligence in the EU Financial Institutions”. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/19cGqMQrhB/<br><br>https://www.instagram.com/aifeuproject/p/C66XoSSMj0f/<br><br>https://t.me/aifeuproject/161 |
| 62. | 16.05.2024 | This week, classes were completed in both groups of higher education students on the course “Artificial Intelligence in the EU Financial Institutions”. Final class - a seminar on the topic "Algorithm for introducing technologies of artificial intelligence in financial institutions" - was conducted by Professor of the Department of Management and Administration, Olha Popelo. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1CNUHEs612/<br><br>https://www.instagram.com/aifeuproject/p/C7CWPIlL-87/<br><br>https://t.me/aifeuproject/165 |
| 63. | 18.05.2024 | Within the framework of the Week of Science, Nataliia Kholiavko conducted a Workshop “Planning and Organization of Project Activities at the University”, which participants were scientific and pedagogical workers and students of Chernihiv Polytechnic National University and Yuri Fedkovich Chernivtsi National University. | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1EqvubnqQk/<br><br>https://stu.cn.ua/bez-kategoriyi/vorkshop-do-tyzhnya-nauky/<br><br>https://www.instagram.com/aifeuproject/p/C7G8LYprtim/<br><br>https://t.me/aifeuproject/167 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 64. | 21.05.2024 | On May 21, 2024 pariticipation in the International Scientific and Practical Multidisciplinary Forum “Dialogue in the Name of the Future” (Riga, Republic of Latvia). During the event, the AIFEU Project, Ph.D., Assoc. Prof. Artur Zhavoronok presented the Project of the Erasmus + Jean Monnet Module “Artificial Intelligence in the EU Financial Institutions”. | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1GQJep2XwL/<br><br>https://stu.cn.ua/bez-kategoriyi/mizhnarodnyj-forum-dialog-v-imya-majbutnogo/<br><br>https://www.instagram.com/aifeuproject/p/C7PEYdxt6re/<br><br>https://t.me/aifeuproject/168 |
| 65. | 27.05.2024 | During March-May 2024, at Chernihiv Polytechnic National University the course “Artificial Intelligence in the EU Financial Institutions” was taught, which is part of the AIFEU Project under the Erasmus + direction of Jean Monnet Module. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1CUWL88uCd/<br><br>https://www.instagram.com/aifeuproject/p/C7dwsQDMcmJ/<br><br>https://t.me/aifeuproject/170 |
| 66. | 27.05.2024 | Colloquium "New Ideas: Student AI-Driven Analytical Projects in Finance" | University website | https://stu.cn.ua/news/kolokvium-novi-ideyi-studentski-analitychni-proyekty-z-shi-u-finansah/ |
| 67. | 11.06.2024 | In the second semester of the academic year 2023-2024 at Chernihiv Polytechnic National University, the first year was taught a course “Artificial Intelligence in the EU Financial Institutions”, which was implemented within the AIFEU Project for the EU Grant support within the Erasmus + Program, Jean Monnet Module. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1Q72jJTp9h/<br><br>https://www.instagram.com/aifeuproject/p/C8EOfCqsxnp/<br><br>https://t.me/aifeuproject/171 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 68. | 09.07.2024 | Because of the war in Ukraine, the educational process often takes place in a mixed or remote format. The Module "Artificial intelligence in the EU Financial Institutions" (Erasmus+ Jean Monnet Module) was held online in the 2023/2024 academic year. Therefore, our team makes a lot of efforts to acquire new knowledge and skills in digital education. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/18fqSiPWxM/<br><br>https://www.instagram.com/aifeuproject/p/C9MRNsQsz3B/<br><br>https://t.me/aifeuproject/172 |
| 69. | 22.07.2024 | The AI universe | Facebook | https://www.facebook.com/share/p/1FDKTx5sGh/ |
| 70. | 28.08.2024 | Dear friends, our vacation is over and we are coming back!<br>We share with you information about the AIIS '2024 conference "ARTIFICIAL INTELLIGENCE AND INTELLIGENT SYSTEMS" | Facebook | https://www.facebook.com/share/p/1F2n5gVd1r/ |
| 71. | 17.09.2024 | Everything about artificial intelligence and cloud technologies - CDTO Campus launches a training program with Microsoft. | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1FV7MPcHnH/<br><br>https://t.me/aifeuproject/173 |
| 72. | 18.09.2024 | Colleagues (Jean Monnet) invite to participate in events, which may be useful to students of the course "Artificial Intelligence in the EU Financial Institutions" (AIFEU). | Facebook<br><br>University website<br><br>Telegram | https://www.facebook.com/share/p/1crj5gSGNe/<br><br>https://stu.cn.ua/bez-kategoriyi/zasidannya-komandy-proyektu-aifeu/<br><br>https://t.me/aifeuproject/174 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 73. | 19.09.2024 | On September 18, 2024, a meeting of the project team for the Jean Monnet Module AIFEU "Artificial Intelligence in the EU Financial Institutions" took place. This event marked another step in the implementation of the AIFEU project, aimed at researching and introducing innovative Artificial Intelligence technologies into the operations of financial institutions. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1JSKNTLjau/<br><br>https://www.instagram.com/aifeuproject/p/DAFrlIwM8Xc/<br><br>https://t.me/aifeuproject/175 |
| 74. | 19.09.2024 | We invite you to participate in the roundtable "Strategy for the Development of Higher Education in Ukraine Amidst Emergencies and Wartime Crises: Building the Network of Higher Education Institutions." | Facebook | https://www.facebook.com/share/p/14pTxsm9UYH/ |
| 75. | 03.10.2024 | Comparison of Artificial Intelligence, Machine Learning and Deep Learning | Facebook<br><br>Instagram | https://www.facebook.com/share/p/1ER9SPFSoC/<br><br>https://www.instagram.com/aifeuproject/p/DAqGmgXMtSr/ |
| 76. | 06.10.2024 | ErasmusDays 2024 in Ukraine! – National Erasmus+ Office in Ukraine | Facebook | https://www.facebook.com/share/p/19cytSWYrQ/ |
| 77. | 06.10.2024 | Dear colleagues, partners, and friends! It is already October, which means that the All-Ukrainian Erasmus Days are fast approaching! | Facebook | https://www.facebook.com/share/p/1GDXNhvh2x/ |
| 78. | 08.10.2024 | Machine learning has long been important for research, particularly for sorting and analyzing vast amounts of data. | Facebook | https://www.facebook.com/share/p/1HqSqhozz5/ |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 79. | 09.10.2024 | The Erasmus+ Jean Monnet AIFEU project team joined the first day of activities within the "35 Years of Jean Monnet Actions" Anniversary Conference. | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1EdBwFnyu7/<br><br>https://stu.cn.ua/bez-kategoriyi/yuvilejna-konferenczi ya-35-rokiv-napryamu-zhan-mone/<br><br>https://www.instagram.com/aifeuproject/p/DA6GMVjMrlN/<br><br>https://t.me/aifeuproject/177 |
| 80. | 14.10.2024 | Opening video for the All-Ukrainian #ErasmusDays2024: "Opportunities and Competition Results" | Facebook | https://www.facebook.com/share/p/1F3zo5XaVk/ |
| 81. | 16.10.2024 | On October 15, 2024, the coordinator of the AIFEU project "Artificial Intelligence in the EU Financial Institutions" (Erasmus+ Jean Monnet Module) Nataliia Kholiavko took part in the Cluster Seminar "Study and dissemination of European studies in Ukraine: successful practices, challenges and prospects". | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1Low1W8YCb/<br><br>https://t.me/aifeuproject/185 |
| 82. | 16.10.2024 | Erasmus+ World Wide Webinar 2024 | Facebook<br><br>University website | https://www.facebook.com/share/p/1BuhTrzS4a/<br><br>https://stu.cn.ua/bez-kategoriyi/klasternyj-seminar-u-mezhah-vseukrayinskyh-erasmusdays-2024/ |
| 83. | 22.10.2024 | The AIFEU project team is joining the Erasmus+ World Wide Webinar 2024. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1CGVyPiz8H/<br><br>https://www.instagram.com/aifeuproject/p/DBa1XUXsjJF/<br><br>https://t.me/aifeuproject/187 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 84. | 23.10.2024 | The AIFEU project team continues to participate in Erasmus+ World Wide Webinar 2024.<br>The packed program of the second day of the Webinar promises to be useful and full of new information for project teams. | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1C4VqiJWZD/<br><br>https://stu.cn.ua/bez-kategoriyi/uchast-u-vebinari-erasmus-world-wide-webinar-2024/<br><br>https://www.instagram.com/aifeuproject/p/DBdZ6bGMu6G/<br><br>https://t.me/aifeuproject/191 |
| 85. | 24.10.2024 | From batteries to space to shared autonomous vehicles, some industries have the potential to reshape the global economy. | Facebook | https://www.facebook.com/share/p/19RQkLrKio/ |
| 86. | 28.10.2024 | Doctor of Economics, professor, responsible executor of the Jean Monnet Module AIFEU project Maksym Dubyna took part in the First International Financial Forum "Fintech and digital transformation of the financial market: a vision of developing the banking and insurance business", which was held at the Western Ukrainian National University. | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1SL5Xq9guD/<br><br>https://t.me/aifeuproject/194 |
| 87. | 30.10.2024 | Participation of AIFEU project coordinator Nataliia Kholiavko in the cluster seminar "Study and dissemination of European studies in Ukraine: successful practices, challenges and prospects" | Facebook<br><br>Telegram | https://www.facebook.com/share/p/18dfFD5CUf/<br><br>https://t.me/aifeuproject/196 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 88. | 31.10.2024 | XIII International Scientific and Practical Conference "European Integration of Higher Education in Ukraine in the Context of the Bologna Process: Digitalization and Quality Assurance to Ensure Equal Access to Quality Higher Education" – REGISTRATION IS OPEN! | Facebook | https://www.facebook.com/share/p/18LW8MiAYe/ |
| 89. | 31.10.2024 | Which countries are best prepared for artificial intelligence (AI): Ukraine ranks 63-rd globally. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1BmznojEwW/<br>https://www.instagram.com/aifeuproject/p/DBzDuzisQ80/<br>https://t.me/aifeuproject/197 |
| 90. | 03.11.2024 | AI Srart-ups Top-50 | Facebook<br>Telegram | https://www.facebook.com/share/p/1DgnpqqwMb/<br>https://t.me/aifeuproject/198 |
| 91. | 06.11.2024 | We actively participate in training activities on the topic of Artificial Intelligence in education | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/14vkWDTQ2RR/<br>https://www.instagram.com/aifeuproject/p/DCB_CETMbqM/<br>https://t.me/aifeuproject/199 |
| 92. | 08.11.2024 | AIFEU Project Coordinator Nataliia Kholiavko participated remotely in the XIII International Scientific and Practical Conference “European Integration of Higher Education in Ukraine in the Context of the Bologna Process: Digitalization and Quality Assurance to Ensure Equal Access to Quality Higher Education.” | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/19b9BtcdhP/<br>https://www.instagram.com/aifeuproject/p/DCG378DMbzv/<br>https://t.me/aifeuproject/200 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 93. | 12.11.2024 | Learn artificial intelligence on a free platform from Google. | Facebook | https://www.facebook.com/share/p/19BAuwGPvB/<br><br>https://t.me/aifeuproject/204 |
| 94. | 13.11.2024 | Top countries with the lowest internet access among the population | Telegram | https://t.me/aifeuproject/205 |
| 95. | 14.11.2024 | The team of the "Hub of the EU Solutions" project at the National University of Ostroh Academy organized an online meeting "ProjectCHECK" for Jean Monnet project coordinators in Ukraine. The event was held on the Zoom platform with the goal of creating a space for experience exchange, collaboration, and enhancing project implementation efficiency. The AIFEU project coordinator Nataliia Kholiavko took part in the meeting. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1VPd3VNzcP/<br><br>https://www.instagram.com/aifeuproject/p/DCXGBHCsA-J/<br><br>https://t.me/aifeuproject/206 |
| 96. | 14.11.2024 | On November 14, 2024, a meeting of the AIFEU project team took place, where the key aspects of continuing the project into its second year—from November 1, 2024, to October 31, 2025 - were discussed. Participants outlined plans for the upcoming period, including organizing educational, scientific, and informational events, and defined strategies to ensure the project's sustainability. | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1HJvpEu7q8/<br><br>https://t.me/aifeuproject/211 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 97. | 19.11.2024 | The Programme Guide for the 2025 EU Erasmus+ calls has been published! | Facebook | https://www.facebook.com/share/p/19bzhJS4At/ |
| 98. | 22.11.2024 | The team behind the AIFEU project ("Artificial Intelligence in the EU Financial Institutions") announces the receipt of a Jean Monnet commemorative plaque for the ERASMUS-JMO-2023-MODULE project (101127170). | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1BqbmQeuRP/<br>https://www.instagram.com/aifeuproject/p/DCriwWwstz4/<br>https://t.me/aifeuproject/214 |
| 99. | 30.11.2024 | EU Erasmus+ Programme Information Days in the fields of education, youth, and sport: 2025 opportunities and calls for organizations from Ukraine | Facebook<br>Telegram | https://www.facebook.com/share/p/1AySDJZitz/<br>https://t.me/aifeuproject/216 |
| 100. | 30.11.2024 | The History of the Emergence and Development of Artificial Intelligence | Facebook | https://www.facebook.com/share/p/19oNXiP3Ly/ |
| 101. | 09.12.2024 | We are joining the ERASMUS+ program's Information Days. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1N6KE2rKU9/<br>https://www.instagram.com/aifeuproject/p/DDWnmfTMI4z/<br>https://t.me/aifeuproject/217 |
| 102. | 10.12.2024 | Networking “Business in Turbulence: Digital Keys to Resilience” | Facebook<br>Telegram | https://www.facebook.com/share/p/1A3XmFMFY7/<br>https://t.me/aifeuproject/220 |
| 103. | 20.12.2024 | We are joining the network of European Digital Innovation Hubs | Facebook | https://www.facebook.com/share/p/1cSfB3VS9M/ |
| 104. | 20.12.2024 | Maksym Dubyna, a project AIFEU representative, attended a lecture by Professor Rose Luckin on the topic: “Empowering Ukrainian Higher Education: Navigating the AI Revolution in Teaching and Learning.” | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1LJ3wiAbsw/<br>https://www.instagram.com/aifeuproject/p/DDz57OHM9ch/<br>https://t.me/aifeuproject/221 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 105. | 24.12.2024 | Dear partners, colleagues, and friends, The team of the Erasmus+ Jean Monnet Module project AIFEU "Artificial Intelligence in the EU Financial Institutions" sincerely wishes you a Merry Christmas and happy New Year! | Facebook | https://www.facebook.com/share/p/18chUYc6jn/ |
| 106. | 06.01.2025 | We invite you to view the brochure on Artificial Intelligence with the material presented in comic book format. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1QBXyqCwQW/<br>https://www.instagram.com/aifeuproject/p/DEfGmB7sCyo/<br>https://t.me/aifeuproject/228 |
| 107. | 22.01.2025 | On January 22, 2025, a virtual working meeting of the AIFEU project team was held, with the participation of N. Kholiavko, M. Dubyna, O. Popelo, V. Bazylevych, and A. Zhavoronok. The AIFEU project is implemented under the Erasmus+ program within the Jean Monnet Module framework.<br>During the meeting, key aspects of organizing the Jean Monnet Module "Artificial Intelligence in the EU Financial Institutions" for higher education students of Chernihiv Polytechnic were discussed. In particular, the participants determined the course format, selected an online platform, established the course launch timeline, and defined the enrollment procedure. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1BRH3RRDC5/<br>https://www.instagram.com/aifeuproject/p/DFIPDELMupL/<br>https://t.me/aifeuproject/229 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 108. | 28.01.2025 | Are you preparing project proposals for the 2025 Erasmus+ call in the fields of education, youth, and sport? | Facebook | https://www.facebook.com/share/p/14v8Pz1j8NC/ |
| 109. | 28.01.2025 | Join the "Voices of Engagement" podcast! | Facebook | https://www.facebook.com/share/p/1FALr6k1ei/ |
| 110. | 07.02.2025 | Preparing for a new semester of teaching a course within the framework of the project "Artificial Intelligence in the EU Financial Institutions" - deepening knowledge in the field of AI | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/19iS5rDbng/<br>https://www.instagram.com/aifeuproject/p/DFxcj_nMUNU/<br>https://t.me/aifeuproject/230 |
| 111. | 12.02.2025 | Registration is now open for the course “Artificial Intelligence in the EU Financial Institutions” | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1E2aFR4orq/<br>https://www.instagram.com/aifeuproject/p/DF-Dlxpsu4k/<br>https://t.me/aifeuproject/231 |
| 112. | 18.02.2025 | We invite every stakeholder to participate in the open public consultations on the future of EU international cooperation! | Facebook | https://www.facebook.com/share/p/1ByubpyYAm/ |
| 113. | 18.02.2025 | We invite you to join the online broadcast of the Stakeholder Conference on preparations for the post-2027 programming period | Facebook | https://www.facebook.com/share/p/1H7qFj2Nt2/ |
| 114. | 18.02.2025 | Cyber Secure Trends 2025: Challenges, Innovations, and Development Prospects | Facebook | https://www.facebook.com/share/p/1DFd2VaVNk/ |
| 115. | 25.02.2025 | Registration for the course "Artificial Intelligence in the EU Financial Institutions" has closed. | Facebook<br>Telegram | https://www.facebook.com/share/p/1Cqg3HAgEF/<br>https://t.me/aifeuproject/232 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 116. | 25.02.2025 | On February 25, 2025, the AIFEU project team held a meeting dedicated to organizing the delivery of the course "Artificial Intelligence in the EU Financial Institutions." | Facebook<br>Telegram | https://www.facebook.com/share/p/1DeJyeXLXx/<br>https://t.me/aifeuproject/233 |
| 117. | 03.03.2025 | Dear students of Chernihiv Polytechnic National University! Classes for our course begin next week! Classes start on March 11, 2025. | Facebook<br>Telegram | https://www.facebook.com/share/p/18YB4Br7Pw/<br>https://t.me/aifeuproject/234 |
| 118. | 07.03.2025 | Nataliia Kholiavko participated in the webinar "Specifics of Implementing EU Erasmus+ Programme Projects Under Martial Law in Ukraine," held online on March 6, 2025. The event was organized by the National Erasmus+ Office in Ukraine in cooperation with the Ministry of Education and Science of Ukraine and the Ministry of Youth and Sports of Ukraine. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/19jAbCZUAr/<br>https://www.instagram.com/aifeuproject/p/DG4-3j1MgQU/<br>https://t.me/aifeuproject/235 |
| 119. | 12.03.2025 | On March 11, 2025, the first session of the course "Artificial Intelligence in the EU Financial Institutions" took place. | Facebook<br>Instagram<br>University website<br>Telegram | https://www.facebook.com/share/p/1EZxKtowS1/<br>https://www.instagram.com/aifeuproject/p/DHF50nbs729/<br>https://stu.cn.ua/bez-kategoriyi/start-vykladannya-kursu-u-2025-roczi/<br>https://t.me/aifeuproject/240 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 120. | 15.03.2025 | This week, as part of the "Artificial Intelligence in the EU Financial Institutions" course, Associate Professor Volodymyr Bazylevych delivered his second lecture, focusing on the impact of artificial intelligence technology on the development of modern society. Practical classes for the course will begin next week. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/182y7vmpcB/<br><br>https://www.instagram.com/aifeuproject/p/DHOWlCDs9Qo/<br><br>https://t.me/aifeuproject/243 |
| 121. | 19.03.2025 | The National Erasmus+ Office in Ukraine invites newcomers - implementers of Jean Monnet projects - to participate in a training session focused on key aspects of project implementation, reporting, and institutional regulations under martial law. | Facebook | https://www.facebook.com/share/p/19VBieP7Hi/ |
| 122. | 20.03.2025 | This week marked the successful completion of the project's first-technical-module. We extend our sincere gratitude to Associate Professor Volodymyr Bazylevych for providing the participants of the "Artificial Intelligence in the EU Financial Institutions" course with a comprehensive introduction to the subject. | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1DTu3Kheen/<br><br>https://t.me/aifeuproject/245 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 123. | 26.03.2025 | Professor Nataliia Kholiavko, coordinator of the Erasmus+ Jean Monnet Module AIFEU project, participated remotely in the training session titled "Implementation of EU Erasmus+ Jean Monnet Projects: From Initial Steps to Reporting — Specifics of Implementation Under Martial Law and Institutional Regulations." | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1EKESMjgYb/<br><br>https://stu.cn.ua/bez-kategoriyi/uchast-u-treningu-realizacziya-proyektiv-programy-yes-erazmus-zhan-mone-vid-pershyh-krokiv-do-zvitnosti-osoblyvosti-vprovadzhennya-pid-chas-voyennogo-stanu-ta-instytuczijni-regulyac/<br><br>https://www.instagram.com/aifeuproject/p/DHqlBrYMKvl/<br><br>https://t.me/aifeuproject/248 |
| 124. | 27.03.2025 | As part of the "Artificial Intelligence in the EU Financial Institutions" course (an Erasmus+ Jean Monnet Module), students from Chernihiv Polytechnic National University, together with their instructor-Nataliia Kholiavko, Doctor of Economics and Professor at the Department of Finance, Banking, and Insurance-participated in the Global Money Week initiative. | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1JFVQx33M7/<br><br>https://stu.cn.ua/bez-kategoriyi/global-money-week/<br><br>https://www.instagram.com/aifeuproject/p/DHspvfDM4e-/<br><br>https://t.me/aifeuproject/253 |
| 125. | 01.04.2025 | Teaching is currently underway within the economics module of the AIFEU course, "Artificial Intelligence in the EU Financial Institutions." | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1DuR3cS5QK/<br><br>https://www.instagram.com/aifeuproject/p/DH6WFKSMQ9N/<br><br>https://t.me/aifeuproject/258 |
| 126. | 08.04.2025 | This week, instruction concluded for the economics module of the Erasmus+ Jean Monnet Module AIFEU course, "Artificial Intelligence in the EU Financial Institutions" (taught by Prof. Nataliia Kholiavko). | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1Du5ruzg7N/<br><br>https://www.instagram.com/aifeuproject/p/DIMWP-3smHv/<br><br>https://t.me/aifeuproject/262 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 127. | 10.04.2025 | We congratulate Anastasiia Tarhonii, a student majoring in "Finance, Banking, Insurance, and the Stock Market" (Specialty 072), and her academic supervisor, Doctor of Economics and Professor Olena Parubets, on their victory in the second round of the All-Ukrainian Competition of Student Research Papers in Finance. | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1Exe2NTABs/<br><br>https://t.me/aifeuproject/266 |
| 128. | 21.04.2025 | As part of the AIFEU project implementation, the financial module of the course “Artificial Intelligence in the EU Financial Institutions” is currently underway. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1SLKtHkyjr/<br><br>https://www.instagram.com/aifeuproject/p/DIs1ZrWMHtT/<br><br>https://t.me/aifeuproject/267 |
| 129. | 29.04.2025 | The course within the framework of the international Jean Monnet Module AIFEU project “Artificial Intelligence in the EU Financial Institutions” is ongoing at Chernihiv Polytechnic National University. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/19mUXcSXS6/<br><br>https://www.instagram.com/aifeuproject/p/DJCMUAtM2ik/<br><br>https://t.me/aifeuproject/271 |
| 130. | 29.04.2025 | We invite you to join the charity fundraiser dedicated to the 65th anniversary of Chernihiv Polytechnic National University! | Facebook | https://www.facebook.com/share/p/1ETFHPDVGq/ |
| 131. | 05.05.2025 | Europe is investing in its digital future! | Facebook | https://www.facebook.com/share/p/1Dkob6DopZ/ |
| 132. | 06.05.2025 | Today, we are beginning the management module of the course "Artificial Intelligence in the EU Financial Institutions." | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1BnBzRjSWB/<br><br>https://www.instagram.com/aifeuproject/p/DJUODwVMhzT/<br><br>https://t.me/aifeuproject/277 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 133. | 06.05.2025 | How Artificial Intelligence Will Develop in Ukraine: Results of an Industry Analysis | Facebook | https://www.facebook.com/share/p/1apjbUQ4cD/ |
| 134. | 07.05.2025 | We invite you to join a colloquium on May 22 at 17:30, held as part of the Jean Monnet Module project "Artificial Intelligence in the EU Financial Institutions." | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1DZtWWx3JP/<br>https://www.instagram.com/aifeuproject/p/DJV_aeEsBCg/<br>https://t.me/aifeuproject/282 |
| 135. | 09.05.2025 | Erasmus+ Office in Ukraine | Facebook | https://www.facebook.com/share/p/19mXtf876U/ |
| 136. | 09.05.2025 | Today is Europe Day | Facebook | https://www.facebook.com/share/p/1CJ873Yqxv/ |
| 137. | 12.05.2025 | In 2025, Nataliia Kholiavko, coordinator of the Jean Monnet Module project "Artificial Intelligence in the EU Financial Institutions," actively participated in organizing events as part of Global Money Week. | Facebook<br>Telegram | https://www.facebook.com/share/p/1EcAx2qfqE/<br>https://t.me/aifeuproject/283 |
| 138. | 14.05.2025 | On May 14, 2025, the teaching of the course "Artificial Intelligence in the EU Financial Institutions" was completed within the framework of the Jean Monnet Module AIFEU project. | Facebook<br>University website<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1K7x4ETiPo/<br>https://stu.cn.ua/bez-kategoriyi/zavershennya-vykladannya-kursu-u-ramkah-proyektu-jean-monnet-module-aifeu-u-2025-roczi/<br>https://www.instagram.com/aifeuproject/p/DJpKsI3sOMT/<br>https://t.me/aifeuproject/290 |
| 139. | 16.05.2025 | In May 2025, Nataliia Kholiavko, coordinator of the Jean Monnet Module project "Artificial Intelligence in the EU Financial Institutions," participated online in the "Innovating Education: 2.0" conference. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1Dpg9TcSxk/<br>https://www.instagram.com/aifeuproject/p/DJtE6R2sfZW/<br>https://t.me/aifeuproject/297 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 140. | 16.05.2025 | Nataliia Kholiavko participated in the conference organized by the IT company Genesis, "Innovating Education: Non-formal Education Approaches and Innovations for Ukrainian Higher Education Institutions." | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1DtcdmVc9q/<br>https://www.instagram.com/aifeuproject/p/DJuCXNUsRNo/<br>https://t.me/aifeuproject/299 |
| 141. | 19.05.2025 | The coordinator of the AIFEU project, Professor Nataliia Kholiavko, participated in the online guest lecture “International Policies on the Use of Artificial Intelligence in Higher Education.” | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1U5yjhviU4/<br>https://www.instagram.com/aifeuproject/p/DJ2A6o8s3pC/<br>https://t.me/aifeuproject/300 |
| 142. | 21.05.2025 | We invite you to a colloquium as part of the "Artificial Intelligence in the EU Financial Institutions" project. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/16DxzFYa1Xc/<br>https://www.instagram.com/aifeuproject/p/DJ6BdjSsVJ7/<br>https://t.me/aifeuproject/302 |
| 143. | 21.05.2025 | A panel discussion titled "International Projects of Chernihiv Polytechnic: Impact on the City, Region, and Country" took place at Chernihiv Polytechnic National University. | Facebook<br>University website<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1DD2FXeV5T/<br>https://stu.cn.ua/news/panelna-dyskusiya-mizhnarodni-proyekty-chernigivskoyi-politehniky-vplyv-na-misto-region-krayinu/<br>https://www.instagram.com/aifeuproject/p/DJ7VbevMiZa/<br>https://t.me/aifeuproject/303 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 144. | 22.05.2025 | Happening today at 17:30 on Zoom. Colloquium "New Ideas: Student AI-Based Analytical Projects in Finance". Part of the Erasmus+ Jean Monnet Module project "Artificial Intelligence in the EU Financial Institutions" | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1Dus9NDthw/<br><br>https://t.me/aifeuproject/305 |
| 145. | 22.05.2025 | On May 21, 2025, a panel discussion titled "International Projects of Chernihiv Polytechnic: Impact on the City, Region, and Country" took place at Chernihiv Polytechnic National University. The event was held as part of the university's 65th-anniversary celebrations and Science Week 2025. | Facebook | https://www.facebook.com/share/p/1BrCd4uTTx/ |
| 146. | 22.05.2025 | A colloquium titled "New Ideas: Student Analytical Projects on AI in Finance" took place, implemented within the framework of the Erasmus+ KA2 Jean Monnet Module project "Artificial Intelligence in the EU Financial Institutions." | Facebook<br><br>University website<br><br>Telegram | https://www.facebook.com/share/p/1Wn1jayeRQ/<br><br>https://stu.cn.ua/bez-kategoriyi/kolokvium-novi-ideyi-studentski-analitychni-proekty-z-shi-u-finansah/<br><br>https://t.me/aifeuproject/306 |
| 147. | 04.06.2025 | The Expert Advisory Committee on the Development of Artificial Intelligence in Ukraine under the Ministry of Digital Transformation, together with leading IT and legal partners, has developed “Recommendations for the Responsible Development of Systems Using Artificial Intelligence Technologies.” | Facebook<br><br>Telegram | https://www.facebook.com/share/p/17hpAk7MaF/<br><br>https://t.me/aifeuproject/315 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 148. | 08.06.2025 | Artificial Intelligence, Machine Learning, deep learning and Big Data Cheat Sheets | Facebook | https://www.facebook.com/share/p/1Q57h7PUkX/ |
| 149. | 17.06.2025 | The EU's Erasmus program has turned 38! | Facebook | https://www.facebook.com/share/p/18wsGGQLSG/ |
| 150. | 17.06.2025 | Students, develop your own AI project — register for the LNU summer school. | Facebook | https://www.facebook.com/share/p/1HmE7a3Sgj/ |
| 151. | 23.06.2025 | The European Commission has released the 2025 State of the Digital Decade report, assessing the EU's progress toward its 2030 digital goals. | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1BT2vD7e2D/<br><br>https://t.me/aifeuproject/316 |
| 152. | 24.06.2025 | Working meeting of the AIFEU project team | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/19WQChbztS/<br><br>https://stu.cn.ua/bez-kategoriyi/robocha-zustrich-komandy-proyektu-aifeu-2/<br><br>https://www.instagram.com/aifeuproject/p/DLSeQUfsVQz/<br><br>https://t.me/aifeuproject/317 |
| 153. | 26.06.2025 | Chernihiv Polytechnic and its partners invite you to collaborate! | Facebook | https://www.facebook.com/share/p/1EcMfBuGbX/ |
| 154. | 26.06.2025 | We are invited to participate in a survey – let's join | Facebook | https://www.facebook.com/share/p/19eXE2Z1qA/ |
| 155. | 26.06.2025 | Summer is a time not only for relaxation, but also for development and growth!<br>We share with you cool opportunities | Facebook | https://www.facebook.com/share/p/1CJxBzN4rK/ |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 156. | 15.07.2025 | Prof. Nataliia Kholiavko, coordinator of the ERASMUS+ Jean Monnet Module AIFEU, is participating in the international roundtable "Ensuring Quality in Teaching and Learning During Emergencies and Crises." The event is organized by the National Erasmus+ Office in Ukraine in cooperation with the Ministry of Education and Science of Ukraine and the EU Erasmus+ Higher Education Reform Experts (HERE) team, with the support of SPHERE and EACEA, and the participation of international expert Sophie Guillet. | Facebook<br><br>University website<br><br>Telegram | https://www.facebook.com/share/p/1WnVf9E4b9/<br><br>https://stu.cn.ua/bez-kategoriyi/mizhnarodnyj-kruglyj-stil-zabezpechennya-yakosti-vykladannya-i-navchannya-v-umovah-nadzvychajnyh-i-kryzovyh-sytuaczij/<br><br>https://t.me/aifeuproject/320 |
| 157. | 16.07.2025 | Roundtable Quality Assurance of Teaching and Learning in Emergency and Crisis Situations | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1C3jkqhVFN/<br><br>https://www.instagram.com/aifeuproject/p/DMKfCLuMdQG/<br><br>https://t.me/aifeuproject/325 |
| 158. | 22.07.2025 | Start thinking about how you want to celebrate #ErasmusPlus and implement it at the #ErasmusDays coming | Facebook | https://www.facebook.com/share/p/19Y8PX3CjX/ |
| 159. | 20.08.2025 | Ready to shape Europe's future in Virtual Worlds? | Facebook | https://www.facebook.com/share/p/1DcpKXhk95/ |
| 160. | 24.08.2025 | Today is Ukraine's Independence Day | Facebook | https://www.facebook.com/share/p/1Bqg7EBFFk/ |
| 161. | 08.09.2025 | Erasmus+ Office in Ukraine | Facebook | https://www.facebook.com/share/p/1DWjwTfkga/ |
| 162. | 09.09.2025 | Artificial Intelligence in Business: How AI Can Increase Profits | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1Jkhp1jnAV/<br><br>https://t.me/aifeuproject/328 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 163. | 12.09.2025 | We continue to share useful and relevant resources with you: Ukraine's first government website dedicated to artificial intelligence. | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1BdF7vpn8m/<br><br>https://t.me/aifeuproject/329 |
| 164. | 16.09.2025 | On September 16, 2025, an online meeting took place for the team of the Erasmus+ Jean Monnet Module project AIFEU ("Artificial Intelligence in the EU Financial Institutions"), which is being implemented at Chernihiv Polytechnic National University. | Facebook<br><br>University website | https://www.facebook.com/share/p/194vUsUXRY/<br><br>https://stu.cn.ua/bez-kategoriyi/zustrich-komandy-proyektu-aifeu-planuvannya-konferencziyi/ |
| 165. | 17.09.2025 | We are launching the WINWIN EdTech Center of Excellence to advance educational technologies in Ukraine. | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1F2YX6s7Aa/<br><br>https://t.me/aifeuproject/330 |
| 166. | 22.09.2025 | We invite you to participate in the All-Ukrainian Scientific and Practical Conference "Artificial Intelligence in the Financial Sector: Challenges and Prospects in the EU and Ukraine" | University website<br><br>Telegram | https://stu.cn.ua/bez-kategoriyi/zaproshennya-do-uchasti-u-konferencziyi/<br><br>https://t.me/aifeuproject/331 |
| 167. | 22.09.2025 | We invite you to participate in the All-Ukrainian Scientific and Practical Conference "Artificial Intelligence in the Financial Sector: Challenges and Prospects in the EU and Ukraine" | Facebook | https://www.facebook.com/share/p/1FGYmgSULc/ |
| 168. | 08.10.2025 | Save the date: NEO events as part of the all-Ukrainian #ErasmusDays2025! – National Erasmus+ Office in Ukraine | Facebook | https://www.facebook.com/share/p/1Q38L3adeo/ |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 169. | 08.10.2025 | Google provides students aged 18 and older with free one-year access to powerful features in Gemini and NotebookLM as part of the AI Pro subscription. | Facebook | https://www.facebook.com/share/p/14pgnq3YjHr/ |
| 170. | 15.10.2025 | The All-Ukrainian Scientific and Practical Conference "Artificial Intelligence in the Financial Sector: Challenges and Prospects in the EU and Ukraine," organized by Chernihiv Polytechnic National University, took place. | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1DxugoC6WG/<br><br>https://stu.cn.ua/bez-kategoriyi/vseukrayinska-naukovo-praktychna-konferenczyya-shtuchnyj-intelekt-u-finansovomu-sektori-vyklyky-ta-perspektyvy-v-yes-ta-ukrayini/<br><br>https://www.instagram.com/aifeuproject/p/DP1yJ3TjMvc/<br><br>https://t.me/aifeuproject/334 |
| 171. | 17.10.2025 | The AIFEU project team participated in the forum held as part of Erasmus+ Days. | Facebook | https://www.facebook.com/share/p/1HUiJi6ziK/ |
| 172. | 18.10.2025 | The forum "Higher Education for Ukraine's Sustainable Development: Challenges and Prospects in the Post-War Period" was held online; it was organized by Chernihiv Polytechnic National University as part of the ErasmusDays 2025 celebrations in Ukraine and timed to coincide with Sustainable Development Day. | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/14pyCzaE2oQ/<br><br>https://stu.cn.ua/bez-kategoriyi/forum-vyshha-osvita-dlya-stalogo-rozvytku-ukrayiny-problemy-ta-perspektyvy-u-povoyennyj-period-2/<br><br>https://www.instagram.com/aifeuproject/p/DP_MmSSDKlV/<br><br>https://t.me/aifeuproject/343 |
| 173. | 30.10.2025 | We invite you to participate in the XIV International Scientific and Practical Conference "European Integration of Higher Education in Ukraine in the Context of the Bologna Process: Bologna Principles, Tools, and Values in Higher Education." | Facebook | https://www.facebook.com/share/p/1DgRwV4Exu/ |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 174. | 06.11.2025 | The world of finance is changing, and artificial intelligence is becoming its primary driver, altering the rules of the game in the industry. | Facebook | https://www.facebook.com/share/p/1LhxChiadE/ |
| 175. | 17.11.2025 | Friends, we share with you a report on digital and AI literacy in Ukraine | Facebook<br><br>Telegram | https://www.facebook.com/share/p/18rYuexq9D/<br><br>https://t.me/aifeuproject/347 |
| 176. | 18.11.2025 | Representatives of the AIFEU project—Doctors of Economic Sciences and Professors M. V. Dubyna and N. I. Kholiavko—participated in the specialized workshop "AI in Finance: Algorithms Transforming Business." | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1CHf761tGo/<br><br>https://stu.cn.ua/bez-kategoriyi/uchast-u-vorkshopi-ai-u-finansah-algorytmy-shho-zminyuyut-biznes/<br><br>https://www.instagram.com/aifeuproject/p/DRMOOM1DNyV/<br><br>https://t.me/aifeuproject/348 |
| 177. | 26.12.2025 | As part of the training session "Organizational Skills in Grant and Project Activities for Digital Transformation", the project "Artificial Intelligence in the EU Financial Institutions" was presented during a showcase of successful case studies. | Facebook<br><br>University website<br><br>Telegram | https://www.facebook.com/share/p/1F2fTtdPD3/<br><br>https://stu.cn.ua/bez-kategoriyi/trening-organizaczijni-navychky-u-grantovij-ta-proyektnij-diyalnosti-dlya-czyfrovoyi-transformacziyi-2/<br><br>https://t.me/aifeuproject/352 |
| 178. | 27.12.2025 | The tech landscape is shifting fast, and leaders are feeling the pressure to choose wisely. | Facebook | https://www.facebook.com/share/p/1MKUvpPaVj/ |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 179. | 22.01.2026 | On January 22, 2026, a regular working meeting was held for the team behind the AIFEU project ("Artificial Intelligence in the EU Financial Institutions"—an ERASMUS+ Jean Monnet Module program). This project is implemented as part of the university's international activities and aims to develop modern approaches to training specialists in the fields of digital finance and the application of artificial intelligence within financial institutions. | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1DRpGUTbbM/<br><br>https://stu.cn.ua/bez-kategoriyi/organizaczijna-zustrich-robochoyi-grupy-2026/<br><br>https://www.instagram.com/aifeuproject/p/DUMaELRjMmH/<br><br>https://t.me/aifeuproject/355 |
| 180. | 04.02.2026 | On February 4, 2026, the team behind the AIFEU project ("Artificial Intelligence in the EU Financial Institutions") held a working meeting to address organizational matters regarding the launch of the next teaching cycle of the module at Chernihiv Polytechnic National University. | Facebook<br><br>University website<br><br>Telegram | https://www.facebook.com/share/p/1KUJVqkNvm/<br><br>https://stu.cn.ua/bez-kategoriyi/zustrich-robochoyi-komandy-proyektu-aifeu-shhodo-zapusku-modulyu-u-2026-roczi/<br><br>https://t.me/aifeuproject/357 |
| 181. | 04.02.2026 | Save the date: Safer Internet Day 2026 | Facebook | https://www.facebook.com/share/p/1EuwJfrgxA/ |
| 182. | 09.02.2026 | Registration is now open for the course “Artificial Intelligence in the EU Financial Institutions”! | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1EJJXWNzRo/<br><br>https://stu.cn.ua/announcements/ogoloshuyetsya-nabir-na-kurs-shtuchnyj-intelekt-u-finansovyh-ustanovah-yes-3/<br><br>https://www.instagram.com/aifeuproject/p/DUg3i3zjEGp/<br><br>https://t.me/aifeuproject/358 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 183. | 09.02.2026 | Nataliia Kholiavko, coordinator of the AIFEU project, participated in the AI Ideation webinar organized as part of the EDIH Digital Hub Noordwest initiative, in collaboration with the Enterprise Europe Network Netherlands and Utrecht University of Applied Sciences (HU). | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1DnoEune28/<br><br>https://stu.cn.ua/bez-kategoriyi/uchast-u-vebinari-ai-ideation/<br><br>https://www.instagram.com/aifeuproject/p/DUi5RTdDO3z/<br><br>https://t.me/aifeuproject/359 |
| 184. | 09.02.2026 | Chernihiv Polytechnic invites you to a useful and interactive event. | Facebook | https://www.facebook.com/share/p/1LpAm7WQEz/ |
| 185. | 13.02.2026 | Partners invite you to events focused on artificial intelligence. | Facebook<br><br>Telegram | https://www.facebook.com/share/p/18Q5Sxwcb3/<br><br>https://t.me/aifeuproject/362 |
| 186. | 17.02.2026 | Friends, a reminder that registration for the "Artificial Intelligence in the EU Financial Institutions" course is open. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1HstxwS8Vd/<br><br>https://www.instagram.com/aifeuproject/p/DU2lmI1DLW-/<br><br>https://t.me/aifeuproject/364 |
| 187. | 22.02.2026 | Registration for the course "Artificial Intelligence in the EU Financial Institutions" has closed. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1DZnqRBwL4/<br><br>https://www.instagram.com/aifeuproject/p/DVDXTsOjBhG/<br><br>https://t.me/aifeuproject/365 |
| 188. | 24.02.2026 | Four years have passed since the start of the full-scale invasion - four years of pain, loss, and hardship, yet also of incredible unity, courage, and resilience. | Facebook | https://www.facebook.com/share/p/1FU9ZsxN1t/ |
| 189. | 25.02.2026 | Dear friends, we will soon begin the third cycle of our course, "Artificial Intelligence in the EU Financial Institutions." | Facebook<br><br>Instagram<br>Telegram | https://www.facebook.com/share/p/1Lk5UQWpWd/<br><br>https://www.instagram.com/aifeuproject/p/DVIoqz2jNvA/<br>https://t.me/aifeuproject/366 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 190. | 04.03.2026 | We have started the course | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1GS72uZTEd/<br>https://www.instagram.com/aifeuproject/p/DVd2PtxDAxh/<br>https://t.me/aifeuproject/367 |
| 191. | 06.03.2026 | On March 4, 2026, instruction begins for the course "Artificial Intelligence in the EU Financial Institutions," conducted as part of the international AIFEU project under the Erasmus+ Jean Monnet Module program. The initiative aims to develop modern competencies regarding the use of artificial intelligence technologies in the European Union's financial sector and to train specialists capable of working amidst the digital transformation of financial systems. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/19dKwLefdY/<br>https://www.instagram.com/aifeuproject/p/DVjFWicjK-r/<br>https://t.me/aifeuproject/368 |
| 192. | 11.03.2026 | Today, we began the economics module of the course "Artificial Intelligence in the EU Financial Institutions" (instructor: Prof. N.I. Kholiavko, Doctor of Economic Sciences). | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/19JhY13Y7U/<br>https://www.instagram.com/aifeuproject/p/DVwLLz2DPAR/<br>https://t.me/aifeuproject/372 |
| 193. | 13.03.2026 | We have launched a series of practical sessions as part of the "Artificial Intelligence in the EU Financial Institutions" course. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/19dXSkkegs/<br>https://www.instagram.com/aifeuproject/p/DV1QKf7jCcm/<br>https://t.me/aifeuproject/374 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 194. | 20.03.2026 | On March 20, 2026, as part of the international Global Money Week initiative, a thematic educational session was held online within the framework of the course "Artificial Intelligence in the EU Financial Institutions." | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/19c1R7oSFN/<br><br>https://stu.cn.ua/bez-kategoriyi/interaktyvne-zanyattya-u-ramkah-inicziatyvy-global-money-week/<br><br>https://www.instagram.com/aifeuproject/p/DWHbbexjApz/<br><br>https://t.me/aifeuproject/378 |
| 195. | 21.03.2026 | On March 20, 2026, Nataliia Kholiavko—Professor of the Department of Finance, Banking, and Insurance, Doctor of Economic Sciences, and coordinator of the AIFEU project—participated in the international online academic and educational event "AI for Hypothesis Generation and Validation," aimed at researchers from higher education institutions. The webinar was held as part of the AI-ERIT project and focused on current approaches to using artificial intelligence in the processes of formulating and validating scientific hypotheses. | Facebook<br><br>University website<br><br>Telegram | https://www.facebook.com/share/p/1Gk6v135fH/<br><br>https://stu.cn.ua/bez-kategoriyi/uchast-u-vebinari-ai-for-hypothesis-generation-and-validation/<br><br>https://t.me/aifeuproject/386 |
| 196. | 01.04.2026 | We launched the financial module of the course "Artificial Intelligence in the EU Financial Institutions" together with M.V. Dubyna, Doctor of Economics, Professor, and Head of the Department of Finance, Banking, and Insurance at Chernihiv Polytechnic National University. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/19k6XCo2PQ/<br><br>https://www.instagram.com/aifeuproject/p/DWmFKUpDNnD/<br><br>https://t.me/aifeuproject/394 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 197. | 04.04.2026 | Nataliia Kholiavko, coordinator of the AIFEU project, completed the "Digital Financial Literacy and Social Responsibility" course. | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/19aDRBAkaQ/<br><br>https://stu.cn.ua/bez-kategoriyi/mikrokredytnyj-kurs-digital-financial-literacy-and-social-responsibility/<br><br>https://www.instagram.com/aifeuproject/p/DWthcbbDD-4/<br><br>https://t.me/aifeuproject/397 |
| 198. | 06.04.2026 | Received a certificate of participation in a webinar titled "AI for Hypothesis Generation and Validation" from Polish partners. | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1DNXJ5dTP7/<br><br>https://t.me/aifeuproject/398 |
| 199. | 08.04.2026 | We continue working within the financial module of the course "Artificial Intelligence in the EU Financial Institutions." | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1JwnT3PL99/<br><br>https://t.me/aifeuproject/399 |
| 200. | 09.04.2026 | Roundtable: "Sustainability of International Project Results: Experience, Insights, and Recommendations" | University website | https://stu.cn.ua/bez-kategoriyi/kruglyj-stil-stalist-rezultativ-mizhnarodnyh-proyektiv-dosvid-insajty-rekomendacziyi-2/ |
| 201. | 10.04.2026 | Hard working withinh the economic block of the AIFEU Module | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1FdmqR4T3G/<br>https://www.instagram.com/aifeuproject/p/DW9CKoDDPYD/<br>https://t.me/aifeuproject/401 |
| 202. | 24.04.2026 | During the last weeks, we have been fruitfully working with the lecturer of Economics, Assoc. Prof. Zhavoronk Artur on the topic "Directions of the use of artificial intelligence in the activities of non-banking institutions of the EU" | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1H4dzuhPNr/<br><br>https://t.me/aifeuproject/402 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 203. | 28.04.2026 | Cognitive and technological transformations of education in the era of artificial intelligence | Facebook | https://www.facebook.com/share/p/1SDb1kBw6J/ |
| 204. | 01.05.2026 | We invite you to the colloquium "New Ideas: Student Analytical Projects on AI in Finance." | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1PTm62PDFF/<br>https://www.instagram.com/aifeuproject/p/DYJ1YPTDHFQ/<br>https://t.me/aifeuproject/406 |
| 205. | 10.05.2026 | The active phase of the "Artificial Intelligence in the EU Financial Institutions" course has been completed. | Facebook<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1F9xB7r9x1/<br>https://www.instagram.com/aifeuproject/p/DYJ1KPRjF5i/<br>https://t.me/aifeuproject/407 |
| 206. | 14.05.2026 | A colloquium titled "New Ideas: Student Analytical Projects on AI in Finance" will take place on May 15, 2026, at 13:00. | Facebook | https://www.facebook.com/share/p/1DbMozccHu/ |
| 207. | 16.05.2026 | On May 15, 2026, the colloquium "New Ideas: Student Analytical Projects on AI in Finance" took place at Chernihiv Polytechnic National University, bringing together over 30 participants representing various sectors of society. | Facebook<br>University website<br>Instagram<br>Telegram | https://www.facebook.com/share/p/1EGGLg3gjg/<br>https://stu.cn.ua/bez-kategoriyi/kolokvium-novi-ideyi-studentski-analitychni-proekty-z-shi-u-finansah-2/<br>https://www.instagram.com/aifeuproject/p/DYaSUdljD2y/<br>https://t.me/aifeuproject/413 |
| 208. | 02.07.2026 | The course "Artificial Intelligence in the EU Financial Institutions" has been included in the list of elective courses at Chernihiv Polytechnic National University. | University website | https://stu.cn.ua/bez-kategoriyi/kurs-shtuchnyj-intelekt-u-finansovyh-ustanovah-yes-vklyucheno-do-pereliku-vybirkovyh-dysczyplin-nu-chernigivska-politehnika/ |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 209. | 01.09.2026 | Happy Knowledge Day and the start of the new academic year! | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1MBEagAn9Y/<br><br>https://www.instagram.com/aifeuproject/p/DcvGX7jMmFj/<br><br>https://t.me/aifeuproject/421 |
| 210. | 10.09.2026 | We share interesting and relevant materials on AI with you. | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1DRRC1bJLu/<br><br>https://t.me/aifeuproject/422 |
| 211. | 15.09.2026 | On September 15, 2026, a working meeting of the team for the Erasmus+ Jean Monnet Module project "Artificial Intelligence in the EU Financial Institutions" (AIFEU) took place. | Facebook<br><br>University website<br><br>Telegram | https://www.facebook.com/share/p/1c5AXt9DPk/<br><br>https://stu.cn.ua/bez-kategoriyi/zasidannya-robochoyi-grupy-dlya-planuvannya-zaklyuchnogo-dyseminaczijnogo-zahodu/<br><br>https://t.me/aifeuproject/423 |
| 212. | 22.09.2026 | AI is already finding its way into schoolwork. | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1ApFskWcW9/<br><br>https://t.me/aifeuproject/424 |
| 213. | 25.09.2026 | WSEI University (Poland) invites academic and teaching staff, researchers, administrative personnel, as well as colleagues involved in institutional decision-making and the development and implementation of university policies and procedures at Chernihiv Polytechnic National University, to participate in the webinar "AI for Hypothesis Generation and Validation."<br>The webinar will focus on artificial intelligence (AI) literacy, ethics, and the use of AI in higher education. | Facebook<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/19LcuHM6qE/<br><br>https://www.instagram.com/aifeuproject/p/DduCOYCM3kA/<br><br>https://t.me/aifeuproject/425 |

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| # | Date | Title | Source | Link |
|---|---|---|---|---|
| 214. | 01.10.2026 | Google has opened registration for an updated five-week program for entrepreneurs, managers, and professionals who want to use AI in their work. | Facebook<br><br>Telegram | https://www.facebook.com/share/p/1HcNqEGwie/<br><br>https://t.me/aifeuproject/426 |
| 215. | 01.10.2026 | Chernihiv Polytechnic National University is hosting the final workshop for the Erasmus+ Jean Monnet Module project "Artificial Intelligence in the EU Financial Institutions" (AIFEU). We invite representatives from the media, financial institutions, government bodies, educational institutions, and civil society organizations. | Facebook<br><br>University website<br><br>Instagram<br><br>Telegram | https://www.facebook.com/share/p/1Md7zhik6u/<br><br>https://stu.cn.ua/events/zaproshuyemo-na-vorkshop-yevropejski-praktyky-shi-u-finansah-dlya-ukrayiny-rezultaty-modulya-zhan-mone-aifeu/<br><br>https://www.instagram.com/aifeuproject/p/Dd8h2sYMCoI/<br><br>https://t.me/aifeuproject/427 |
| 216. | 03.10.2026 | On October 2, 2026, the international scientific and practical conference "Disinformation, AI and Law: Potential and Legal Frameworks for Countering Disinformation" took place, focusing on issues of artificial intelligence, disinformation, and legal mechanisms for countering information threats. N. Kholiavko participated in the conference panel titled "The Ukrainian Perspective and Responses," delivering a presentation on "Artificial Intelligence in the EU Financial Institutions: Jean Monnet Module." | Facebook<br><br>University website<br><br>Telegram | https://www.facebook.com/share/p/1Djjq4VwWJ/<br><br>https://stu.cn.ua/bez-kategoriyi/mizhnarodna-naukovo-praktychna-konferenczyya-disinformation-ai-and-law-potential-and-legal-frameworks-for-countering-disinformation/<br><br>https://t.me/aifeuproject/428 |
| 217. | 10.10.2026 | Final workshop “European Practices of AI in Finance for Ukraine: Results of the AIFEU Jean Monnet Module” | Facebook<br>Telegram<br>University website | https://www.facebook.com/share/p/1DsHaWy2pe/<br>https://t.me/aifeuproject/431<br>https://stu.cn.ua/bez-kategoriyi/dyseminaczijnyj-zahid-dlya-pidvedennya-pidsumkiv-realizacziyi-modulya-zhan-mone-aifeu/ |

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# 2. Leaflets, brochures

The leaflets and brochures were prepared in Ukrainian and English. Their full versions can be viewed in more detail at: https://drive.google.com/drive/folders/1Ki_y9bPIi68HqJ--VEQtH8FUpqkehihr

The materials differ in design and visual style, as they were developed for different target audiences: a more formal style for academic staff and the adult population, and a more vivid and engaging, illustrated style for young people – university students and school pupils.

The leaflets and brochures were printed in 100 copies and distributed to the general public, as well as among students, academic staff and stakeholders of Chernihiv Polytechnic National University.













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# 3. Video interview with students

A video interview with students was recorded to assess the quality of teaching and the content of the Module. The video is available at: https://www.youtube.com/watch?v=QGFeeufXUQI

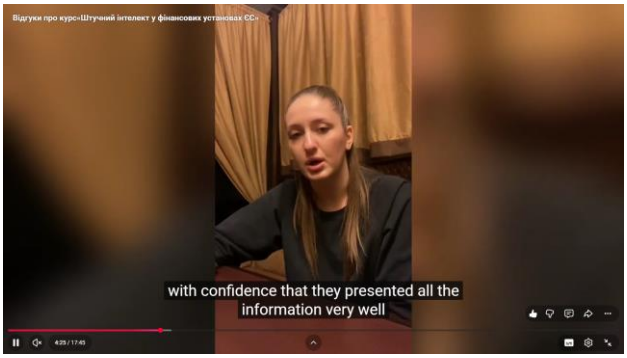
The students speak in the national language (Ukrainian); English subtitles are available and can be switched on in the video player.

All speakers gave their consent to being recorded and to the use of their personal data and the information they provided for the purposes of the project and its dissemination.



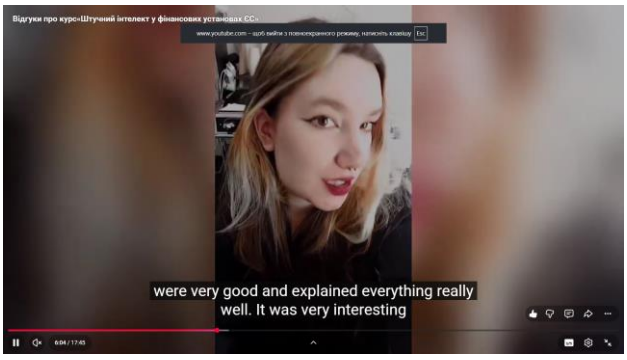


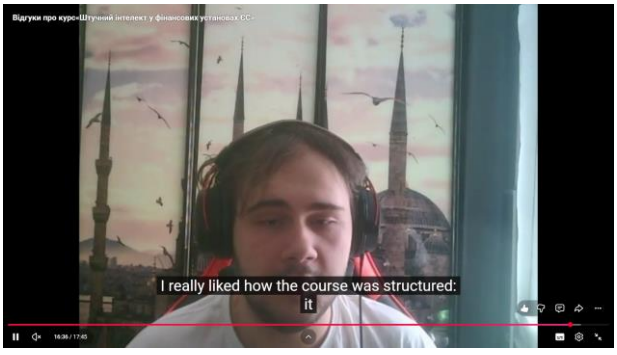











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# 4. Research papers

The project team, in co-authorship with Ukrainian and European researchers (as foreseen in the Grant Agreement), published 4 research papers disseminating information about the project and its results. Each paper contains the disclaimer.

*The list of papers:*

1. Cosmulese, C. G., **Zhavoronok, A.,** Greshko, R., Ostrovska, N., Kharabara, V., & Tkach, V. (2026). Fintech as a factor of asymmetric transformation of the banking sector: European experience and potential for Ukraine. *Journal of Theoretical and Applied Information Technology*, *104(2),* 138-153.

2. **Popelo, O., Zhavoronok, A.,** & Cosmulese, C. G. (2024). Impact of artificial intelligence on the activities of financial institutions and state security. *Problems and Prospects of Economics and Management, 1(37),* 226-239.

3. Shlapak, A., **Zhavoronok, A.,** Vdovenko, N., Bilousov, O., Horban, D., & Krylov, D. (2025). The impact of digital technologies and artificial intelligence on management of socio-economic processes in the context of sustainable development. *RISUS – Journal on Innovation and Sustainability*, *16(2),* 180-193.

4. **Zhavoronok, A.,** Filyppova, S., Tochylina, Y., Ozarko, K., Neykov, S., & Krylov, D. (2025). The impact of artificial intelligence on the development of the digital business ecosystem. *Journal of Theoretical and Applied Information Technology, 103(9),* 3945-3958.

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# FINTECH AS A FACTOR OF ASYMMETRIC TRANSFORMATION OF THE BANKING SECTOR: EUROPEAN EXPERIENCE AND POTENTIAL FOR UKRAINE

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**ABSTRACT**

In the current conditions of digital transformation of the financial sector, FinTech is one of the key drivers of structural changes in banking. The COVID-19 pandemic, the full-scale war in Ukraine, and global digitalization processes have significantly accelerated the introduction of contactless payment technologies, mobile banking, and remote financial services. Special scientific attention is required to analyze the impact of FinTech on the banking systems of developing countries, which simultaneously strive to catch up with digital leaders and face institutional, economic, and infrastructural constraints. Ukraine, being in conditions of military instability, demonstrates unexpectedly high rates of digitalization of banking services, which actualizes the need for its scientific understanding in a comparative international context. The purpose of the study is to analyze the main trends in the development of financial technologies in the banking sector of different countries, in particular, to compare digital transformation in developed and developing countries, to identify success factors, development barriers, and the potential for integrating innovations into the banking sector. The study uses quantitative and comparative approaches. Statistical indicators characterizing access to financial services and the level of digitalization of banking activities are analyzed, in particular, the number of bank branches and ATMs, the volume of mobile and Internet banking transactions, the number of transactions per capita and the share of digital payments in GDP using the example of 11 European countries. Methods of comparative analysis, data visualization and interpretation of digital trends in dynamics are used. The results of the study indicate the presence of pronounced unevenness and asymmetry of the digital transformation of the banking sector under the influence of FinTech. In developed countries (Estonia, Poland, Turkey), FinTech is actually transforming into the dominant banking service channel, which is accompanied by a reduction in physical banking infrastructure, a rapid increase in the number of digital transactions and a high share of non-cash payments in GDP. In contrast, in developing countries (Albania, Kosovo, Bosnia and Herzegovina, Moldova), digital financial services are at the stage of formation and are developing in parallel with the physical banking infrastructure, which indicates the catching-up nature of digitalization and limited substitutability of traditional service channels. For Ukraine, despite the lack of complete statistical data in the sample, a specific model of forced digital transformation is characteristic, in which the reduction of physical banking infrastructure is combined with the intensive growth of remote banking services, in particular mobile banking and non-cash payments. This allows to attribute Ukraine to the group of countries with a high potential for accelerated FinTech integration, provided that the institutional and regulatory environment is stabilized. The value of the study lies in identifying and systematizing models of asymmetric FinTech transformation of the banking sector in European countries with different levels of economic development, which allows to explain the absence of a universal trajectory of digitalization. The practical significance of the results obtained lies in the possibility of using them to form strategies for the digital transformation of the banking sector, develop financial inclusion policies, and adapt best European FinTech practices for countries in catching up, in particular for Ukraine.

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**Keywords:** *ICT Sector; FinTech; banking sector; digital transformation; developing countries; IMF Financial Access Survey; digital transactions; cashless payments; banking services market; national economy; Ukraine; Europe.*

## 1. INTRODUCTION

FinTech have become a powerful driver of transformation of the banking sector. Digitalization covers almost all aspects of banking activities - from opening an account to making transactions, lending, managing savings, identifying customers, etc. Particularly noticeable is growing popularity of mobile and online banking, the number of transactions in which is showing explosive growth in most countries, regardless of the development level of the financial system. This process is not uniform: while Estonia is experiencing a stable and rapid growth of digital services, in developing countries or countries that are only in the transformation stage, FinTech is developing at a slower pace, often facing barriers in the form of weak infrastructure, insufficient digital literacy or imperfect regulation.

Despite the general trend towards digitalization of financial services, there is no clear understanding of how the development of FinTech correlates with changes in traditional banking infrastructure – the number of banks, branches and ATMs – and how these processes affect the availability of financial services in countries at different stages of transformation. The issue of comparability and interpretation of digital activity indicators (the number and value of mobile and Internet banking transactions, their share in GDP, transactional activity per capita) in combination with indicators of the physical presence of banks remains particularly problematic. In countries with catching up development, the lack of comprehensive and comparable data makes it difficult to assess the real level of FinTech penetration and the formation of effective strategies for the digital transformation of the banking sector. This problem is given additional relevance by the situation in Ukraine, where structural changes in the banking system are taking place under the influence of crisis factors, which requires scientific understanding without prior generalizations about the effectiveness of digitalization. This necessitates a systematic comparative analysis of the development of FinTech in the banking sector of different countries in order to identify general patterns, limitations, and potential directions for further development.

## 2. LITERATURE REVIEW

In recent years, FinTech has become a key factor in transformation of the banking sector in both developed and developing countries (Aldaarmi [2]; Shkolnyk [42]; Shkarlet et al. [39]; Dubyna et al. [9]). FinTech encompasses a wide range of digital solutions: from mobile payments and online lending to blockchain and artificial intelligence in financial services (Shaposhnykov et al. [36]; Savchenko et al. [34]; Zagirniak et al. [51]).

Studies by Abramova et al. [1], Gancarczyk et al. [12]. and Alieksieiev et al. [3] define FinTech as an evolutionary response to the need for faster, cheaper and more accessible financial services. The authors emphasize that FinTech not only changes service consumption patterns, but also forces banks to adapt, automate processes and innovate. Khudolei et al. [22] and Hidayat-ur-Rehman [15] show that FinTech can reduce transaction costs, increasing the efficiency of financial systems.

In EU countries, the FinTech sector is showing rapid development. According to studies by Zybareva et al. [54], Ivashchenko et al. [20], Li [27] and Kychko et al. [25] regulatory support (e.g., PSD2 in the EU) has contributed to development of open banking and competition in the market. The British FCA has become an example of regulatory sandboxes, which have stimulated innovation.

At the same time, the available scientific literature notes uneven development: southern and eastern EU countries lag behind in the FinTech implementation due to weaker digital infrastructure, lower investment, and caution of banking institutions (Kozmenko et al. [24]; Serdarušić et al. [35]). Bukhtiarova et al. [8]; Hrubliak et al. [16]) identify three main strategies of banks in response to FinTech: cooperation (partnership with FinTech startups), competition (creation of their own digital solutions), and consolidation (acquisitions).

In Ukraine, FinTech is in active formation stage. According to the USAID, the sector is showing growth due to high level of digitalization of the population, popularity of mobile payments (e.g., monobank), and active support from the National Bank of Ukraine. However, challenges remain - among them: regulatory uncertainty, weak investment attraction, and limited trust in new players.

Domestic researchers (Kholiavko [21]; Popelo, et al. [32]; Shchur et al. [37]) emphasize that Ukraine has significant potential for the FinTech ecosystem, especially in the field of alternative lending, digital wallets and blockchain solutions. A comparison of FinTech ecosystems between EU countries and

Ukraine indicates available common challenges (the need for regulatory adaptation, cybersecurity, data protection) and differences (level of capitalization, access to financing, banks' readiness to innovate) (Shkarlet et al. [40]; Zveryakov et al. [53]). Therefore, studying European experience is extremely valuable for developing effective policies in Ukraine.

A review of available scientific literature provides understanding that FinTech is a powerful driver of transformation of the banking sector in Europe. Ukraine has all prerequisites for repeating a similar trajectory, provided that there is effective policy, support for innovation and attraction of investments, which determines relevance of research on this topic today.

Despite the growing number of scientific studies devoted to the development of FinTech and its impact on banking, the current scientific literature lacks a holistic view of the patterns and models of digital transformation of banking systems in countries with different levels of economic development and financial infrastructure. Most of the works focus on individual aspects of FinTech - technological innovations, regulatory environment or consumer behavior, without providing a comprehensive comparative analysis of structural changes in the banking sector in different national contexts. A separate scientific challenge remains the lack of systematic empirical studies that would integrate the experience of EU countries and Ukraine into a single analytical framework. Ukrainian scientific works mainly focus on the potential of FinTech and individual cases of digital banking services, but do not provide a comparative assessment of the depth and effectiveness of the digital transformation of the banking sector in conditions of institutional instability, regulatory restrictions and military risks. Thus, the research problem lies in the lack of a universal and at the same time adaptive model of FinTech transformation of the banking sector, capable of explaining the unevenness, asymmetricity, and multidirectionality of digitalization processes in countries with different levels of development and of forming scientifically based recommendations for regulatory policy, in particular for countries in catching up development, such as Ukraine.

## 3. METHODOLOGY

To assess the global level of the FinTech implementation in the banking sector, it is recommended to use the IMF Financial Access Survey (FAS) index, which is calculated by the International Monetary Fund. The FAS structure includes three main categories, namely: access; usage; financial intermediaries and FinTech indicators.

The component related to FinTech in banks covers:

1. Mobile and internet banking transactions.
2. Number of mobile and internet banking transactions.
3. Value of mobile and internet banking transactions.

These indicators reflect the penetration level of FinTech solutions in the banking sector, in particular in terms of digital access, electronic payments and remote banking.

For the analysis, it is recommended to use data from a group of developing European countries (Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Hungary, Kosovo, Moldova, Montenegro, North Macedonia, Poland, Romania, Serbia, Turkey, Ukraine) and compare them with Estonia, a leader in the digital transformation of the state and the banking sector. In addition, Estonia has a similar banking model, structural interaction between banks and FinTech, and is geographically close to the countries of Eastern Europe. The purpose of the study is to analyze the main trends in development of financial technologies in the banking sector of different countries, in particular, to compare digital transformation in developed and developing countries, to identify success factors, development barriers and the potential for integrating innovations into the banking sector. Special attention is paid to determining the role of digital services in transformation of financial infrastructure, as well as assessing prospects for FinTech for countries with a lower level of digitalization, including Ukraine.

## 4. RESULTS

According to the Financial Stability Board (FSB): Financial Innovation (FinTech) as technologically enabled innovation in financial services that could result in new business models, applications, processes or products with an associated material effect on financial markets and institutions and the provision of financial services. FinTech innovations are affecting many different areas of financial services [13]. Stages of the FinTech development in the banking sector can be divided into three key periods that demonstrate evolution of technology and changing role of banks in the financial system (Fig. 1):

Stage I – FinTech 1.0 (1866 – 1967) – this stage is associated with development of the global financial infrastructure, which laid the foundation

for further digitalization of the banking system. Main characteristics are as follows: emergence of global communication systems: telegraph, telephone, fax; creation of a network of international money transfers; formation of a traditional banking model with a physical presence.

Stage II – FinTech 2.0 (1967 – 2008) –transition to digital banking technologies. This period is associated with penetration of computer technologies into the banking sector: introduction of automated teller machines (ATMs) – the first automation of cash transactions; creation of the SWIFT system for secure exchange of financial messages; active development of electronic banking, bank cards, POS terminals. The key significance of this period is the use of IT solutions by banks to improve efficiency, opening the way to FinTech 3.0 [26].

Stage III – FinTech 3.0 (2008 – present) – innovative transformation and emergence of digital banks. Characteristic features were as follows: emergence of neobanks (digital-only banks) without physical branches; widespread use of mobile applications, AI, Big Data, cloud technologies, P2P platforms, crowdfunding, cryptocurrency, smart contracts; open banking (Open Banking), API integration. These changes focused on improving personalization, improving the quality of customer service [47].

Digitalization of the financial sector and active integration of financial technologies are significantly transforming the traditional model of bank functioning.

Innovations brought by FinTech have disrupted traditional banking models and opened up new opportunities for financial inclusion, efficiency, and improved customer experience [29; 50; 33].

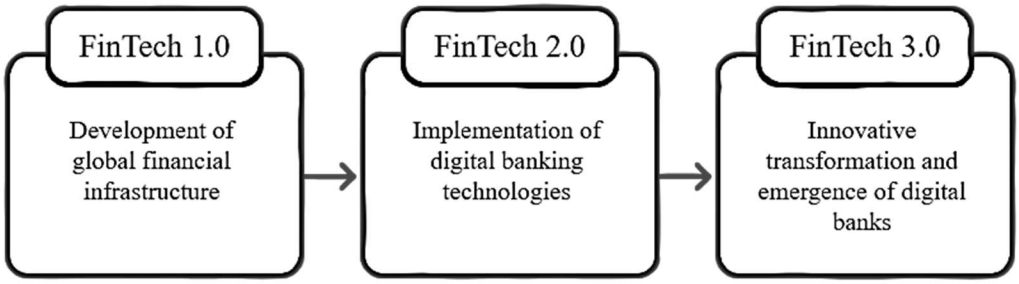



*Figure 1: Evolution of FinTech in the banking sector*
*Source: Source: summarized by the authors based on Arner et al. [4]*

Evolution of FinTech in the banking sector demonstrates gradual transition from physical infrastructure to full digital transformation. A modern bank increasingly resembles a technology company that uses innovation to improve convenience, accessibility, and security of financial services.

Development of mobile banking, open banking, artificial intelligence in scoring, digital customer identification - all this leads to emergence of a new banking architecture in which FinTech becomes not an external factor, but an integrated part of the banking environment. Fig. 2 depicts transformation of the banking model – from traditional to innovative, functioning in symbiosis with FinTech.

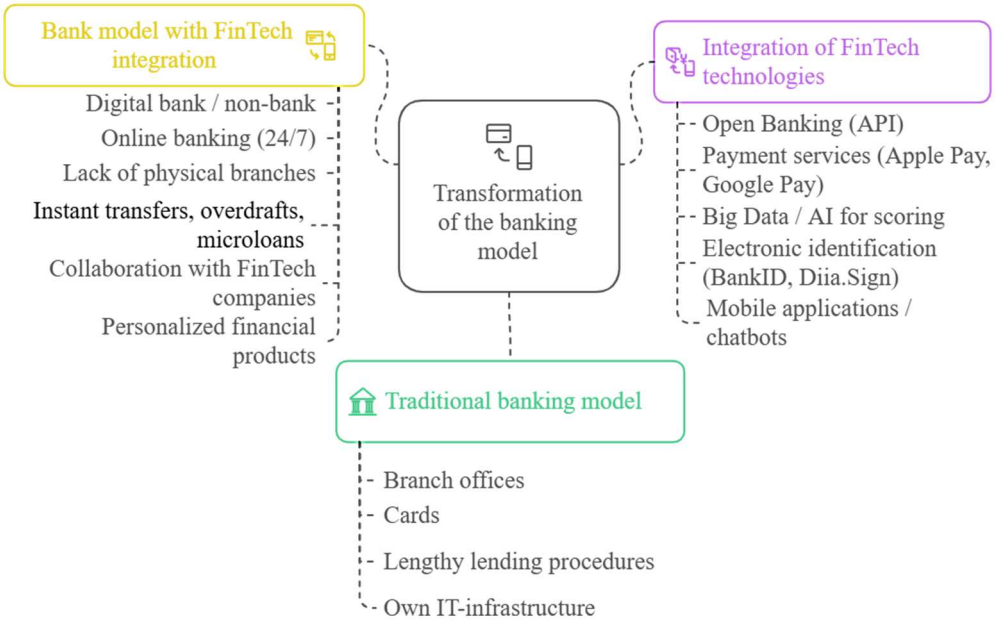



*Figure 2: Transformation of the banking model under the influence of FinTech*
*Source: compiled by the authors*

The initial link is the traditional banking model, which is based on physical presence of branches and the use of plastic cards as the main tool for accessing accounts. It is characterized by complex and lengthy lending procedures, as well as the available bulky IT infrastructure, which complicates scaling and adaptation to new technologies.

The next stage of transformation is integration of FinTech technologies, which opens up new opportunities for the banking system. It involves the use of open banking (API) for interaction with financial services, the use of mobile payment solutions (such as Apple Pay and Google Pay).

Digital identification (BankID, Diya.Sign) simplifies access to financial products, and mobile applications and chatbots provide a convenient channel of communication with users.

Due to transformation, the FinTech-integrated banking model is being formed, which involves the operation of digital banks or neobanks without physical branches. This model focuses on providing customers with fast services - instant transfers, microloans, overdrafts - and close cooperation with FinTech companies. It also offers personalized financial products based on the user's behavior analysis, which significantly increases the quality of service and customer loyalty.

Thus, digitalization is changing the functioning of banks. New competitive challenges are forcing incumbents to rethink their own strengths and vulnerabilities, as well as assess risks and opportunities, which ultimately stimulates changes in their business models [23; 33]. Development of financial technologies is significantly transforming the traditional banking service model, changing both internal operational processes and customer interaction channels. FinTech solutions are gradually being integrated into key areas of the banking activity – from payment services to risk management and investment services. A. Thakor notes that FinTech includes innovations in payment systems (in particular, cryptocurrencies), credit markets (including P2P lending), and in the insurance sector, where blockchain-based smart contracts play an important role [44]. For comprehensive understanding of the scale and effectiveness of this transformation, it is important to systematize FinTech products according to their areas of use and expected benefits for banks. Fig. 3 presents the grouped analysis of FinTech solutions in the banking practice.

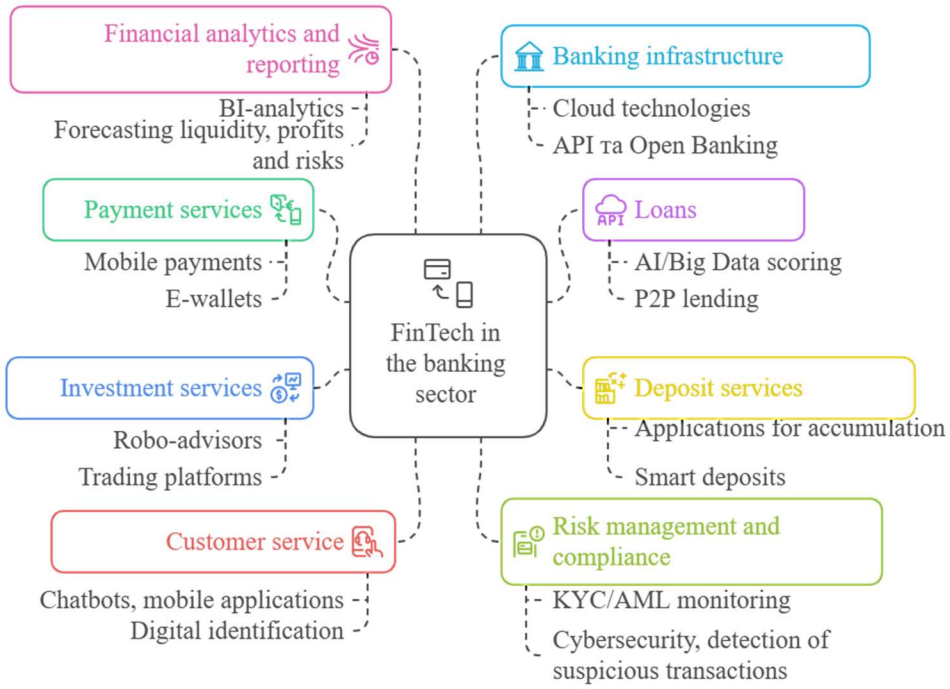



*Figure 3: FinTech products and areas of banking application*

*Source: compiled by the authors*

The way financial services are provided is changing, there is a need to discuss sustainability, security and competition in the payments sector, foundation is laid for improving transnational money transfers and the issue of whether private or public money is issued is raised [6]. Application of FinTech products in banking activities and their impact on bank efficiency is presented in Table 1.

*Table 1. Application of FinTech products in banking activities and their impact on bank efficiency*

| Scope | FinTech- products / solutions | Bank benefits |
|---|---|---|
| Payment Services | - mobile payments (Apple Pay, Google Pay)<br>- QR codes, NFC, P2P<br>- e-wallets (Payoneer, Revolut) | - lower transaction costs<br>- branchless payment infrastructure |
| Lending | - AI/Big Data scoring<br>- P2P-crediting (Mintos)<br>- BNPL (Buy Now Pay Later) | - rapid decision-making<br>- microloan servicing<br>- new approaches to risk assessment |
| Deposit Services | - savings applications (e.g. “bank”)<br>- smart deposits with a dynamic rate | - increasing the financial culture of customers<br>- stimulating loyalty through personalized products |
| Investment Services (WealthTech) | - robo-advisors<br>- trading platforms (securities, bonds)<br>- crowdfunding/crowdinvesting | - client access to investment products<br>- reduction in asset management costs |
| Customer Service | - chatbots (e.g. Gus)<br>- digital identification (BankID, Face ID)<br>- new generation mobile applications | - 24/7 service<br>- less load on contact centers<br>- improved customer interaction |
| Risk Management and Compliance (RegTech) | - KYC/AML monitoring (automated)<br>- suspicious transaction detection (AI/ML)<br>- cybersecurity | - automation of inspections<br>- fewer human errors<br>- increased trust of regulators |
| Financial | - BI analytics | - strategic management |

| | | |
|---|---|---|
| Analytics and Reporting | - behavioral analysis of transactions<br>- forecasting of liquidity, profits, risks | - transparency of financial decisions |
| Banking Infrastructure | - cloud technologies (Cloud banking) - API and Open Banking<br>- Core Banking as a Service | - scalability, flexibility<br>- reduced IT costs<br>- speed of implementation of new services |

*Source: compiled by the authors*

That is, FinTech is a powerful driver of innovation in the banking sector. Their use allows:

– increase operational efficiency through automation and digitalization of processes;

– reduce costs for customer service and infrastructure support;

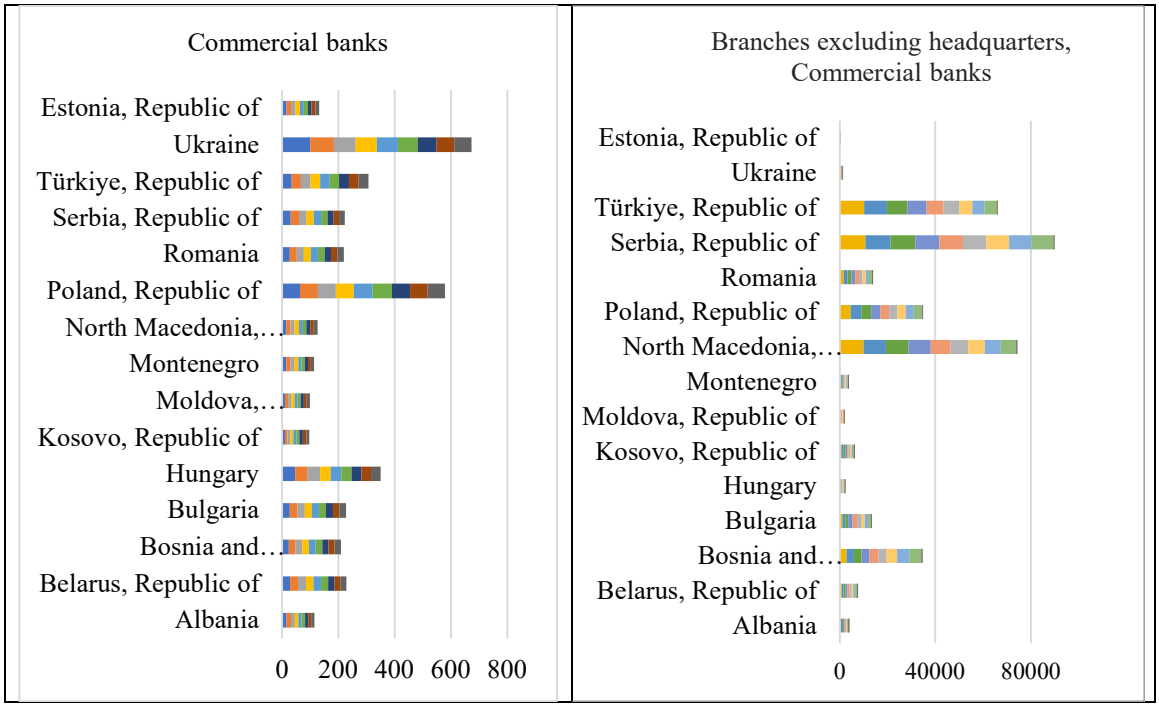
– expand access to financial services through mobile applications, P2P platforms and cloud solutions;

– improve the customer experience through personalized services, convenience and speed;

– increase reliability and transparency of compliance procedures and risk management.

Generalization shows that implementation of FinTech solutions is not only a technological trend, but also a strategic necessity to ensure competitiveness of banks in the digital era.

Access to financial services is an important indicator of the digitalization level of banking activities, since it is through digital channels that customers receive fast, convenient and secure access to various banking products and services. To analyze dynamics of the access level to financial services in developing countries in Europe, with a focus on Ukraine and a comparison with Estonia (as a representative of developed digital economies), it is recommended to rely on data from the IMF Financial Access Survey (Fig. 4).



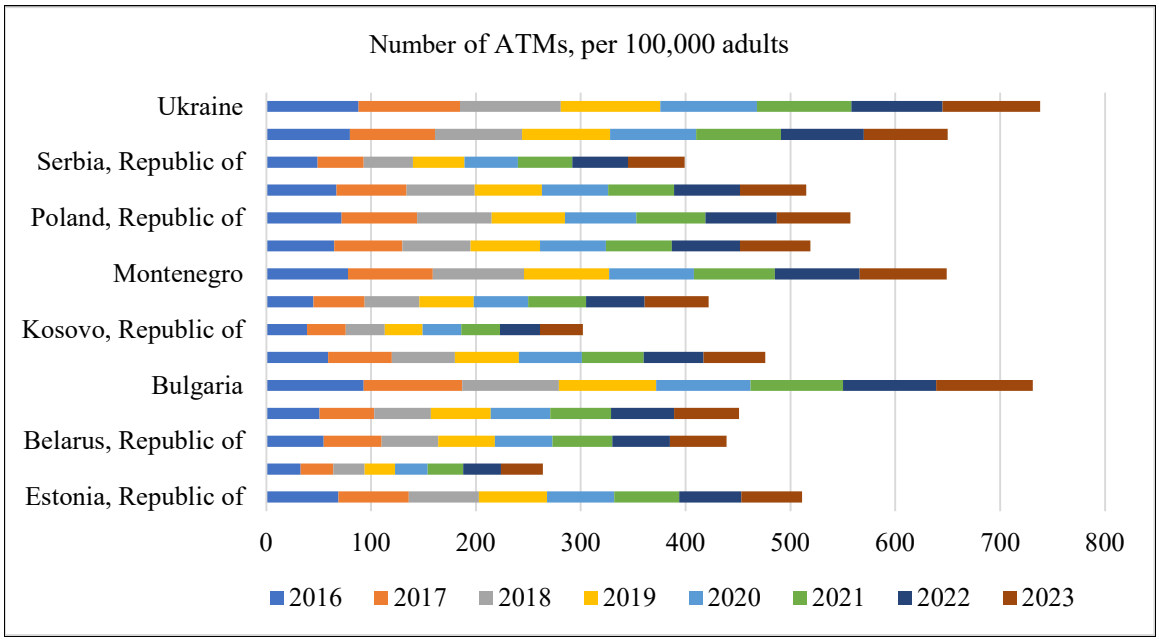



*Figure 4: Dynamics of access to financial services for developing European countries and Estonia*
*Source: compiled by the authors based on information from [11]*

Between 2016 and 2024, most emerging European countries will see a clear transformation in access to financial services, particularly in the number of ATMs, bank branches and banks in general. The most notable trend is the gradual shift away from physical banking in favour of digital solutions, including FinTech services, which is particularly evident in countries such as Estonia and, to some extent, Ukraine. Estonia is a model of a digital financial model: the number of ATMs per 100,000 population has decreased from 67 in 2016 to 58 in 2023, and the number of branches has almost halved, from 99 to 62. Despite this, access to banking services remains stable thanks to full transition to digital channels, primarily mobile and online banking. It is noteworthy that some banks in Estonia remained stable at 16 throughout the period, indicating a concentrated but efficient system.

In contrast, Ukraine has experienced profound transformation of its banking system, especially after 2020. While in 2016 the country had one of the most extensive networks – over 10 thousand bank branches, 100 banks and 97 ATMs per 100 thousand people – by 2024 these figures had almost halved. The most noticeable decline occurred in 2020-2022. However, it is important to note that against the backdrop of reduction of the physical infrastructure in Ukraine, digital channels – for example, mobile applications, including Monobank and state digital services based on JSC CB "PrivatBank" – have been actively developing.

Poland, Romania, Serbia and Bulgaria show the more gradual reduction in physical presence of banks, which occurs in parallel with introduction of digital services, but without sharp jumps. In these countries, there is gradual decrease in the number of ATMs and branches, as well as slight consolidation of banking institutions, which indicates stable, controlled transformation of the system.

These data allows to identify several patterns. Countries such as Estonia, Poland and, in recent years, Ukraine, demonstrate that active digitalization can compensate for the loss of physical infrastructure. Instead, stable growth of the number of ATMs and bank branches, as in Kosovo and Albania, indicates a stage of the infrastructure development, not its collapse.

Ukraine, in turn, is an exceptional example of forced transformation, where the war became a catalyst for rapid transition to remote banking. Unlike Estonia, which proceeded gradually and deliberately, Ukraine implemented digitalization of banking services at an accelerated pace - largely due to the technical potential, high level of digital literacy and adaptability of citizens.

In general, it can be argued that Europe as a whole, including developing countries, is moving towards reducing physical channels of access to financial services, while stimulating the FinTech development. Estonia is an example of this transition, and Ukraine is an example of a hybrid model.

Developing countries, particularly in Europe, face challenges of modernizing their banking infrastructure, while demonstrating different dynamics of change depending on the digitalization level, macroeconomic conditions and regulatory policies (Fig. 5).

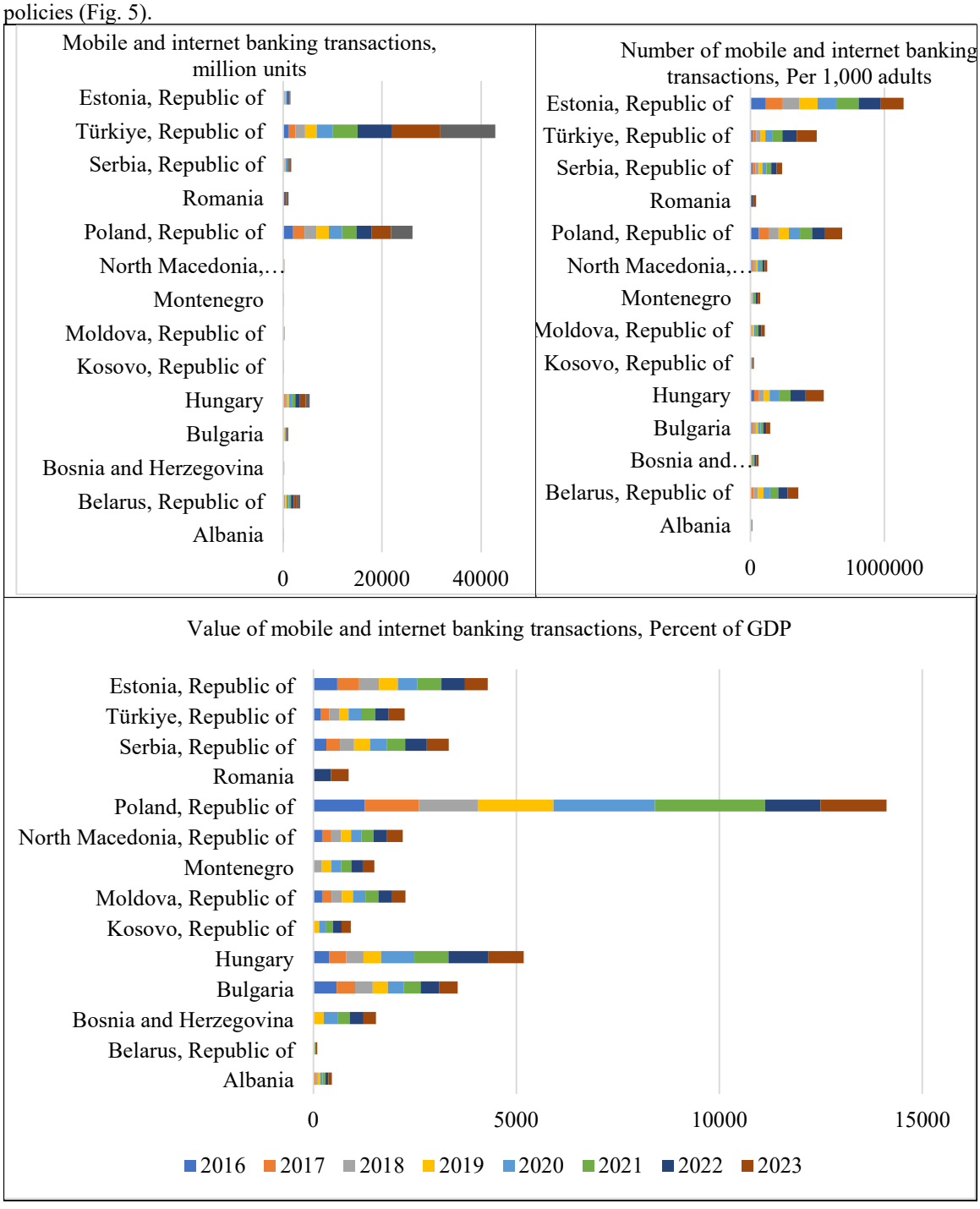



*Figure 5: Dynamics of mobile and internet banking development for developing European countries and Estonia*

*Source: compiled by the authors based on information from [11]*

The analysis allows to identify dependencies between key indicators of financial infrastructure accessibility and to form assumptions about directions of development of the banking system in the digital economy. Despite the lack of current data on Ukraine in the given sample, it is included in the analysis based on the logic of regional comparison, similarity of structural problems and strategic course on digitalization. This allows to draw general conclusions about possible scenarios for development of the Ukrainian banking infrastructure and to clarify the potential of FinTech solutions as a compensatory mechanism to overcome existing restrictions on access to financial services.

The number of mobile and online banking transactions shows a clear upward trend in all the countries studied – both in the smaller markets of the Western Balkans and in much larger financial systems, including Turkey and Poland. The most notable growth is observed in Turkey, where the volume of transactions increased from 1.08 billion units in 2016 to 11.1 billion units in 2024, i.e. more than tenfold. Poland ranks second in absolute terms. In the Western Balkan countries, the growth dynamics are weaker, but characterized by stability. This indicates gradual expansion of the digital financial sector in conditions of less developed banking infrastructure. Estonia, despite a significant level of digitalization, shows only moderate growth - from 126 to 198 million transactions, which indicates a certain saturation of the market and stable user behavior in the context of already integrated digital services. Particularly dynamic growth was observed in Hungary until 2023, when the volume of transactions increased from 236 million to over 1 billion. However, in 2024, a decrease to 871 million is recorded, which is the result of market correction and structural changes in consumer behavior.

The indicator of the number of transactions per 1,000 adult population gives an idea of the actual penetration level of financial technologies into the daily lives of citizens. The leader among the countries of the region is Estonia, where in 2023 each adult made an average of over 460 mobile or internet banking transactions per year, which indicates almost complete digitalization of the financial sector. High level of activity is also observed in Poland, Turkey and Hungary - with indicators within 90-140 thousand transactions per 1,000 adult population, which indicates available developed digital platforms and widespread use of remote services. In countries, including Serbia, Bulgaria and Romania, an average level of penetration is observed - from 20 to 40 thousand transactions per 1,000 people. Moldova, Montenegro and North Macedonia demonstrate a gradual increase in this indicator, although they still remain within 25-30 thousand. The lowest values are observed in Albania, Kosovo and Bosnia - up to 7 thousand transactions per 1,000 adults, however, positive dynamics are also recorded in these countries, which indicates the beginning of active development of the FinTech direction.

In regions with a high level of digital transactions, there is also a trend towards a reduction in physical banking infrastructure – a decrease in the number of ATMs and branches, which is well illustrated by examples of Estonia, Poland and Hungary. At the same time, in countries with low level of digitalization, such as Kosovo or Albania, physical service channels remain important for users. Another important indicator is the volume of mobile and online banking transactions as GDP percentage, which demonstrates the depth of integration of digital finance into the country's economy. Poland turned out to be a record holder with an extremely high figure of 2713% of GDP in 2021, although in 2022 it was observed to decrease to 1367% – which is a consequence of both methodological changes and financial shocks. Other countries, in particular Estonia, Hungary and Bulgaria, maintain consistently high values in the range of 400-600%, which indicates overwhelming share of digital channels in the total volume of payments. Turkey, Romania, Serbia and North Macedonia demonstrate average level of this indicator – from 300 to 500% of GDP. In countries with a lower level of FinTech development – Moldova, Montenegro, Kosovo – the volume of digital transactions as a GDP share remains lower, but the growth trend is obvious. In countries such as Albania and Belarus, digital payment systems are at the initial implementation stage, and their share in the economy is still insignificant, but prospects for development remain positive. Although Ukraine is absent from the sample, the analysis suggests that by 2021 it could demonstrate dynamics close to Poland and Hungary, given active spread of mobile banking and development of FinTech services. However, with the outbreak of a full-scale war, digital banking activity has fluctuated, although the demand for remote financial services remained high due to the decrease in available physical infrastructure.

In the comparative analysis of indicators of digital transformation of the banking sector, clear patterns are observed, reflecting the maturity level of FinTech solutions in different countries. The most developed countries in this context are Estonia, Poland and Turkey. They are characterized by a reduction in the number of ATMs and bank

branches, which is accompanied by high volumes of digital transactions per capita and a significant share of these transactions in the GDP structure. This indicates deep integration of FinTech into daily banking operations and complete transition to a fully digital service model. While in these countries digital channels are becoming the main way of interacting with the financial system, less developed markets, in particular Albania, Kosovo, Moldova, demonstrate a different approach. Here there is still gradual expansion of physical banking infrastructure - new branches are opening, the number of ATMs is increasing. At the same time, the growth rate of digital services is also stable, which indicates a trend towards a digital model in the medium term. Although digital indicators in these countries are significantly inferior to leaders, they demonstrate the potential for development.

According to current trends, Ukraine until 2020 was characterized by a significant number of ATMs and extensive physical network of banking institutions. However, with the onset of the pandemic and especially after the start of a full-scale war, digital solutions began to rapidly displace traditional channels. Services such as Privat24, Monobank and others ensured rapid transition of millions of users to remote service. This suggests that today's level of digital banking transactions in Ukraine may be comparable to indicators of countries such as Poland or Hungary. Although the lack of accurate data limits possible direct comparison, structural changes in the country's financial environment indicate a high degree of digital maturity of the banking sector.

## 5. DISCUSSION

According to Bazilinska et al. [5], Hrubliak et al. [17] and Kovalenko et al. [23], the issue of FinTech and banking sector transformation in European countries remains multidimensional and depends on the level of digital maturity of economies, regulatory environment and readiness of financial institutions for innovations, with which authors fully agree. This is confirmed by the fact that the obtained empirical results allow to interpret the digital transformation of the banking sector as a process of structural restructuring of financial markets, and not only as a technological update of individual services.

Shestakovska et al. [38] and Shkarlet et al. [41] argue that FinTech are changing the logic of banking, shifting the focus from physical presence and product-based approaches to customer-centric digital ecosystems. Studies [7; 18; 19] show that this transformation enhances the role of data, transaction processing speed, and personalization of financial services as key factors of competitiveness.

Shkolnyk et al. [43], Tkachuk [45] argue that alternative financial technologies, such as open banking, digital payments, neobanks and artificial intelligence-based platforms, contribute to increasing the competitiveness of the financial sector and fill gaps that traditional banks are not always able to effectively cover. In this context, the study shows that European countries demonstrate different models of interaction between banks and FinTech companies - from cooperative approaches to competitive confrontation.

An important analytical result is the identification of an asymmetry between the speed of technological implementation and the adaptation of the regulatory environment. In a number of countries, digital financial services are developing faster than the regulatory framework, which creates both opportunities for innovation and additional risks for financial stability and consumer protection [28; 48; 52]. This confirms the need to move from reactive to proactive regulation of fintech [31; 46; 49].

Thus, the transformation of the banking sector can occur either through the integration of fintech innovations into traditional financial institutions or through the development of independent digital financial ecosystems. This difference in strategic approaches not only reflects national economic and social characteristics, but also forms the prerequisites for structural changes in the European financial sector in the medium term.

For Ukraine, the potential for FinTech development is significant, given the high level of digitalization of payment services and the active implementation of state digital platforms. At the same time, further transformation of the banking sector requires improving the regulatory framework, harmonization with European standards and stimulating the innovation environment. The experience of European countries can serve as a guideline for the formation of a balanced development model that combines financial stability with technological progress. Thus, the extended analysis confirms that effective digital transformation of the banking sector requires a systemic approach that covers technological, regulatory and behavioral aspects.

Therefore, this study complements scientific developments in the field of financial technologies and banking transformation, summarizing European experience and identifying prospects for its adaptation to Ukrainian conditions, taking into account current economic and institutional challenges.

## 6. CONCLUSIONS

The main trends in the FinTech development in the banking sector include deep digital transformation of financial services, focused on convenience, accessibility and efficiency of customer service. Globally, there is consistent transition from traditional physical banking infrastructure (branches, ATMs) to digital channels, in particular mobile and Internet banking. In countries with developed financial systems (such as Estonia, Poland, Turkey), this process is accompanied by a decrease in the number of banking institutions and active implementation of innovative services - digital wallets, instant payments, Open Banking, e-KYC, biometric identification, etc.

The study showed the unevenness and asymmetry of the digital transformation of the banking sector under the influence of FinTech between countries with different levels of economic development and financial infrastructure.

In some European countries (Estonia, Poland, Turkey), FinTech is actually replacing traditional physical banking channels, which is manifested in the reduction of the network of branches and ATMs while simultaneously sharply increasing the number and value of digital transactions. In other countries (Albania, Kosovo, Moldova, Bosnia and Herzegovina), FinTech has not yet become a full-fledged alternative to traditional banking infrastructure, and digital services are developing in parallel with the physical expansion of the network. Ukraine is characterized by forced and uneven digitalization, when a sharp reduction in physical banking infrastructure is combined with the rapid growth of remote financial services, but official statistics do not always allow to fully assess the scale of these changes.

Thus, the study showed that FinTech does not form a single universal trajectory of development of banking systems, but is implemented through different models, determined by institutional conditions, the level of digital maturity of the population and the features of the regulatory environment. This necessitates a comparative analysis and search for adaptive models of digital banking, taking into account national characteristics.

The scientific contribution of the study is to systematize approaches to assessing the impact of FinTech on the banking sector through a combination of indicators of digital activity and physical banking infrastructure, as well as to identify typical transformation models for different groups of countries. The results obtained can be used as an analytical basis for the formation of state policy and regulatory strategies in the field of digital banking, especially for countries that are at the stage of catching up.

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# IMPACT OF ARTIFICIAL INTELLIGENCE ON THE ACTIVITIES OF FINANCIAL INSTITUTIONS AND STATE SECURITY

*The article examines peculiarities of the development of artificial intelligence technologies in various fields of application. The field of application of the artificial intelligence technologies in Ukraine has been studied. Based on the analysis of the road map of the artificial intelligence development, the key areas of the implementation of such technologies were formed. Areas of use of artificial intelligence in the activities of financial institutions are highlighted. Based on the analysis of strengths and weaknesses, positive and negative aspects of the use of the artificial intelligence technologies were formed. Based on the experience of using the artificial intelligence technologies in the activities of financial institutions of the EU countries, software products that allow detecting threats, dangers and financial crimes have been identified. The peculiarities of the use of artificial intelligence in ensuring the security of the state have been studied. It is substantiated that when ensuring the security of the state, an important aspect when using the artificial intelligence technologies is the ability to analyze large volumes of data, which include open sources of information, social networks, which allows predicting possible threats and dangers.*

***Keywords:*** *artificial intelligence, information technologies, financial institutions, state security, experience of EU countries, European norms in domestic legislation.*
*Fig.: 4. References: 15.*

**Formulation of the problem.** The modern development of society is characterized by the formation of a new type of information technologies, which are actively introduced into all spheres of life. In Ukraine, despite the existing problems, there is a significant development of information technologies, which allow the country to actively integrate into the processes of global informatization. It is the development of information technologies that allows the state to actively participate in international exchange and consumption processes. Prompt access to information and its effective use play an important role. The widespread use of new information collection and processing systems contributes to increasing the informatization of society.

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One of the areas of the development of digital technologies is the use of the artificial intelligence technologies, which are developed in most countries of the world. The artificial intelligence technologies are widely used in all spheres of social life. Ukraine should pay due attention to the development and implementation of the technologies based on artificial intelligence, as it risks losing the opportunity to compete with other countries in many strategic sectors of the economy, which will negatively affect its overall development.

Today, most authors define artificial intelligence as a complex of technological solutions based on which the cognitive function of a person is imitated, which allows when performing certain tasks to obtain results that are equal to the results of the human intellectual activity. The rapid development of technologies leads not only to positive changes, which are expressed in the automation and acceleration of the performance of many functions, but also requires significant attention in the matters of security and information protection. Therefore, in addition to the development of the artificial intelligence technologies, it is necessary to develop methods and approaches to the protection of information that affects the security of the activities of institutions and the state at all levels of management.

**Analysis of recent research and publications.** Today, the issue of the development of the artificial intelligence technologies is relevant and is considered from different positions by many foreign and domestic scientists. Features of the impact of the artificial intelligence technologies on security at different levels are studied in the works of O. Adamchuk, O. Baranova, T. Katkov, K. Khernes, S. Petryaeva, Yu. Sydorchuk, O. Yastreb O. and others. Features of the use of the artificial intelligence technologies in the activities of financial institutions are studied in the works of A. Bahramirze, L. Klob, N. Panteleeva, F. Pasiura, M. Feti, and others. However, despite the significant amount of thorough research in this topic, the issue of the influence of artificial intelligence on the activities of financial institutions and the security of the state remains relevant today.

**The goal of the article** is to determine the specifics of the influence of artificial intelligence on the activities of financial institutions and the security of the state.

**Presenting main material.** The modern world is characterized by a significant development of digital technologies, in this context, information is a strategic resource that affects the economic and security development of the state. Important in this case is the state of information security, which is influenced by factors of the external and internal environment. The main factors include the socio-economic state of the state, the political situation in the country, the state of digitization and innovative development. The implementation of the artificial intelligence technologies is an urgent issue not only for business structures, but also for the state as a whole. In the conditions of the expansion of the information space, the issues of ensuring the security of the state are becoming relevant, which affects the state's ability to counter threats and dangers in various areas of the country's development. The sphere of defense and security is a priority area of the

development for every state, and this is especially relevant for Ukraine in the current conditions of military aggression. The introduction of the artificial intelligence technologies makes it possible to significantly expand the capabilities of this field and change the balance of power between the world's states.

In Ukraine, for the development of the artificial intelligence technologies, an expert advisory committee for the development of the field of artificial intelligence was formed under the Ministry of Digital Transformation of Ukraine, which was created in 2019. The main purpose of creating the committee is to increase the competitiveness of Ukraine in the artificial intelligence field. The main areas of work were divided into four groups: public administration, education, security and regulation. It is in these areas that the areas of development of the artificial intelligence technologies are being implemented. In Ukraine, the expert advisory committee for the development of the artificial intelligence field developed a road map for the regulation of artificial intelligence in Ukraine.

The proposed road map includes the following areas of development:

- service training, which includes the formation of business tools for preparing for the new conditions of the regulatory framework of the domestic and European legislation for the functioning of enterprises;
- prudence, which is built on the use of the experience of European countries in the implementation of the artificial intelligence technologies to take into account risks and threats;
- partnership and self-regulation, which forms the directions of cooperation between the state and business in various spheres of social life, since close cooperation will make it possible to take into account the needs of each party more effectively and reduce the level of conflict of interests;
- global perspectives, which include orientation to the world trends (extraterritorial effect of the EU AI Act and "Brussels Effect"), taking into account the interests of the state in the foreign market;
- product approach, which is based on such business development, which is able to independently enter international markets and maintain its competitiveness.

The importance of the development of the artificial intelligence field for Ukraine lies in the support and implementation of such technologies in the specified priority areas to ensure economic freedom and security of the state at all levels.

In matters of the national security, the development of the artificial intelligence systems is a priority task, military aggression by Russia has shown that today's weapon control systems are outdated compared to the technologies of developed countries. In the future, it is the systems based on artificial intelligence that will be involved in the security of states.

In the education sphere, there is a significant deficit in the fields of Computer vision, Machine learning, Big data, Natural language processing, which negatively affects the state's competitiveness on the international market.

In the economy, the development of artificial intelligence contributes to the capitalization of modern corporations, the use of such technologies contributes to the innovative integration of the country into the global space.

There are many approaches to defining the essence of artificial intelligence, but in general it can be presented as the result of human activity, which is capable of logical thinking, justification and management of its actions, but the lack of their correction in case of changing conditions. Artificial intelligence should be considered as a result of the innovative development of technologies, which is a system of interconnections and the basis for the formation of the information system formations. In the future, the use of artificial intelligence will allow to change social relations.

Today, the artificial intelligence programs consist of various modular components that are activated as needed depending on the structure of a specific task. If we consider the implementation of the artificial intelligence technologies in the activities of financial institutions, it was first used by the US bank Citibank to automate decision-making processes. However, at that time, the introduction of innovative technologies required significant financial resources, which only individual financial institutions could afford. Since 2017, the leading Japanese companies have declared their readiness to finance such projects for the automation of workplaces [1].

The need to implement such innovations is explained by the need to support the competitiveness of institutions at the international level, development of technologies and systems of automation of production processes. Thus, the main areas of use of the artificial intelligence technologies in the activities of financial institutions can be attributed (Fig. 1).

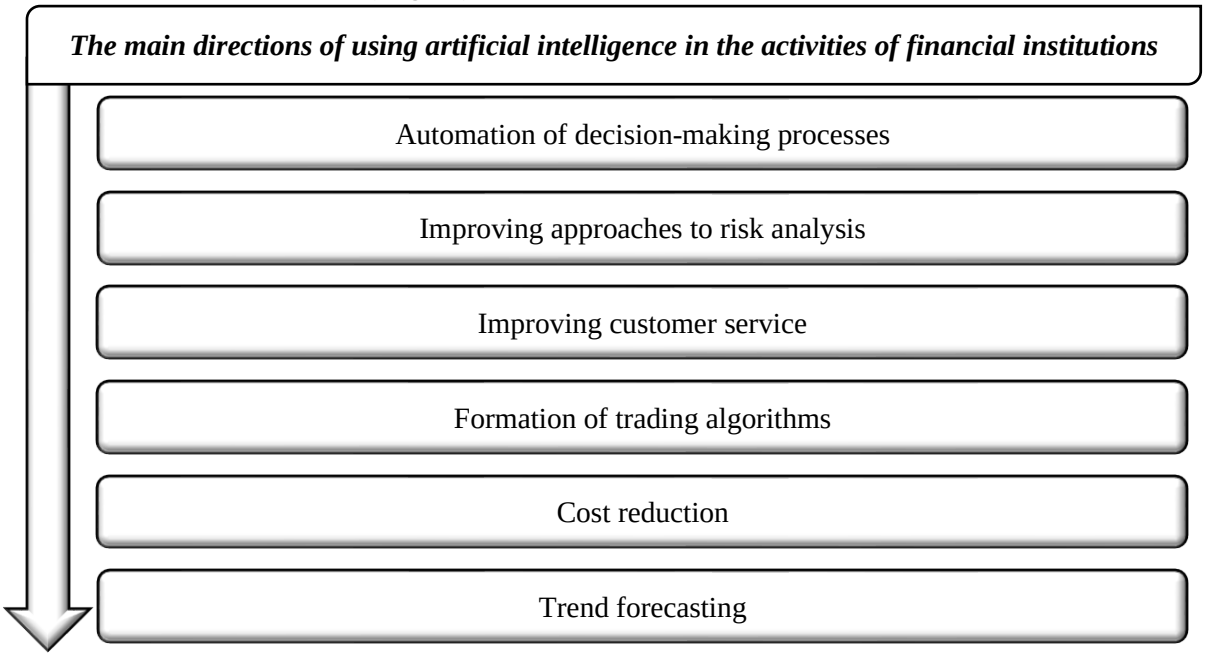



*Fig. 1. The main directions of using artificial intelligence in the activities of financial institutions*

Source: summarized by the authors based on [3; 7].

The use of automation of decision-making processes allows financial institutions to reduce the use of human labor in areas that require the analysis of large data sets, which significantly simplifies the processes of making informed decisions about risk determination, credit scoring, and others. The use of the artificial intelligence technologies allows financial institutions to analyze risks in real time.

Chatbots, personalized recommendations, and analysis of customer behavior are currently being actively used to improve interaction with customers, which allows us to treat customers more loyally and satisfy their needs.

Large investment funds use artificial intelligence algorithms to make decisions on buying and selling financial instruments on various stock markets.

The use of artificial intelligence technologies allows large institutions to automate routine tasks, which significantly reduces the use of labor and allows to optimize business processes.

The artificial intelligence technologies allow financial institutions to forecast economic and financial trends by using analytical models that take into account many factors of the external and internal environment. Such trends allow institutions to adapt more quickly to the changes in the economic and financial environment, which makes it possible to significantly reduce the risk of economic losses. The activities of large financial institutions in the state contribute to ensuring the security of the state in both the economic and social aspects. Therefore, it is also advisable to use artificial intelligence technologies to ensure the security of the state (Fig. 2).

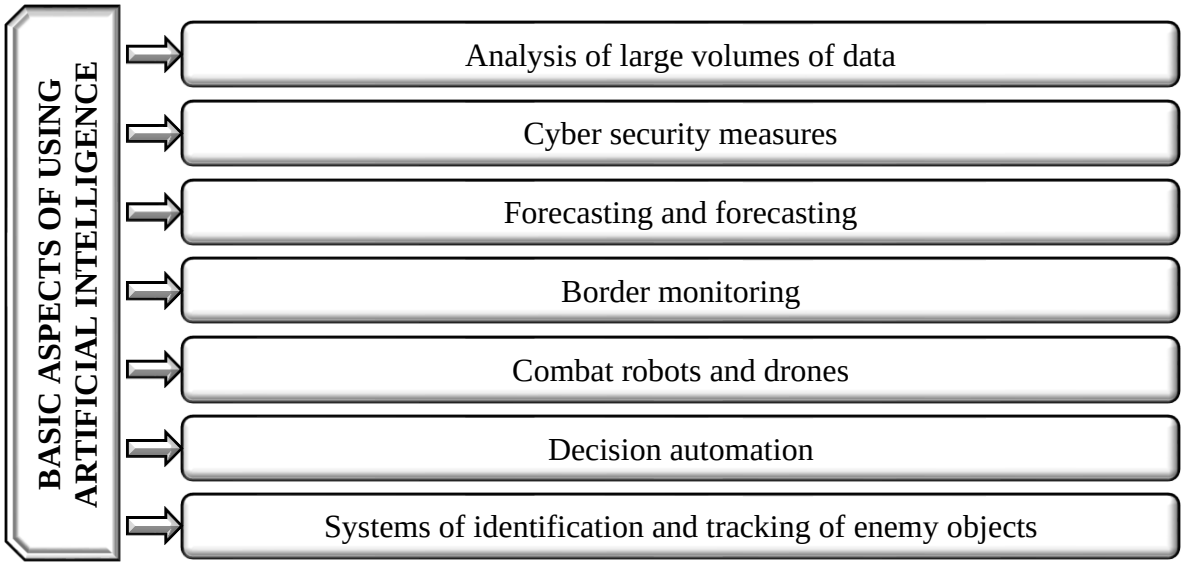



*Fig. 2. Basic aspects of the use of artificial intelligence in ensuring the security of the state*

Source: summarized by the author based on [2].

When ensuring the security of the state, an important aspect when using the artificial intelligence technologies is the ability to analyze large volumes of data, which include open sources of information, social networks, which allows

predicting possible threats and dangers. Based on the use of modern technologies, technologies are used for the security of the state, which, based on the analysis of network traffic, make it possible to determine the abnormal activity and identify potentially dangerous software. Based on the data analysis carried out with the help of artificial intelligence, it is possible to predict possible crises and conflicts that may affect the security of the state.

The use of modern technologies based on video surveillance, the use of images to effectively monitor borders and detect illegal activities. In matters of defense security, with the help of control of combat drones and robots, it is very effective to carry out operations to ensure the security of the state. As in the activities of financial institutions, automation of decision-making plays an important role in ensuring the security of the state, which contributes to the selection of the optimal possible set of alternatives. For the defense industry, artificial intelligence technologies make it possible to recognize and track enemy military objects, aircraft, ships, etc., which significantly contributes to ensuring the defense security of the state.

When using the artificial intelligence technologies, it is important to observe ethical and legal norms that affect the privacy of citizens, the sphere of abuse of powers, and insufficient regulation of measures. The implementation of artificial intelligence requires maintaining a balance between innovative development and ensuring people's rights and freedoms. The use of artificial intelligence in various fields has both positive and negative aspects (Fig. 3).

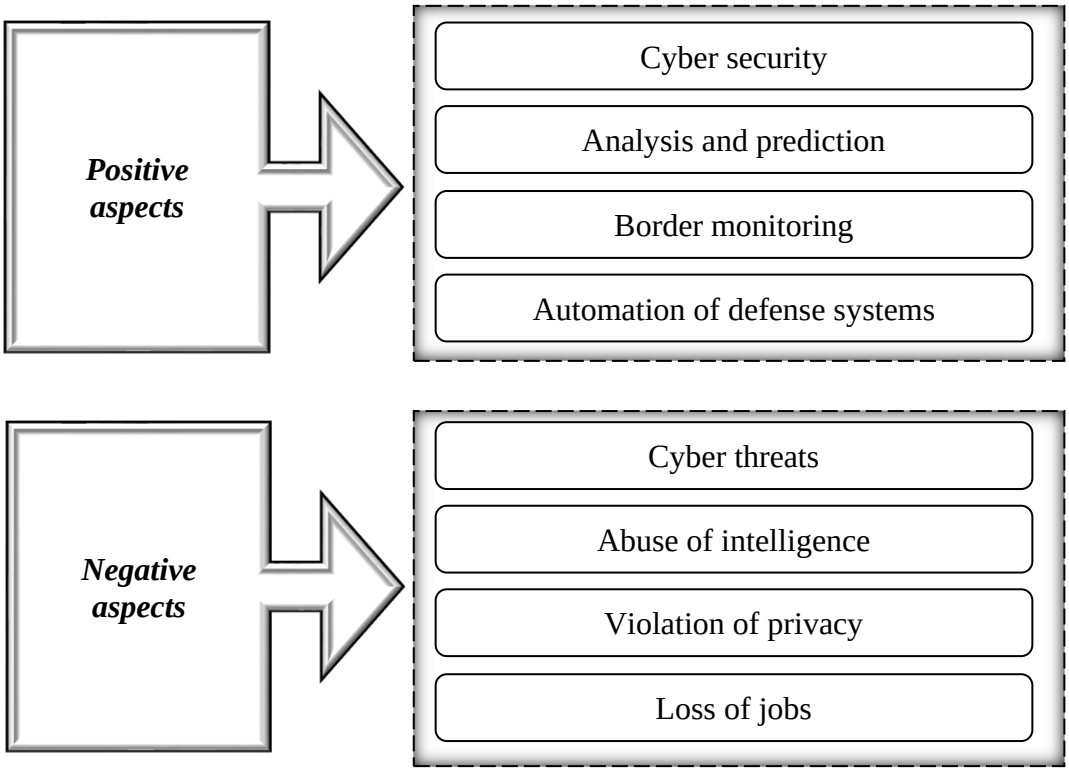



*Fig. 3. Positive and negative aspects of using artificial intelligence in the context of ensuring state security*

Source: summarized by the authors based on [2; 5-7].

The positive aspects include protection against cyber-attacks, analysis of large data sets and the construction of forecasts based on these data, border monitoring and automation of defense systems, which are currently an important direction in the defense capability of the developed countries. The negative aspects of the use of the artificial intelligence technologies include the creation of more complex and intelligent cyber threats, which significantly complicates the task of cyber protection.

Improper use of the received information can violate the privacy of citizens and contribute to mass surveillance. Innovative development in technologies leads to a decrease in the level of use of human capital in many production processes, which negatively affects the level of personnel involvement, as the need for it decreases. Such trends lead to an increase in the unemployment rate of the population, which negatively affects the socio-economic development of the regions and the state as a whole. Therefore, the wide use of the artificial intelligence technologies should be based on the development of appropriate programs and measures that would facilitate the involvement of released workers in other areas of activity.

If we consider the impact of artificial intelligence on the development of financial institutions, according to IHS Markit in 2018, due to the implementation of the artificial intelligence technologies on Wall Street, $41.1 billion will be saved by 2030. The decrease in the expenses level occurred mainly due to the reduction of employees of banking institutions by 1.3 million people [4]. Under such trends, the introduction of technology will lead to the dismissal of tens of millions of workers in the field of financial services all over the world. The most vulnerable in this case are employees of call centers, credit departments, operators, that is, professions that mostly have a narrow range of operations. Due to the introduction of chatbots, collector robots, scoring systems and other technologies that automate these processes. Quite successful implementation of the artificial intelligence technologies took place in interaction with blockchain, crowdfunding platforms, Internet acquiring, electronic wallets, big data and others.

These technologies are also popular in Ukraine. The most common financial institutions in Ukraine that use the artificial intelligence technologies are banking institutions and insurance companies, and banking institutions use such technologies more actively. Insurance companies use artificial intelligence technologies most often for the development and implementation of new services, justification of tariffs taking into account the needs of customers and the general dynamics of prices in the industry [9].

The use of chatbot technologies allows the companies to be in constant contact with the client while the insurance contract is in effect, which greatly simplifies the procedure for providing services and assessing risks. The advantages of introducing artificial intelligence into the activities of financial institutions include a reduction in the level of corruption due to the transparency of service

provision, forecasting and personalization of the receipt and provision of services, the development of online marketing taking into account the needs of customers, and fast processing of payment documents.

The threats of using such technologies in the financial sector include the possibility of choosing the wrong algorithm for selecting financial indicators, the likelihood of cyber-attacks, and reducing the number of personnel due to the automation of most processes [4].

Current trends and potential opportunities for the use of artificial intelligence in software development are presented in Fig. 4.

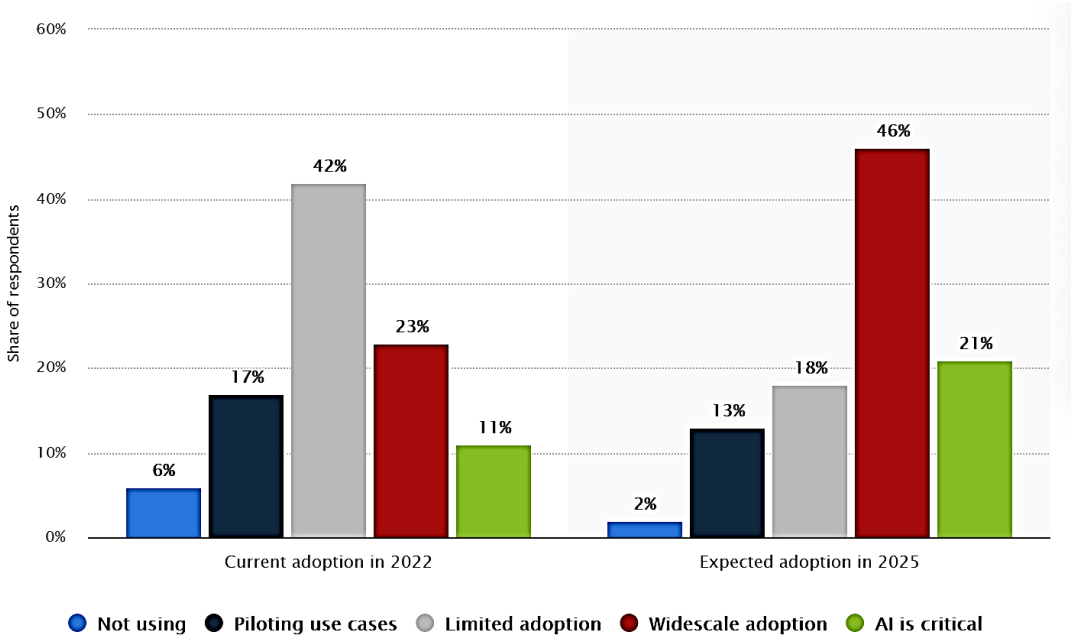



*Fig. 4. Current trends and potential opportunities for using artificial intelligence in the software development*

Source: [8].

In the field of activity of financial institutions, the use of artificial the intelligence technologies is connected with the use of Internet products, therefore threats most often accompany users precisely through Internet traffic. Taking into account the experience of the EU countries in this area [10-15], it is advisable to single out the following software products that allow detecting threats and dangers, detecting financial crimes:

NDR (Network Detection and Response) is a software product that allows you to detect attacks at the network level, which allows you to quickly react to them and neutralize their negative impact. Based on existing databases, these technologies based on artificial intelligence can identify them and eliminate their negative impact by changing the configuration of network devices.

EDR (Endpoint Detection and Response) – platforms capable of detecting threats on servers and computer devices with a system of rapid response to them and elimination of negative consequences. These platforms are able to detect

malicious programs and automatically respond to them by transmitting data to control centers. As in the first option, the artificial intelligence system, based on existing databases, collects information about enemy objects and detects internal threats.

UEBA (User and Entity Behavior Analytics) – this software product is a system that analyzes the behavior of users and information entities, and uses a non-typical algorithm to determine the presence of unwanted programs. Based on the detection of atypical behavior, this product detects and identifies threats. It also identifies atypical behavior as an abnormal phenomenon, singles out various threats and risks for the enterprise and the state as a whole. Such deviations in behavior can be used to detect fraud, protect conference data, comply with regulations, and more.

TIP (Threat Intelligence Platform) - platforms that, based on data, identify threats and dangers at the early stages and are aimed at establishing threats from the external environment.

SIEM (Security Information and Event Management) is a technology that evaluates and monitors information flows in real time, which come from various means of information protection, which allows establishing security threats. These technologies are also based on a large amount of information support, based on which information is checked for compliance and its identification within the framework of threats.

SOAR (Security Orchestration and Automated Response) – this system is aimed at identifying threats and dangers with the help of existing accumulated databases, but unlike the existing ones, artificial intelligence technology allows not only to evaluate threats, but also to automatically respond to them.

Application Security – additional data protection systems that, based on the use of artificial intelligence, can identify threats, respond to them independently, identify weaknesses in information security, which allows changing data protection rules.

Antifraud – systems based on artificial intelligence that allow real-time detection of threats in business processes and establishment of appropriate deviations. The use of such technologies allows a quick response to established financial crimes, which significantly reduces the level of possible losses [2].

Thus, it can be concluded that today the field of artificial intelligence is at a stage of rapid development. The most common directions of its use are data protection, processing of large amounts of information, customer orientation.

In Ukraine, the development of areas of artificial intelligence is regulated by the Concept of the Development of Artificial Intelligence in Ukraine ("On the Approval of the Concept of the Development of Artificial Intelligence in Ukraine"). According to this concept, the development of artificial intelligence covers nine areas, including [7]:

- the field of education and science, in which it is planned to train and retrain highly qualified employees to acquire skills for performing works based on the use of artificial intelligence, development of digital literacy (use of digital

technologies, searching for data on the Internet). Stimulation of scientific research in the field of the use of the artificial intelligence technologies, promotion of international cooperation within such research, involvement of foreign specialists and scientists in projects based on the use of innovative technologies.

In the field of economic development, stimulation is carried out within the framework of supporting enterprises that introduce artificial intelligence technologies. Stimulation is carried out based on the formation of a suitable business climate, investment attractiveness of the industry, development of information infrastructure, formation of the favorable tax policy for enterprises of this industry.

In the field of cyber security, the artificial intelligence technology is implemented in national information systems, programs and products that include not only data processing, but also data protection.

The field of information security based on the use of the artificial intelligence technologies is designed to ensure national interests through the prevention of threats and their effective neutralization.

In the defense field, the use of the artificial intelligence technologies has been implemented in weapons systems, military equipment, data collection and analysis in the process of combat missions, analysis of the capabilities of the troops, protection of personal data, tracking of enemy maneuvers, etc.

In the field of public administration, the use of the artificial intelligence technologies allows identification of individuals, which greatly simplifies obtaining services in the medical field and the field of obtaining public services of various levels.

In the field of legal regulation, these technologies contribute to the integration of European norms into the domestic legislation, which greatly simplifies the procedure of international cooperation.

The artificial intelligence technology is also being introduced into the sphere of justice, which will contribute to the simplification and expansion of already existing technologies of the Unified Register of Pretrial Investigations, the electronic court, and others.

It can be concluded that in Ukraine the development of the artificial intelligence technologies is gradually being introduced into all spheres of social life. As the experience of EU countries proves, these technologies make it possible to significantly simplify the analysis of data systems, identify weaknesses and threats, and quickly respond to negative actions. In financial institutions, the use of artificial intelligence technologies allows to significantly increase the level of customer orientation, which simplifies and speeds up the receipt of services and improves their quality.

**Conclusions.** Based on the analysis of the experience of EU countries, it can be stated that the artificial intelligence technology is actively used in various sectors of the national economy. The most common are technologies for analyzing large amounts of information, its evaluation, and based on the comparison of input information with existing algorithms, the level of threats and dangers is

determined. The European experience proves that the use of artificial intelligence in the activities of financial institutions allows to improve interaction with clients, significantly shorten the terms of receiving services, and more effectively analyze the external environment and internal client base.

However, with the development of the artificial intelligence technology, the products need to be improved not only in the field of service and analytics, but also in the field of data security. Cyberattacks on financial institutions can lead to a collapse in the country's banking system, which will negatively affect not only the domestic market, but also foreign operations. Therefore, ensuring security is a priority direction for the use of the artificial intelligence technologies.

Since Ukraine is a full member of the global financial system, the provision of services in virtual space significantly increases the level of risk, for the elimination and prevention of which it is necessary to attract significant funds for the development of security systems. Due to the influence of global financial systems in terms of the use of the artificial intelligence technologies, the transformation of the domestic financial sector will take place. The implementation of such programs will significantly increase the competitiveness of financial institutions, contribute to the development of financial cooperation, and increase trust in consumers of financial services. Features of the development and implementation of the artificial intelligence technology should be reflected in the development strategies not only of the economic and defense sectors, but also in the national programs.

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# ВПЛИВ ШТУЧНОГО ІНТЕЛЕКТУ НА ДІЯЛЬНІСТЬ ФІНАНСОВИХ УСТАНОВ ТА БЕЗПЕКУ ДЕРЖАВИ

*У статті розглянуто особливості розвитку технологій штучного інтелекту у різних сферах застосування. На основі аналізу дорожньої карти розвитку штучного інтелекту було сформовано ключові аспекти впровадження таких технологій. Окреслено напрями використання штучного інтелекту в діяльності фінансових установ. За результатами аналізу сильних та слабких сторін сформовано позитивні та негативні аспекти використання технологій штучного інтелекту. Враховуючи досвід використання технології штучного інтелекту у діяльності фінансових установ країн ЄС, виокремлено програмні продукти, що дозволяють виявити загрози, небезпеки та фінансові злочини. Досліджено особливості використання штучного інтелекту при забезпеченні безпеки держави. Обґрунтовано, що важливим аспектом при використанні технологій штучного інтелекту є спроможність до аналізу великих обсягів даних, які включають відкриті джерела інформації, соціальні мережі, що дозволяє передбачити можливі загрози та небезпеки.*

*На основі аналізу досвіду країн ЄС, стверджується, що технологію штучного інтелекту активно використовують у різних галузях народного господарства. Визначено, що використання штучного інтелекту у діяльності фінансових установ дозволяє покращити взаємодію з клієнтами, значно скоротити строки отримання послуг, більш ефективно проводити аналіз зовнішнього середовища та внутрішньої клієнтської бази. Аргументовано, що з розвитком технології штучного інтелекту потребує удосконалення продуктів не тільки сфера обслуговування та аналітики, але й сфера забезпечення безпеки даних. Акцентовано на тому, що кібератаки на фінансові установи можуть привести до колапсу в банківській системі держави, що негативно вплине не тільки на внутрішній ринок, але й на зовнішні операції, тому забезпечення безпеки є пріоритетним напрямом використання технологій штучного інтелекту.*

***Ключові слова**: штучний інтелект; інформаційні технології; фінансові установи; безпека держави; досвід країн ЄС; європейські норми у вітчизняному законодавстві.*

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# THE IMPACT OF DIGITAL TECHNOLOGIES AND ARTIFICIAL INTELLIGENCE ON MANAGEMENT OF SOCIO-ECONOMIC PROCESSES IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

*O impacto das tecnologias digitais e da inteligência artificial na gestão dos processos socioeconômicos no contexto do desenvolvimento sustentável*

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## ABSTRACT

The modern world is experiencing transition to the digital economy, where digital technologies and artificial intelligence play the key role in transformation of socio-economic processes. These technologies allow states optimizing resource management, automating production and administrative processes, increasing efficiency of urban governance, and ensuring inclusive sustainable development. In the article, the impact of digital technologies and artificial intelligence on formation of modern development strategies, in particular in the aspect of sustainable urban and economic governance is analyzed. IMD rating indicators investigated Smart City Index for Ukraine's neighboring countries - Hungary, Romania, Poland and Slovakia. Their successes in implementing digital solutions and policies on artificial intelligence were assessed. For example, Hungary is actively developing national artificial intelligence laboratories, implementing automated administrative processes and developing a data market platform. Poland promotes development of artificial intelligence through research initiatives and investments in video games that integrate artificial intelligence elements. Romania is implementing the national development strategy of artificial intelligence aimed at optimizing public administration and supporting research. Slovakia, in turn, focuses on digital transformation and developing infrastructure for innovations in artificial intelligence. The study pays particular attention to the international Hiroshima initiative. AI Process, which is considered as the mechanism to ensure transparency and responsible use of artificial intelligence worldwide. Based on the analysis of implemented initiatives in neighboring countries, recommendations are provided for Ukraine to improve its digital strategy and implement artificial intelligence in key sectors of the economy, urban governance, and public sector to ensure sustainable development. In particular, development of the comprehensive digitalization policy, development of the national artificial intelligence infrastructure, and integration into international initiatives to ensure competitiveness and sustainable development of Ukraine are proposed.

**Keywords:** Digital Technologies, Artificial Intelligence, FinTech, Management, Sustainable Development, Socio-economic processes, National Economy, IMD Smart City Index, Hiroshima AI Process

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# O IMPACTO DAS TECNOLOGIAS DIGITAIS E DA INTELIGÊNCIA ARTIFICIAL NA GESTÃO DOS PROCESSOS SOCIOECONÔMICOS NO CONTEXTO DO DESENVOLVIMENTO SUSTENTÁVEL

*The impact of digital technologies and artificial intelligence on the management of socioeconomic processes in the context of sustainable development*

Alla Shlapak[1], Artur Zhavoronok[2], Natalia Vdovenko[3], Oleksiy Bilousov[4], Dmytro Horban[5], Denys Krylov[6]
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**RESUMO**

O mundo moderno está passando por uma transição para uma economia digital, onde as tecnologias digitais e a inteligência artificial desempenham um papel fundamental na transformação dos processos socioeconômicos. Essas tecnologias permitem que os estados otimizem a gestão de recursos, automatizem processos de produção e administrativos, aumentem a eficiência da governança urbana e garantam um desenvolvimento sustentável inclusivo. O artigo analisa o impacto das tecnologias digitais e da inteligência artificial na formação de estratégias de desenvolvimento modernas, em particular no aspecto da governança urbana e econômica sustentável.
Os indicadores de classificação do IMD investigaram o Smart City Index para os países vizinhos da Ucrânia - Hungria, Romênia, Polônia e Eslováquia. Seus sucessos na implementação de soluções digitais e políticas sobre inteligência artificial foram avaliados. Por exemplo, a Hungria está desenvolvendo ativamente laboratórios nacionais de inteligência artificial, implementando processos administrativos automatizados e desenvolvendo uma plataforma de mercado de dados. A Polônia promove o desenvolvimento da inteligência artificial por meio de iniciativas de pesquisa e investimentos em videogames que integram elementos de inteligência artificial. A Romênia está implementando uma estratégia nacional de desenvolvimento de inteligência artificial com o objetivo de otimizar a administração pública e apoiar a pesquisa. A Eslováquia, por sua vez, foca na transformação digital e no desenvolvimento de infraestrutura para inovações no campo da inteligência artificial. O estudo dá atenção especial à iniciativa internacional de Hiroshima. AI Process, que é considerada um mecanismo para garantir transparência e uso responsável da inteligência artificial em todo o mundo. Com base na análise de iniciativas implementadas em países vizinhos, são fornecidas recomendações para a Ucrânia melhorar sua estratégia digital e implementar inteligência artificial em setores-chave da economia, governança urbana e setor público para garantir o desenvolvimento sustentável. Em particular, são propostos o desenvolvimento de uma política abrangente de digitalização, o desenvolvimento de uma infraestrutura nacional de inteligência artificial e a integração em iniciativas internacionais para garantir a competitividade e o desenvolvimento sustentável da Ucrânia.

**Palavras-chave:** Tecnologias Digitais, Inteligência Artificial, FinTech, Gestão, Desenvolvimento Sustentável, Processos socioeconômicos, Economia Nacional, Índice de Cidades Inteligentes do IMD, Processo de IA de Hiroshima

## INTRODUCTION

Digital technologies and artificial intelligence (AI) have become key factors that change socio-economic processes in the modern world. They open up new opportunities for increasing management efficiency, economic development, improving the quality of life and ensuring sustainable development. In the context of globalization and rapid technological change, these innovations can significantly affect various aspects of social and economic activity. They make it possible to automate production, optimize administrative systems, promote development of new industries and ensure more sustainable and equitable development. For example, the UN initiative AI for Good demonstrates how AI can be used to achieve public good, in particular in sustainable development.

However, using digital technologies and AI also requires careful approach, as their improper implementation can lead to social inequalities, ethical dilemmas and negative environmental consequences. Important task remains development of regulatory mechanisms that will ensure the use of digital technologies and AI in the interests of sustainable development, while minimizing potential risks to society.

## 1 LITERATURE REVIEW

Researchers are studying various aspects of the impact of digital technologies and AI on implementation of the Sustainable Development Goals, their interconnection and interdependence.

Recent studies by Di Vaio et al. (2020), Tulchynska and al. (202 1 ) focused mainly on the Sustainable Development Goals and sustainable business models, as well as the study by Khakurel et al. (2018) delve deeper into technological aspects of AI and its relationship to the framework of Sustainable Development Goals.

Rappitch (2015) analyzed the impact of digital technologies, AI, and sustainable development on various markets (energy, food, healthcare, housing, mobility, and finance) and emphasized that, provided that new technologies are implemented in responsible and sustainable manner, positive effects outweigh negative ones.

Goswami (2014) examines both positive and negative impacts of new technologies on environmental, economic and social well-being. He argues that while the digital sector offers significant opportunities for creating the green economy, collaboration between government and business is key to achieving this goal.

Jones et al. al. (2017) examined various ways in which the digital industry can contribute to achievement of the Sustainable Development Goals. The study highlighted contribution of IT companies to sustainable development and also examined main challenges they face.

Pipes and al. (2017) partially equates AI with all digital technologies, noting the impact of AI on 8 Sustainable Development Goals, in particular, mobile phones and digital technologies increase access to banking services in developing countries. However, if the device or application can easily perform the same functions without using AI, it makes no sense to claim that AI is the cause of benefits obtained from these technologies. Only in cases where AI is a major factor contributing to certain phenomenon can it be considered the driver or the obstacle to achieving Sustainable Development Goals.

Artificial intelligence is often associated with Big Tech, which usually refers to four or five largest technology companies (Herrman (2019); Dubyna et al. (20 24); Verbivska et al. (20 24)). These four companies include the GAFA (Google, Amazon, Facebook and Apple), and those who talk about top five add Microsoft to the list (Foer (2017)). They are key players in new global technology systems, competing with new companies, including Alibaba and Tencent from China.

Furthermore, AI is closely related to data collection and access. Zuboff (2019) and Parubets et al. (2023) emphasize that AI is directly related to access to and accumulation of data –valuable aspect that should be taken into account when considering relationship between AI and sustainable development.

## 2 METHODOLOGY

To identify the impact of digital technologies and artificial intelligence on socio-economic processes in the context of sustainable development, following research methods were used, namely: analysis of literature and regulatory acts to study scientific works, legislative documents and strategies on digitalization and AI; comparative analysis to compare the impact of digital technologies in different countries on socio-economic processes; the

systems approach to consider digital technologies as part of the comprehensive sustainable development management system; statistical analysis to process and interpret quantitative data on the digitalization level, GDP, productivity, etc.

The IMD Smart City Index 2024 is also being analyzed – the fifth edition of the annual ranking that evaluates 142 cities around the world on their ability to integrate technology to improve lives of residents. The ranking is based on residents' feedback on cities' infrastructure and technology solutions, covering aspects of health, safety, mobility, opportunity and governance.

This index analyzes how effectively cities use technology to improve the quality of life of residents and sustainable development. The assessment is based on two key aspects:

The structural aspect is quality of the existing infrastructure.

Technological aspect – the level of use of digital technologies to improve living conditions of citizens.

Technological aspect of IMD Smart City The Index is created based on the survey of residents of different cities who evaluate technological solutions and use of digital innovations in the following areas:

- Health and safety.
- Mobility.
- Resource management.
- Opportunities (work and study).
- Activity.

Cities of Ukraine's neighboring countries that are included in the IMD were selected for the analysis. Smart City Index . This made it possible to assess development level of digital technologies in the countries closest to Ukraine and identify opportunities for improving Ukrainian cities.

Among countries bordering Ukraine, according to the IMD rating Smart City Index includes:

1) Poland – Warsaw, Krakow.
2) Slovakia – Bratislava.
3) Hungary – Budapest.
4) Romania – Bucharest.

We will also compare Index indicators of these cities with those of Zurich, the city that ranks first in the overall IMD ranking. Smart City Index 2024. The city demonstrates high integration level of technology into various aspects of urban life, ensuring high quality of life, efficient resource management, and sustainable development.

Using artificial intelligence for sustainable development of countries is assessed based on Hiroshima AI Process (HAIP). This is the international initiative launched by the G7 countries during the Hiroshima Summit in 2023. The main goal is to develop global guidelines for responsible use of artificial intelligence, in particular generative AI, which is rapidly developing and has significant impact on various areas of society.

## 3 RESULTS

The Sustainable Development Goals (SDGs), adopted by the United Nations in 2015 (Transforming Our World: The 2030 Agenda for Sustainable Development) , are the global roadmap for creating a more just, environmentally sustainable, and economically prosperous world. They aim to eradicate poverty, ensure quality education, health, economic growth, combat climate change, and many other important aspects of societal development.

Adoption of the SDGs is necessary for several reasons:

1. Global challenges – the world faces problems, including environmental crisis, social inequality, economic instability. The SDGs offer shared vision and strategy for overcoming these challenges.
2. Economic development – sustainable development contributes to formation of economies based on innovation, green technologies, and efficient use of resources, which ensures long-term growth.
3. Social justice – The SDGs aim to reduce inequality, access to quality education, healthcare, and opportunities for all segments of the population.
4. Environmental responsibility – implementing the SDGs helps minimize human impact on the environment, promotes development of renewable energy sources, and reduces greenhouse gas emissions.

5. Technological innovations – digital technologies and artificial intelligence can help achieve the SDGs, including through process automation, improved resource management, and development of "smart" cities.

Using digital technologies in broader sense, including mobile phones, online banking and other digital services, has been actively used since inception of the Sustainable Development Goals (SDGs). They have contributed to improving access to financial, educational and health services, increasing efficiency of resource management and developing inclusive economies.

Artificial intelligence, on the other hand, has more profound and transformative impact on achieving the SDGs. With its ability to analyze large amounts of data, predict trends, and automate complex processes, AI can significantly improve efficiency of decisions in healthcare, environmental monitoring, urban management, and industry. However, its application also comes with ethical challenges, privacy concerns, and risks of unequal access to advanced technologies.

Artificial intelligence is the key element in development of digital technologies for sustainable development. Its implementation allows for more efficient use of resources, reducing environmental burdens and improving the quality of life of citizens. Ukraine should consider AI as the tool for digital transformation of public space, in particular within smart cities.

Potential role of digital technologies and artificial intelligence in achieving each of the Sustainable Development Goals and the expected impact of their implementation are summarized in Table 1, which shows that digital technologies and artificial intelligence have significant impact on at least 12 SDGs

**Table 1 - The role of digital technologies and artificial intelligence in achieving the Sustainable Development Goals**

| SDGs | The role of digital technologies and artificial intelligence in achieving the SDGs | Level of influence |
|---|---|---|
| Goal 1. Eradicate poverty | Digital financial services, mobile payments, data analytics for social applications | High |
| Goal 2. End hunger and achieve food security | Using AI to predict yields, manage food supply chains | High |
| Goal 3. Ensuring healthy lifestyle and well-being | Telemedicine, AI-based diagnostics, personalized medicine | High |
| Goal 4. Ensuring inclusive and equitable quality education | Online learning, adaptive educational systems, digital textbooks | High |
| Goal 5. Ensuring gender equality, empowering women and girls | Digital platforms for education and entrepreneurship, tools to combat discrimination | Average |
| Goal 6. Ensuring sustainable water resources management | Sensors for water quality monitoring, drought forecasting | Average |
| Goal 7. Ensure access to modern energy sources | Smart grids, AI-based energy consumption optimization | High |
| Goal 8. Promote sustainable economic growth | Process automation, development of the digital economy, new jobs in IT | High |
| Goal 9. Create sustainable infrastructure, promote innovation | Infrastructure digitalization, Internet of Things (IoT), artificial intelligence in construction | High |
| Goal 10. Reduce inequality within and between countries | Access to digital services for vulnerable populations | Average |
| Goal 11. Ensure open, safe, and environmentally sustainable cities | Smart cities, AI-based transportation systems, environmental monitoring | High |
| Goal 12. Ensuring transition to sustainable | Supply chain optimization, digital control of emissions and waste | High |

| | | |
|---|---|---|
| consumption and production models | | |
| Goal 13. Take action to combat climate change | Big data-based climate change analysis, $CO_2$ emissions management | High |
| Goal 14. Conservation and sustainable use of oceans, seas and marine resources | Satellite monitoring of oceans, fishing control | Average |
| Goal 15. Protection and restoration of terrestrial ecosystems | Remote sensing, satellite image analysis to track deforestation | Average |
| Goal 16. Peace, justice and strong institutions | Digital governance, open data, fighting disinformation | High |
| Goal 17. Global partnership for sustainable development | Digital collaboration, access to global knowledge and innovation | High |

Source: compiled by the authors based on Transforming Our World: The 2030 Agenda for Sustainable Development (https://sdgs.un.org/2030agenda)

Digital technologies and artificial intelligence have the potential to transform economic, social and environmental processes. The impact of digital solutions on various spheres of life contributes to increased efficiency, transparency and inclusiveness, making them the powerful tool for solving global challenges.

First, digital technologies contribute to poverty reduction (SDG 1) through development of financial technologies, mobile payments and remote access to banking services, which allows the poor to integrate into the economy. In the area of food security (SDG 2), artificial intelligence is used to monitor soil conditions, predict yields and optimize agricultural production, which allows reducing food losses and increasing resource efficiency.

AI and digital technologies are also having significant impact on health systems (SDG 3), enabling telemedicine, personalized diagnostics, and epidemic prediction. Similarly, in education (SDG 4), digital platforms, adaptive learning technologies, and online courses are enabling access to quality education regardless of where one lives. This is particularly important for ensuring equal opportunities for women and girls (SDG 5), as digital platforms enable gender-equal access to knowledge and careers.

Natural resource management also benefits significantly from digitalization. In the area of water and sanitation (SDG 6), sensors are used to monitor water quality, reducing the risk of pollution. Similarly, digital technologies are facilitating transition to renewable energy sources (SDG 7), through optimization of electricity consumption and implementation of "smart" energy grids.

Sustainable economic development (SDG 8) depends to large extent on automation, digital transformation of enterprises and creation of new forms of employment, which reduce costs and increase productivity. Innovation and infrastructure development (SDG 9) are also receiving significant boost from digital solutions that contribute to emergence of "smart" cities (SDG 11) with modern transport and environmental infrastructure.

Digital technologies also contribute to the fight against climate change (SDG 13) through big data analytics to predict environmental changes, manage $CO_2$ emissions and monitor air pollution. In ocean conservation (SDG 14) and terrestrial ecosystems (SDG 15), remote sensing technologies allow monitoring of deforestation, poaching and water pollution levels.

The role of digital technologies in strengthening peace, justice and institutions (SDG 16) is also significant, as they provide access to open data, promote government transparency and prevent corruption. In addition, development of global partnerships (SDG 17) is based on technology sharing, digital collaboration platforms and diffusion of innovation.

The level of "smartness" of cities around the world based on implementation of digital technologies and AI is assessed by the Institute for Management Development (IMD) in collaboration with the Singapore University of Technology and Design (SUTD). Results of this study feed into formation of the IMD Smart City Index, the global ranking.

Unlike other rankings, the Smart City Index focuses not only on implementation of technologies, but also on the extent to which these solutions actually improve lives of citizens. The rating is used by municipalities and

governments to assess the level of digital transformation of cities, as well as to determine directions of further development of infrastructure, management of socio-economic processes in sustainable development.

Accordingly, we will focus on the study of the technological aspect of the IMD Smart City Index to analyze the ranking of world cities in terms of implementation of digital innovations, their impact on socio-economic processes and possibile application for sustainable development of Ukrainian cities. The rating includes cities from different parts of the world that seek to implement innovative solutions to improve comfort, safety and quality of life of their residents. In 2024, the index included 142 cities. It is worth noting that the “smart city” concept is also gaining popularity in Ukraine. Some Ukrainian cities, such as Kharkiv, are already implementing Smart City elements and are gradually moving towards the status of a smart city ( Smart City Ukraine ), however, military operations in Ukraine have suspended these processes, so as of the end of 2024, not a single Ukrainian city was included in this rating.

Table 2 contains data on the impact of digital technologies on health and safety of residents in different cities in the IMD Smart City Index 2024. The leader in all indicators is Zurich, which ranks 1st in the overall index ranking. Warsaw, Bratislava, Krakow, Budapest and Bucharest show average and lower results, which correlates with their positions in the overall ranking.

**Table 2 - Comparative analysis of health and safety indicators in the IMD Smart City Index 2024**

| Indicator | Zurich (1st place) | Warsaw (38th place) | Bratislava (56th place) | Krakow (76th place) | Budapest (89th place) | Bucharest (100th place) |
|---|---|---|---|---|---|---|
| Online reporting of city maintenance issues ensures quick resolution | 60.6 | 49.2 | 45.8 | 50.2 | 38.2 | 47.3 |
| Free public Wi-Fi has improved access to public services | 54.8 | 57.9 | 57.7 | 53.6 | 52.1 | 52.8 |
| CCTV cameras helped residents feel safer | 51.2 | 51.4 | 54.3 | 57.7 | 53.8 | 50.6 |
| Website or app allows residents to effectively monitor air pollution | 45.4 | 61.7 | 43.6 | 69.0 | 43.4 | 51.7 |
| Online doctor appointment booking improved access | 63.4 | 66.8 | 61.3 | 63.1 | 47.9 | 61.0 |

Source: compiled by the authors based on the Smart City Index ( https://imd.widen.net/content/uurdpo9mt3/pdf/20240412-SmartCityIndex-2024-Full-Report_4.pdf )

The highest value of the indicator "Online reporting of technical maintenance issues" is in Zurich (60.6%), which indicates the effective system for monitoring city problems. In Warsaw (49.2%), Krakow (50.2%) and Bucharest (47.3%) indicators are close, while Budapest (38.2%) lags significantly behind. This indicates the need to improve digital platforms for prompt response to technical problems in the city.

The best results for the Free Public Wi-Fi indicator are in Warsaw (57.9%) and Bratislava (57.7%), indicating wide availability of digital services in these cities. In Zurich (54.8%), Krakow (53.6%), Budapest (52.1%) and Bucharest (52.8%), Wi-Fi also plays an important role, but there is room for improvement.

Residents in Krakow (57.7%) and Bratislava (54.3%) experience the highest levels of comfort and security with video surveillance. Other cities have similar figures, indicating active use of cameras to maintain order.

Krakow has the highest level of digital air quality monitoring (69.0%), due to the city's high pollution levels and the need for constant monitoring. Bratislava (43.6%) and Budapest (43.4%) lag significantly behind.

The best results for the "Online doctor appointment" indicator are in Warsaw (66.8%) and Zurich (63.4%), indicating effective digital services in the healthcare sector. Krakow (63.1%), Bratislava (61.3%) and Bucharest (61.0%) also have positive results, while Budapest (47.9%) needs to improve its online medicine system.

To improve its position in the global ranking of smart cities in health and safety, Ukraine needs to implement the following measures:

1. Expand the use of digital platforms for monitoring urban problems, which will ensure rapid response to technical malfunctions (as in Zurich).

2. Develop free Wi-Fi in public places, especially in small towns, to improve citizens' access to electronic services.
3. Strengthen video surveillance systems to increase security in cities.
4. Implement environmental monitoring with access to air quality data through mobile applications.
5. Massively implement e-medicine and online doctor appointments, which will significantly improve accessibility of medical services for the population.

Table 3 contains data on the impact of digital technologies on mobility in different cities in the IMD Smart City Index 2024. The selected cities have average or lower scores compared to Zurich, indicating problems in transport infrastructure and the use of digital solutions to improve mobility.

The most widely used apps to reduce congestion are in Warsaw (47.0%) and Zurich (43.6%), indicating effective use of smart transport systems. Budapest (39.6%), Bratislava (39.9%) and Krakow (40.9%) have significantly lower rates, indicating the need to develop digital solutions to combat congestion.

**Table 3 - Comparative analysis of mobility indicators in the IMD Smart City Index 2024**

| Indicator | Zurich (1st place) | Warsaw (38th place) | Bratislava (56th place) | Krakow (76th place) | Budapest (89th place) | Bucharest (100th place) |
|---|---|---|---|---|---|---|
| Online access to job listings simplifies job search | 79.8 | 74.9 | 68.4 | 73.6 | 72.0 | 67.3 |
| Teaching IT skills in schools | 63.9 | 56.3 | 53.5 | 53.6 | 54.1 | 45.9 |
| Online services for starting a business | 57.1 | 60.8 | 44.0 | 57.8 | 51.9 | 43.9 |
| Internet speed and reliability | 82.0 | 69.8 | 67.8 | 70.2 | 66.8 | 76.1 |

Source: compiled by the authors based on the Smart City Index ( https://imd.widen.net/content/uurdpo9mt3/pdf/20240412-SmartCityIndex-2024-Full-Report_4.pdf )

Parking apps are also most widely used in Warsaw (50.5%), indicating effective integration of digital technologies into the parking system. Krakow (48.6%) also has a high rate, while Zurich (44.5%) and Bratislava (44.1%) have worse situation.

In terms of “Bicycle rental as a way to reduce congestion,” Warsaw (57.6%) and Zurich (55.6%) are the leaders, indicating popularity of cycling in these cities. Bratislava (51.1%), Krakow (51.8%) and Budapest (49.5%) also show good results, while Bucharest (47.2%) lags behind.

Zurich has the highest score for "Online planning and ticketing for public transport" (79.3%), confirming the ease of using digital services for public transport. Bratislava (67.7%) and Bucharest (59.7%) have the lowest scores, indicating the need to improve the e-ticketing system.

Zurich has the highest score for “Traffic information via mobile devices” (61.8%), meaning that residents receive up-to-date information about traffic situation. Krakow (45.0%) and Bratislava (45.2%) have relatively low scores.

To improve mobility in Ukrainian cities and move up in the global IMD Smart City Index ranking, it is necessary to implement the following measures:

1. Develop intelligent transport systems to reduce congestion through digital applications, as done in Warsaw.
2. Implement smart parking with mobile applications that simplify the search for free spaces.
3. Expand the bicycle rental system, which will promote environmentally friendly transport.
4. Digitize public transport through online ticketing and route planning, like in Zurich.
5. Develop information platforms for tracking traffic jams in real time.

Ukraine has great potential for development of smart mobility and implementation of these solutions will contribute to improving the quality of life in cities.

Table 4 contains comparative data on available digital solutions for employment, training, starting a business, and the quality of Internet connection in the cities studied in the IMD Smart City Index 2024.

**Table 4 - Comparative analysis of possibilities of using digital technologies for work and learning in the IMD**

| Indicator | Zurich (1st place) | Warsaw (38th place) | Bratislava (56th place) | Krakow (76th place) | Budapest (89th place) | Bucharest (100th place) |
|---|---|---|---|---|---|---|
| Apps that help reduce traffic jams | 43.6 | 47.0 | 39.9 | 40.9 | 39.6 | 41.5 |
| Parking search apps | 44.5 | 50.5 | 44.1 | 48.6 | 45.4 | 47.7 |
| Bicycle rental as the way to reduce congestion | 55.6 | 57.6 | 51.1 | 51.8 | 49.5 | 47.2 |
| Online planning and ticket sales for public transport | 79.3 | 71.1 | 67.7 | 71.2 | 71.3 | 59.7 |
| Traffic information via mobile devices | 61.8 | 49.9 | 45.2 | 45.0 | 57.8 | 52.2 |

Source: compiled by the authors based on the Smart City Index (https://imd.widen.net/content/uurdpo9mt3/pdf/20240412-SmartCityIndex-2024-Full-Report_4.pdf)

The leader in the indicator "Online access to job listings simplifies job search" is Zurich (79.8%), indicating effective digital infrastructure for job search. Warsaw (74.9%) and Krakow (73.6%) also have high scores, indicating well-developed online services. Budapest (72.0%) and Bratislava (68.4%) lag behind, and Bucharest has the worst score (67.3%).

The highest level of the indicator "Teaching IT skills in schools" is in Zurich (63.9%), demonstrating high level of digital education. Warsaw (56.3%), Krakow (53.6%), Bratislava (53.5%) and Budapest (54.1%) are approximately at the same level. Bucharest (45.9%) lags significantly behind, indicating problems in teaching digital skills.

The best results for the indicator "Online services for starting a business" are in Warsaw (60.8%) and Krakow (57.8%), which demonstrates high level of business digitalization. Zurich (57.1%) has slightly lower indicator, but is still the leader. Bratislava (44.0%) and Bucharest (43.9%) have the lowest indicators, which indicates difficulties with registering business online.

Zurich (82.0%) has the best internet connection quality. Warsaw (69.8%), Krakow (70.2%) and Bratislava (67.8%) have average internet quality. Budapest (66.8%) has the lowest score among the cities considered.

To improve its position in the global IMD Smart City Index ranking and develop opportunities for using digital technologies in work and education, Ukraine should implement following measures:

1. Create single national online platform for job search, integrated with educational and government services.
2. Implement digital skills training programs in secondary and higher education institutions, following the example of Switzerland.
3. Simplify business opening procedures, develop e-government, and reduce bureaucracy for business registration.
4. Improve internet infrastructure and, especially, expand access to high-speed internet in the regions to reach the level of Bucharest.

Ukraine has significant potential for digital development and implementation of these changes will contribute to the growth of employment, entrepreneurship, and the quality of education.

Table 5 contains data on available online services for purchasing tickets for cultural events (shows, museums) in cities ranked in the IMD Smart City Index 2024.

**Table 5 - Digitalization of cultural activities in the IMD Smart City Index 2024**

| Indicator | Zurich (1st place) | Warsaw (38th place) | Bratislava (56th place) | Krakow (76th place) | Budapest (89th place) | Bucharest (100th place) |
|---|---|---|---|---|---|---|
| Online purchase of tickets for shows and museums | 82.0 | 78.6 | 74.6 | 79.1 | 79.1 | 77.1 |

Source: compiled by the authors based on the Smart City Index (https://imd.widen.net/content/uurdpo9mt3/pdf/20240412-SmartCityIndex-2024-Full-Report_4.pdf)

The analysis of indicators of digital services for purchasing tickets for cultural events (shows, museums) shows that this aspect is well developed in all cities, regardless of their position in the ranking. High indicators, which vary within 74.6% - 82.0%, indicate active implementation of online services in culture. This indicates that residents of these cities have convenient access to digital platforms for purchasing tickets, which simplifies visiting cultural events. Development of digital solutions in the cultural sphere is important component of the "smart city" concept, as it contributes to user's convenience, increasing availability of cultural services and overall development of the digital economy.

Ukraine has all prerequisites for improving the digitalization level of the cultural sphere and can develop this sphere in the following areas:

1. Create single online platform for booking tickets to theaters, museums, cinemas and cultural events, which will be integrated with mobile applications.
2. Develop mobile applications for culture that will allow not only to buy tickets, but also to receive additional information about events, history of places, and integration with audio guides.

Table 6 compares effectiveness of using online initiatives in city government, reflects the value of each indicator in respective cities, and allows us to assess their contribution to improve efficiency of governance using modern digital technologies.

**Table 6 - Comparison of online initiatives to improve city governance in the IMD Smart City Index 2024**

| Indicator | Zurich (1st place) | Warsaw (38th place) | Bratislava (56th place) | Krakow (76th place) | Budapest (89th place) | Bucharest (100th place) |
|---|---|---|---|---|---|---|
| Online access to city finances for the public to reduce corruption | 48.4 | 44.4 | 37.3 | 42.6 | 33.0 | 28.6 |
| Online voting to increase citizen participation | 53.1 | 61.4 | 45.8 | 51.9 | 53.6 | 35.4 |
| Online platforms for citizens' suggestions for improving the city | 51.7 | 63.7 | 45.8 | 58.9 | 46.6 | 43.6 |
| Online processing of identity documents to reduce waiting times | 63.6 | 68.3 | 55.7 | 65.0 | 67.2 | 56.9 |

Source: compiled by the authors based on the Smart City Index (https://imd.widen.net/content/uurdpo9mt3/pdf/20240412-SmartCityIndex-2024-Full-Report_4.pdf)

Effectiveness of using online platforms to ensure financial transparency in Zurich is demonstrated by the highest level of the indicator "Online public access to city finances to reduce corruption" (48.4%). Bucharest (28.6%) has the lowest score, indicating the lack of proper financial control or distrust in online systems. Overall, the data indicate that online access to finances contributes to reducing corruption, but not all countries have achieved significant results.

Warsaw (61.4%) has the highest level of participation through online voting, indicating the well-developed infrastructure for electronic voting. Bucharest (35.4%) has the lowest rate, indicating a lack of reliable platforms and limited access to these services. Online voting contributes to increased citizen participation, which is important to improve democratic processes.

Warsaw also has the highest (63.7%) indicator for "Online platforms for citizens' suggestions for improving the city", which indicates active involvement of citizens in improving the urban environment through online initiatives. Bucharest has the lowest result (43.6%). Cities that actively use online platforms for suggestions have more opportunities for development and improvement of living conditions.

Zurich shows high efficiency (63.6%) in fast document processing, which is due to development of digital technologies in the public sector. Bucharest (56.9%) has an average score, which also indicates the developed, although not perfect, online document processing system.

Prospects for Ukraine:

1. Ukraine should develop online systems for financial transparency at the local level, which will help reduce corruption. It is necessary to create platforms where citizens can access financial information, projects and tenders of city authorities, programs similar to those used in Zurich.

2. Ukraine should introduce electronic voting, primarily in referendums and local elections, which will increase citizen participation in decision-making. This will make the processes democratic and ensure greater trust in the electoral system.

3. Increasing the use of online platforms for collecting ideas from citizens will allow city residents to actively participate in development of projects that improve the urban environment.

4. Further development of online services for document processing will help significantly reduce waiting times and improve citizens' interaction with authorities. It is important that online systems are reliable, convenient and accessible to all citizens, especially those who do not have constant access to the Internet.

Overall, Ukraine has great potential to improve governance using digital technologies. It is important to invest in the infrastructure, ensure access to online platforms, and create mechanisms for active citizen participation in governance processes.

To explore the role of artificial intelligence in managing socio-economic processes in the context of sustainable development, we will use the initiative launched by the G7 countries to promote development of safe, reliable and ethical artificial intelligence technologies, known as the Hiroshima AI Process (HAIP) (National AI policies & strategies).

As part of this process, the G7 countries are working to establish international standards and codes of conduct for organizations developing advanced AI systems. The key element is establishment of the reporting framework to promote transparency and accountability in development and implementation of these systems. This also helps to identify and disseminate best practices, and provides opportunities for benchmarking of AI risk mitigation efforts.

Thus, researching AI implementation projects in countries will help to understand how international AI initiatives and policies can contribute to achieving sustainable development, and will also allow us to identify the best approaches for implementing AI.

Table 7 provides information on the number and nature of AI projects in Hungary, Poland, Romania, Slovakia, and Ukraine. It demonstrates the diversity of initiatives aimed at developing AI in these countries, including scientific research, innovation, and implementation of AI in public administration and the economy.

**Table 7 - Projects of neighboring countries and Ukraine in artificial intelligence and their impact on sustainable development**

| Country | Number of projects | Essence of the project |
|---|---|---|
| Hungary | 14 projects | Projects: creation of the national AI laboratory, data market platform, and automation of administrative processes promote innovation and efficiency. The Hungarian government is also focusing on ethical aspects of using AI, adapting European guidelines to national conditions. |
| Poland | 4 projects | Projects: GAMEINN program funds the use of AI in video games, Poland-Taiwan Scientific Co-operation promotes scientific exchange with Taiwan. The AI Development Policy in Poland, approved in 2021, defines the strategy for implementation of AI technologies in the economy, healthcare and other areas. Poland is actively adapting its legislation, in particular the Labor Code, to consider changes related to automation and implementation of AI in the workplace. |
| Romania | 4 projects | The National Strategic Framework Plan on AI (2023-2027) aims to introduce innovative technologies into public administration to improve business efficiency. The country is also working on the National Strategy for Research, Innovation and Smart Specialization for 2021-2027 to develop AI in the economy and science. Romania is creating the National Strategy for AI, which will determine further development of technologies in the country. As part of the research program "The Impact of ICT and AI on the Evolution of Humans and Society", the Romanian Academy is conducting research and reflection groups to analyze the impact of AI on society. |
| Slovakia | 2 projects | The Digital Transformation Action Plan sets out steps to create successful digital country with focus on sustainable, human-centric and trustworthy AI. Slovakia implements state R&D programmes and R&D infrastructure development programmes that promote development of scientific research and innovation in the AI sphere, providing support for research institutes and innovation centres. |
| Ukraine | 1 project | The National Strategy for the Development of Artificial Intelligence is focused on using the country's existing potential in AI sphere to achieve strategic goals in various areas. The strategy provides for creation of favorable environment for development of innovations, in particular in the areas, including industry, agriculture, medicine and public administration, and provides for support for scientific and research initiatives and cooperation with international partners to integrate advanced technologies. |

Source: compiled by the authors based on National AI policies & strategies (https://oecd.ai/en/dashboards/overview )

AI projects in these countries have positive impact on socio-economic processes, contributing to sustainable development. They improve efficiency of public administration, support innovation in industry, healthcare and agriculture, which leads to economic growth. AI projects also help automate processes, reducing costs and improving access to services. Implementation of ethical principles for the use of AI ensures the balance between technological progress and social responsibility, which is important aspect of sustainable development. For example, projects in Hungary, including creation of the national AI laboratory and the data market platform, contribute to increasing innovation and economic efficiency. This allows the country to create new jobs and support sustainable development through automation of administrative processes. Poland's GAMEINN program finances the use of AI in video games, supports development of the creative industry, which stimulates economic development, and also creates new opportunities for entrepreneurs.

Ukraine has one main project – the National Strategy for the Development of Artificial Intelligence [15], which is focused on using existing potential of AI to achieve strategic goals in industry, agriculture, medicine and public administration. The strategy includes creating favorable environment for development of innovations and supporting research initiatives, as well as cooperation with international partners. This indicates that Ukraine is at the initial stage of development in this area, and to achieve success in the future it is necessary to expand initiatives and increase the number of projects in the AI sphere.

## DISCUSSION

According to research results (Djakona et al. (2021); Filyppova et al. (2024); Hryhorkiv et al. (2024)), digital technologies and AI are actively transforming socio-economic processes, contributing to achievement of sustainable development goals. We agree with Kochubei's statements et al. (2021), Zybareva et al. (2021) and Shaposhnykov et al. (2023) w Digital technologies and artificial intelligence (AI) are key factors in transformation of socio-economic processes, particularly in the context of sustainable development. Implementation of innovative solutions contributes to effective management of resources, optimization of production and improvement of the standard of living of the population.

Scientists Tanasiichuk et al. (2024), Popelo et al. (2024) and Marhasova et al. (2023) analyzed and determined economic impact of AI and digital technologies on functioning of the national economy (automation, productivity, digital transformation). In contrast, Kosach et al. (2022) and Fedyshyn et al. (2022) analyzed sustainable development and AI (environmental initiatives, "green" technologies, emission reduction) and concluded that digital technologies and AI are key factors in managing socio-economic processes in the context of sustainable development.

Based on the analysis of all scientific literature, among debatable issues remain the following challenges that arise and relate to: ethical issues (data privacy issues and discriminatory algorithms); imbalance in the labor market (automation can displace traditional professions); digital divide (uneven access to digital technologies between countries and social groups).

## CONCLUSION

The analysis of the experience of Ukraine's neighboring countries shows that introduction of digital technologies in urban governance is the key factor for improving the quality of life of citizens, increasing efficiency of governance and sustainable development. Ukrainian cities should consider these trends and invest in development of digital infrastructure, smart transport, environmental projects and e-government. This will increase competitiveness of cities, attract investments and ensure sustainable development in the future.

Despite many benefits, implementation of digital technologies and artificial intelligence also brings certain challenges. In particular, there are risks of digital inequality between different countries and social groups, issues of data protection, cybersecurity and responsible use of AI, which are prospects for further research. Therefore, to maximize potential of digital technologies, it is necessary to create appropriate policies and regulations aimed at ensuring inclusive and sustainable development, ethical standards and security measures. It is important to ensure equal access to digital solutions, minimize negative consequences of automation and develop environmentally responsible technologies.

Overall, digital technologies and artificial intelligence are indispensable tools for achieving the SDGs. They can significantly accelerate resolution of global problems, but their implementation must be carried out responsibly, considering social, economic and environmental aspects of sustainable development.

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# THE IMPACT OF ARTIFICIAL INTELLIGENCE ON THE DEVELOPMENT OF THE DIGITAL BUSINESS ECOSYSTEM

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**ABSTRACT**

In the article, main aspects of the impact of artificial intelligence on functioning and development of the digital business ecosystem are considered. Urgency of using digital technologies, in particular artificial intelligence, for business development is substantiated. Experience of implementing artificial intelligence in functioning of business ecosystems and their main components in Ukraine is analyzed, and main challenges by using artificial intelligence technologies are identified. Based on the study of the essence of phenomenon of "digital business ecosystem" and effects of implementing artificial intelligence in functioning of digital ecosystems, the model of the digital business ecosystem is proposed, and positive features of the impact of artificial intelligence on development of the digital business ecosystem are highlighted. It is proven that existing problems in using artificial intelligence can be solved based on the strategic approach, which is the key one in development of effective modern policies in digitalization of the economy and management. It is substantiated that effectiveness strategic measures depend on coordination of the mechanism of the impact of artificial intelligence on the business ecosystem development. The model of the specified mechanism is proposed, and features of its action are determined.

**Keywords:** *Business, Business Ecosystem, Strategic Management, Digitalization, Digital Economy, Digital Technologies, Artificial Intelligence.*

## 1. INTRODUCTION

Formation of digital ecosystems has become possible due to the digital economy development, the key factor of which is production based on digital data, processing of large amounts of information, which has positive effect on efficient use of production resources, introduction of new production and sales technologies, establishment of logistics chains and development of business strategies. Most authors agree on conclusion that the digital economy determines social and economic development of the country. Digital technologies, including artificial intelligence (AI) as their important component, are one of the leading factors influencing formation of innovative ecosystems and are considered as the basis for establishment of the digital economy and transformation of socio-economic processes. Developemnt of the ecosystem and changes in its structure depend on the level of implementation of artificial intelligence, which subsequently creates conditions for development of

digital business in face of new challenges and threats to economic security.

At the same time, the level of integration of AI into business processes directly affects the structure and dynamics of the development of digital ecosystems, and therefore the competitiveness of digital economy entities.

Despite the rapid growth of interest in digital ecosystems, the mechanism of the impact of artificial intelligence on their development remains insufficiently studied: which elements of ecosystems undergo the greatest changes, how business processes are transformed, in which areas AI creates added value, and how these changes affect the overall sustainability and innovativeness of digital business. The lack of a comprehensive understanding of these relationships complicates strategic planning and management in the context of digital transformation.

## 2. LITERATURE REVIEW

Artificial intelligence is the key technology that is shaping current trends in digital business. Its implementation is significantly changing the way businesses do business, manage resources, market strategies, and communicate with consumers.

Development of digital ecosystems refers to one of the most relevant areas of scientific research in recent years. The issue of using artificial intelligence as effective tool to organise management is being considered by domestic and foreign scientists.

Gong S. [1], Kummer et al. [2], Sayyadi [3], Shkarlet et al. [4] discuss AI and business transformation, noting that AI allows for automation of many processes, including supply chain management, financial analysis, and operational processes. Machine learning allows companies to make decisions based on large data sets, which helps increase efficiency and reduce costs [5].

AI also plays important role in personalizing marketing strategies. According to studies [6], [7], [8], [9], data analysis algorithms allow predicting consumer behavior and offering personalized recommendations. This increases customer satisfaction and contributes to increased sales.

Using artificial intelligence is changing the labor market [10], creating new opportunities, but also leading to job losses in some industries [11]. However, studies show that along with disappearance of traditional professions, new ones that require digital skills are emerging [12].

At the same time, scientific search for solutions to problems of using artificial intelligence in the context of transformation of corporate governance, digitalization of science and public administration is gaining relevance.

Active implementation of AI takes place in all spheres of society. Every year, interest of the scientific in studying the AI impact on digital business is growing. This is confirmed by the bibliometric analysis of scientific activity in one of the highest-rated bibliometric databases, Scopus (Fig. 1).

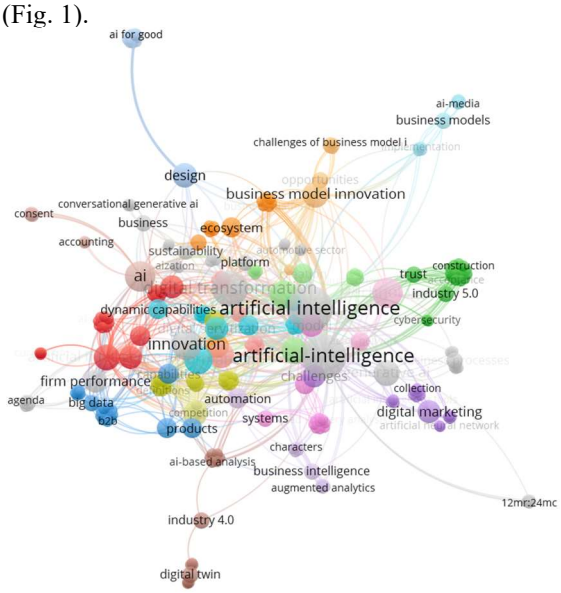



*Figure 1: Map visualizing relationship between keywords in scientific publications on the topic of AI in digital business*

The analysis of publications over the past ten years has shown growing number of studies in this area (number of publications has increased by 250%). The main areas of research have become as follows: business automation, ethical aspects of AI, digital transformation, demonstrating dynamic development of research in the AI sphere and digital business and confirming urgency of further scientific research in this area.

However, despite a significant amount of research, the scientific literature still lacks a systematic understanding of the impact of AI on the formation and evolution of digital business ecosystems as holistic structures.

The purpose of the study is to analyze the impact of artificial intelligence on the development of digital ecosystems and identify the main directions of digital business transformation under the influence of AI. In this context, it is proposed to discuss the conceptual principles of the impact of artificial intelligence on digital business ecosystems, identify the key directions of transformations occurring under its influence, and also substantiate

the practical possibilities of using AI for the strategic development of digital business. The integration of artificial intelligence into the digital business ecosystem contributes to increasing management efficiency, creating new forms of digital interaction and strengthening the competitive positions of companies in the context of global digital transformation. The results of the study may be useful for entrepreneurs and company managers who implement digital technologies and seek to strengthen their position in the market; for politicians and government agencies that form the country's digital strategy; for scientists who study the processes of digital transformation; for investors who are looking for promising areas of capital investment in an AI-dominated market.

## 3. METHODOLOGY

To define the essence of the concept of "digital business ecosystem" and identify the effects of the implementation of artificial intelligence in the functioning of digital ecosystems, a set of scientific research methods was applied, in particular:

1. System analysis - to study the digital business ecosystem as a complex open socio-economic system with numerous relationships between participants, technologies, data and institutions. This method allowed us to determine the structure and functional elements of the ecosystem.
2. Factor analysis - to identify key factors that determine the effectiveness of the functioning of digital ecosystems in the context of the integration of artificial intelligence (in particular, the level of automation, data processing speed, service personalization, adaptability of business processes, etc.).
3. Modeling method - to build a visual model of the digital business ecosystem, which reflects the relationships between its main components and illustrates how the implementation of AI changes the functioning of the ecosystem.
4. Content analysis of scientific sources – to identify approaches to defining a digital business ecosystem, analyze theoretical concepts and empirical results of research on the impact of AI on the digital transformation of business.

The use of these methods in combination allowed us to form a substantiated model of a digital business ecosystem that takes into account current trends in the implementation of artificial intelligence and reflects transformational processes in the digital environment, as well as the mechanism of the impact of artificial intelligence on digital business ecosystems.

The study used a comparative analytical method that allows us to identify the characteristic features of the development of the artificial intelligence industry in Ukraine in comparison with similar processes in the countries of Central and Eastern Europe. This method allows us to compare not only absolute indicators (number of investments, company offices, funds), but also the dynamics of development in different political and economic environments, which is important for identifying success factors or deterrent barriers.

The selected countries of Central and Eastern Europe (including Poland, the Czech Republic, Romania, Hungary, Bulgaria, Estonia, and others) have a similar post-socialist past, comparable starting conditions for digital transformation, but demonstrate different levels of integration into global innovation ecosystems. This selection allows us to identify: unique features of AI development in Ukraine against the background of regional analogues; factors that facilitate or hinder the attraction of venture capital to the technology sector; the impact of external crises (including full-scale war) on the investment climate in the AI industry.

## 4. RESULTS

In generalizing main theoretical aspects of formation of ecosystems as modern trend of the economy, it is possible to define the digital ecosystem of business as a set of digital technologies, processes and services that form the basis for implementation by the company of the main areas of activity in the digital society. In the context of globalization economic processes, digital business systems coordinate various areas of the company's economic activity. Modern state programs that regulate implementation of principles of the digital economy distinguish following main digital technologies:

- big data (Big Data);
- artificial intelligence;
- systems;
- quantum technologies;
- Internet of Things;
- virtual reality technologies.

Development of global digital platforms has been driven by advances in artificial intelligence. Platforms act as infrastructure, eliminating unnecessary intermediary transactions and creating network effects, optimizing the real-time matching of supply and demand. The impact of platform models is diverse. Models of social interaction help improve purchasing goods and services with resource savings, creating possible implementation of projects in the circular economy. Work processes

are improved when platforms make it possible to work remotely. Using social networks promotes effective communication with stakeholders. A positive factor is contribution of artificial intelligence technologies to companies achieving sustainable development goals and implementation of corporate social responsibility policies to ensure gender equality, combat climate change, and preserve marine and terrestrial ecosystems.

Research results show that the largest AI market is in North America, with estimated value of $87.18 billion to $167.3 billion in the United States. In Canada, the North American the AI industry accounts for more than a third (36.84%) of the global AI market, which is worth $43.7 billion. (Figure 2).

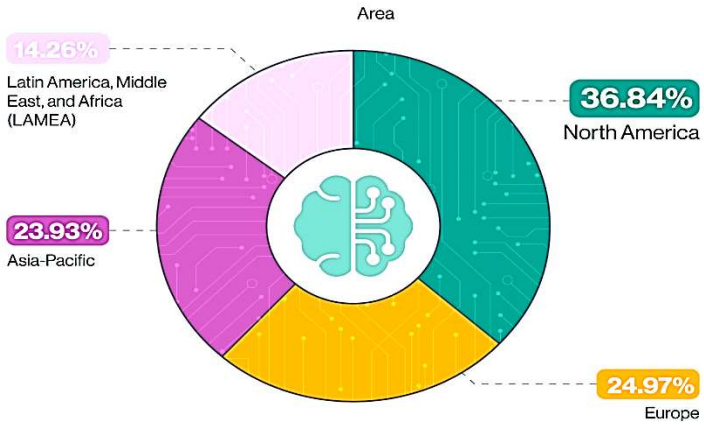



*Figure 2: Use of AI in the global market, %*

*Source: [13]*

The analysis of AI development statistics shows that 24.97% of the global AI market share is accounted for by European countries. It should be noted that the AI market in Germany is worth US$25.7 billion, which is 146% less than that of the US. The Asia-Pacific region accounts for 23.93% of the total AI market size. Forecast data on the AI technology development show that the global market size could exceed US$2,500 billion by 2032 (Figure 3).

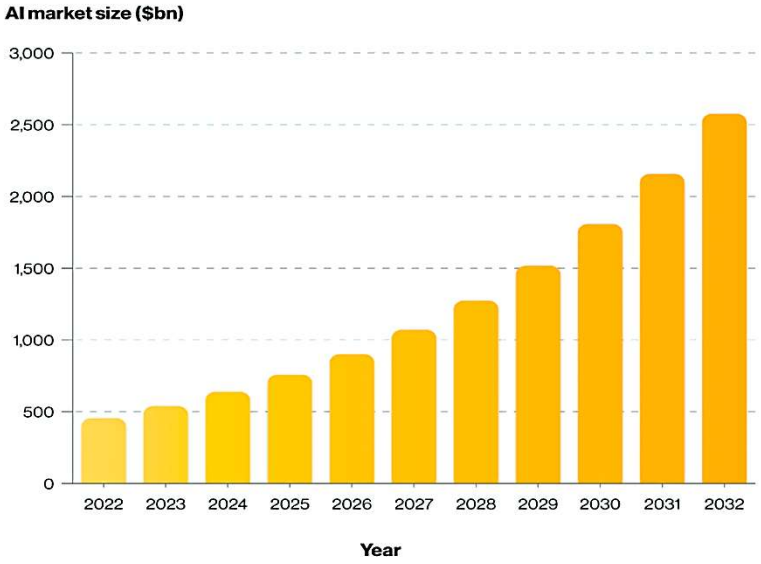



*Figure 3: Global statistics and forecast of artificial intelligence use, 2022-2032*

*Source: [13]*

Forbes survey show that 65% of CEOs surveyed plan to use ChatGPT for business purposes instead of search engines. Top managers are convinced (97%) that this will have positive impact on their business. 74% of business owners believe that ChatGPT will help them generate answers to customers using chatbots. 70% of CEOs are convinced of significant speed of content creation, and 44% are sure that AI will help them create necessary content in different languages. (Figure 4).

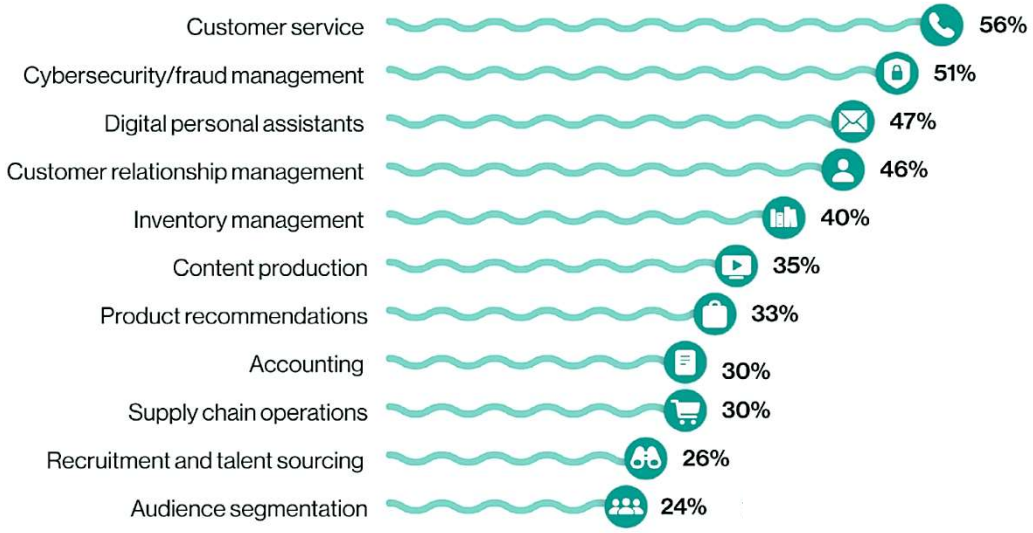



*Figure 4: Percentage of business owners using AI technologies, %*

*Source: [13]*

Studying the experience of implementing artificial intelligence in functioning of business ecosystems and their main components in Ukraine for the period 2022-2023 allows us to draw the following conclusions. In terms of the number of AI companies in 2023, Ukraine ranked 2nd among the countries of Central and Eastern Europe. Since 2014, number of companies using artificial intelligence technologies has increased from 97 to 243 by the end of 2023. The study of human resources of domestic companies indicates a 5-fold increase in the number of specialists with AI competencies, which amounted to 5,200 people by the beginning of 2024. Despite riskiness of doing business and decline in business activity due to military operations, there are 44 venture funds in Ukraine that support startup projects in artificial intelligence technologies. The largest centers of AI development in Ukraine are Kyiv - 177 company offices and Lviv - 43 offices [14] (Figure 5).

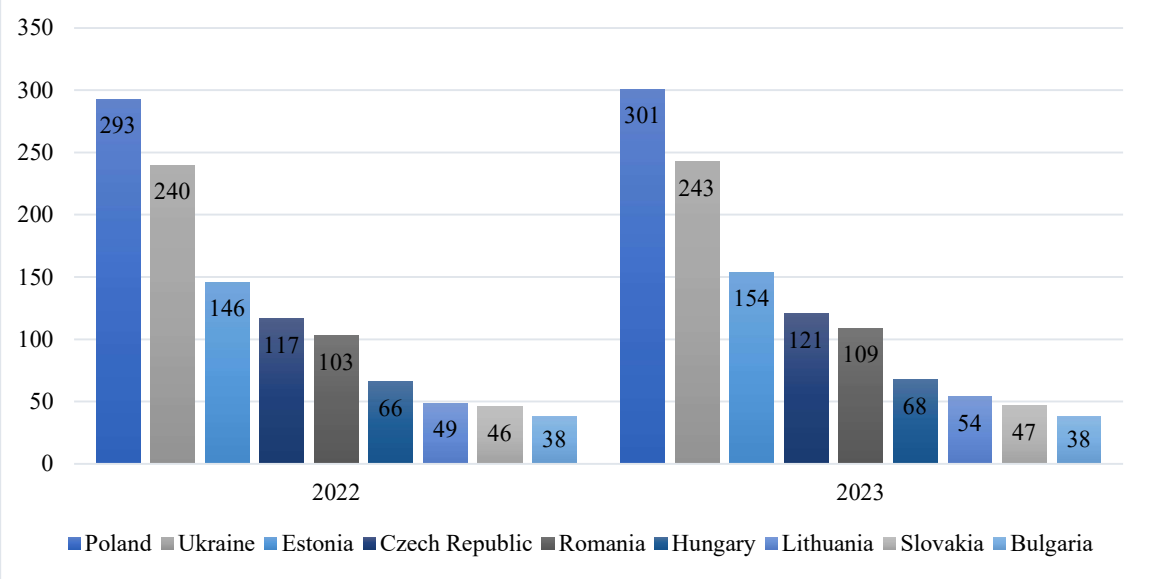



*Figure 5: Number of AI companies in dynamics (2022 – 2023)*

*Source: [14]*

In 2023, there was a 35% increase in funding for startups in artificial intelligence, which, despite military aggression of the Russian Federation and work in conditions of high risk, follows the global trend of increasing investments in the AI. However, in terms of the number of venture investments, Ukraine ranks last among the countries of Central and Eastern Europe (10.8 million USD in 2023) (Figure 6).

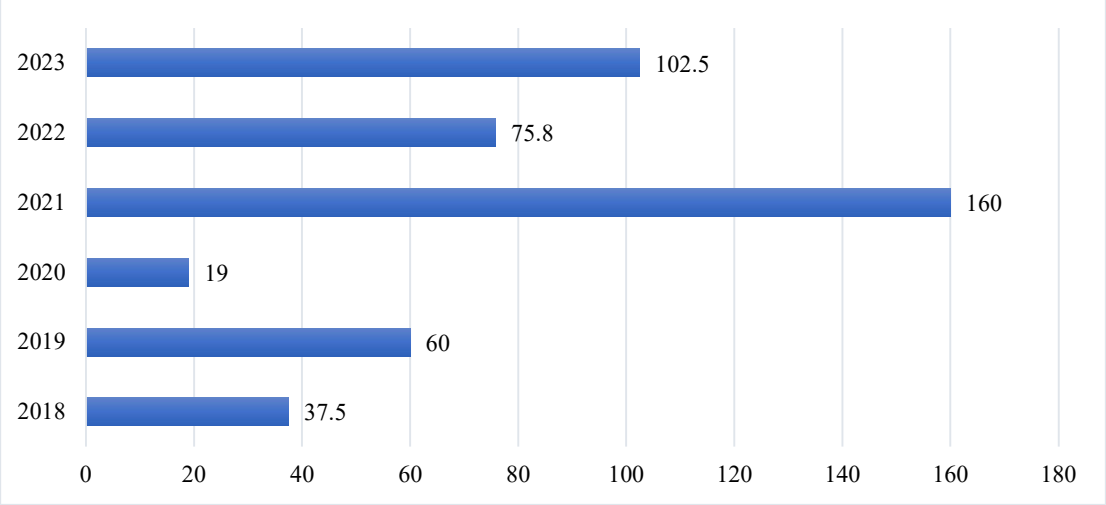



*Figure 6: Financing startups specializing in AI technologies*

*Source: [14]*

Universities are also involved in developing artificial intelligence technologies. Thus, out of 31 artificial intelligence laboratories operating in Ukraine, 6 operate at universities: Lviv National University named after Ivan Franko, Kyiv National University "KPI named after I. Sykorsky", Kharkiv National University of Radio Electronics, etc.

Regarding the industry distribution of AI startups, the leader is investments in software development – 27.2%, healthcare – 12.54%, marketing – 9.78%, FinTech technologies – 8.92%, development and implementation of automated systems – 6.19% [15].

The main challenges using artificial intelligence technologies, according to experts, are:

- lack or secrecy of information, as well as difficulties with data processing in certain sectors of the national economy (medical, military, agricultural), which does not always contribute to the spread of AI technologies;
- lack of clear established regulatory norms;

- need to train specialists who possess not only technical, but also communication and creative skills,
- reduction in available financial resources for investment in artificial intelligence.

Defining the essence of the phenomenon of "digital business ecosystem" and effects of introducing artificial intelligence into functioning of digital ecosystems allows us to form the following model of the digital business ecosystem (Figure 7).

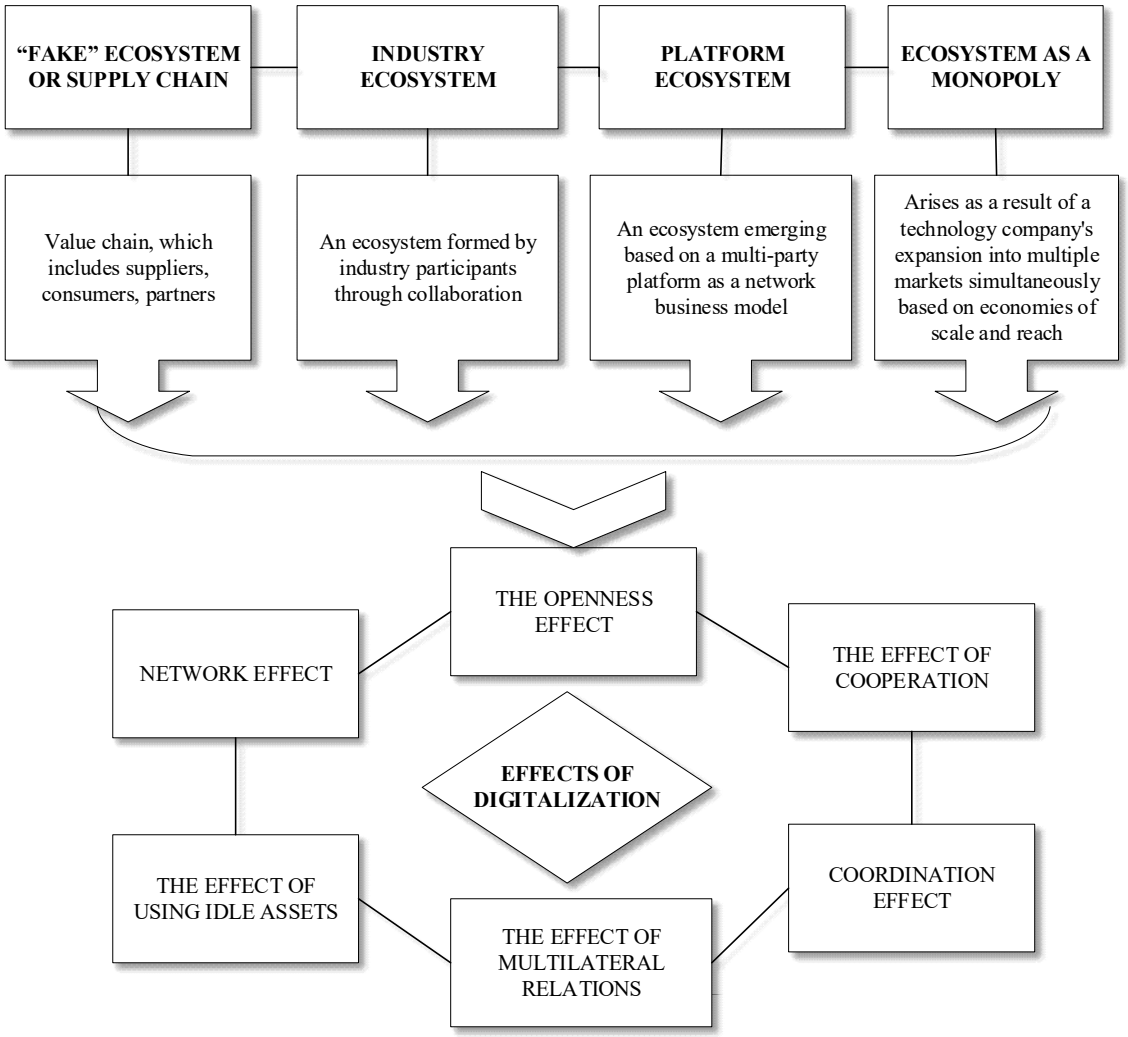



*Figure 7: Digital business ecosystem model*

*Source: developed by the authors*

Following positive features of the impact of artificial intelligence on development of the digital business ecosystem should be highlighted:

- high productivity of economic operations due to process automation;
- ability to accumulate and process large data sets;
- expanding opportunities for social integration;
- ensuring business transparency to the public;
- possible effective cost management;
- achieving competitive advantages in production and sales activities.

However, spread of using artificial intelligence as effective tool of the digital economy is hampered by certain circumstances caused by crisis state of the domestic economy, military aggression of the Russian Federation, political and social instability. As a result, low innovation capacity, investment limitations do not allow most manufacturing enterprises to carry out technological upgrades, use new methods and tools to ensure effective logistics and sales systems. In addition, there is shortage of qualified personnel in informatization and digitalization, with developed digital competencies,

which is due, among other things, to significant population migration. Personnel with high level of knowledge in digital technologies in functioning of business ecosystems play the leading role, since the work of the performer is transformed into the work of the manipulator and controller of high-tech equipment and digital management platforms. Fig. 5 presents data on probability and trust consumers to companies that use artificial intelligence in their own activities (Figure 8).

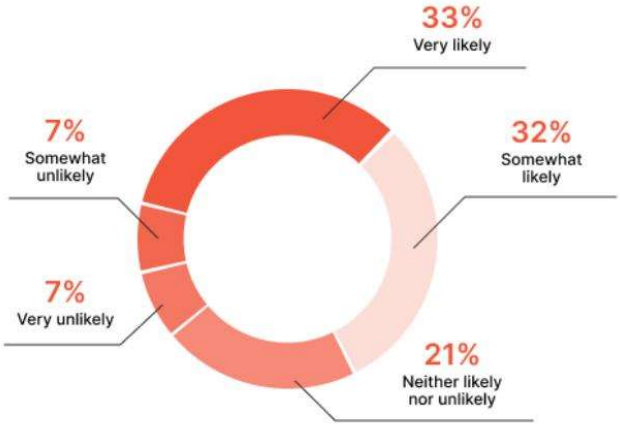



*Figure 8: Likelihood of consumers trusting companies that use AI*

*Source: [16].*

Strategic management of business ecosystem development is key direction of effective modern policy in the economy digitalization and management processes, which affects making management decisions at both the state and microeconomic levels and can be considered as effective tool for solving the above problems. Urgency of the strategic approach is significantly increasing in the context of technological transformations of business processes and transition to new technological order, which is based on principles of creating fundamentally new technical systems that use advantages of artificial intelligence. When forming principles of strategic management of implementing artificial intelligence technologies, it is necessary to take into account investment factor, including for conducting applied research and their further commercialization in the medium term. At the same time, the time factor is of great importance in ensuring strategic management of implementation of artificial intelligence systems in activities of business ecosystems due to high level of competition in this area not only from the standpoint of civilian developments, but also from the point of view of ensuring national security and possible threats associated with adaptation of artificial intelligence to solving military tasks. Accordingly, strategic management of implementation and use of artificial intelligence systems should be considered as important direction of the socio-economic, scientific and technical policy of the state, as well as national security policy, which will further contribute to ensuring competitive advantages of the domestic economy at the international level. Figure 9 presents indicators of using artificial intelligence in various areas of enterprise activity, among which the most popular areas are: automation of IT processes (33%), security and threat detection (29%) and marketing and sales (28%).

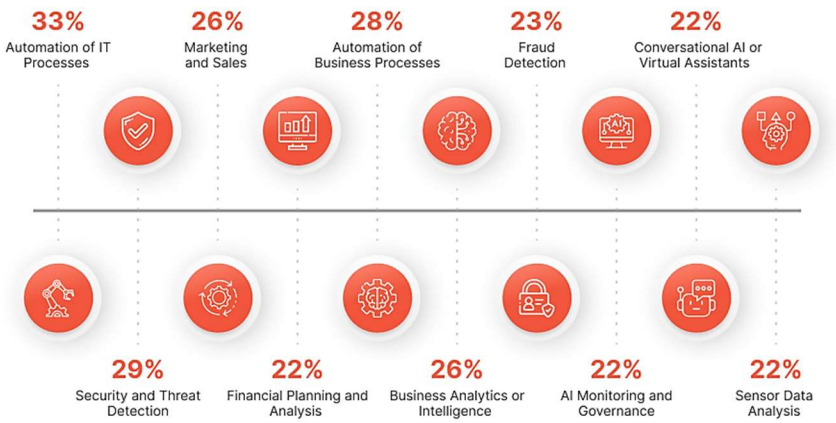



*Figure 9: Using AI in various areas of business activity*

*Source: [16]*

Existing trends in the world indicate available requirements for compliance of artificial intelligence technologies with ethical norms and direction of its use to solve the problems of humanity, however, at present there is no unified view on formation and regulation of relevant institutions, development of norms and rules for implementation of relevant projects. First of all, this concerns ethical component of using facial recognition systems and social scoring. Issues of personal data protection, access to them, especially during neural network training and development of intelligent systems also do not always have appropriate institutional support. From the point of view of legal protection, the priority area of regulatory policy is the issue of legal personality of artificial intelligence and legal nature of results of its application. The economy digitalization creates prerequisites for competitive struggle in artificial intelligence, however, geopolitical tensions, spread of technological sovereignty do not contribute to formation of the single universal approach to development of regulatory policy, since priority is given to national models of regulatory frameworks.

Analyzing dynamics of development of artificial intelligence and its use in business, it is advisable to pay attention to positive dynamics. In 2017, only 20% of companies used AI, in the period 2018-2023 - there were 47-58% of these enterprises, and in 2024 - 72%, which significantly exceeds indicators of previous years (Figure 10).

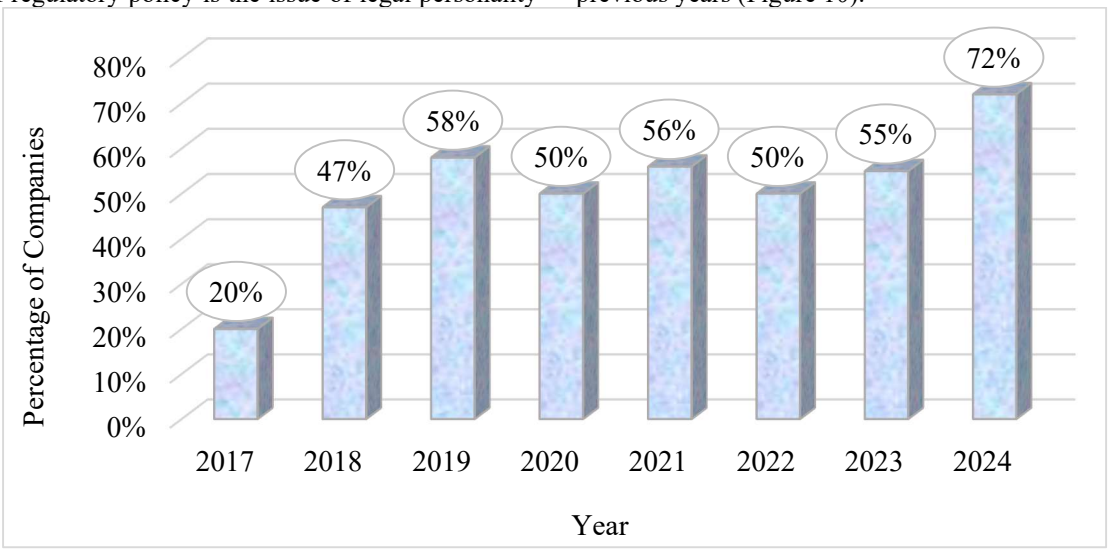



*Figure 10: Companies using Al, %*

*Source: [17]*

The strategic management system of development of artificial intelligence in the conditions of functioning of digital business ecosystems should be based on appropriate regulatory and legal support and measures of state regulation and support, including those of stimulating nature. Effectiveness of strategic measures largely depends on coordination of the mechanism of influence of artificial intelligence on development of the business ecosystem, formed in the conditions of effective interaction of market relations subjects and state policy measures and expansion of the practice of using digital innovations in implementation of entrepreneurial initiatives. Implementation of the mechanism involves state intervention in the context of measures of strategic management of development of artificial intelligence in the conditions of functioning of business ecosystems, as well as taking into account principles and objective prerequisites associated with organizational and economic features of artificial intelligence as an object of management in strategic perspective (Figure 11).

Effect of the mechanism of influence of artificial intelligence on functioning of business ecosystems is determined by its following features:

- functional features and potential capabilities of artificial intelligence depending on the level of its implementation. Thus, some researchers distinguish levels of artificial intelligence, depending on the ratio of resource potential of business entities. These can be both specialized programs used for data processing and formation of optimal models of behavior of the management entity, and automated systems that completely or partially replace the person and control management n various areas of the company's business;
- scale and level of use of artificial intelligence. Thus, prevalence of competencies in digital technologies and artificial intelligence among citizens and company employees is of great importance. At the same time, digital skills should be spread among different social strata of economically active part of the population as potential consumers of companies' products and services;
- stage of the life cycle of artificial intelligence technology and its ability to adapt to technological changes.

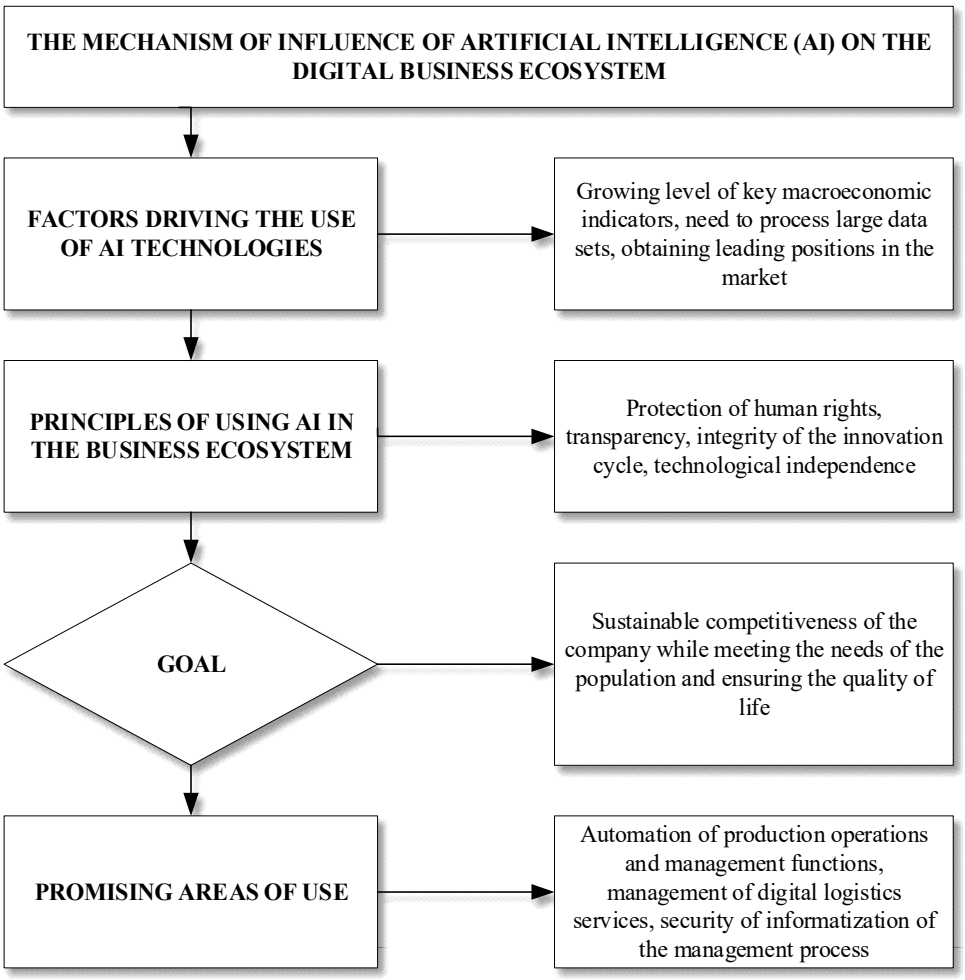



*Figure 11: Mechanism of influence of artificial intelligence on development of the digital business ecosystem*

*Source: developed by the authors*

When developing strategic management measures for companies, the following aspects of the mechanism should be taken into account, such as the ability to develop, design and implement artificial intelligence systems based on available administrative and financial support from government authorities, as well as ability to modernize and update artificial intelligence systems and ensure continuous investment process in the company's intellectual capital.

## 5. DISCUSSION

The issue of the impact of artificial intelligence on development of the digital business ecosystem remains debatable today. In the context of the research conducted, it can be seen that most authors devote their works to revealing the essence of business ecosystems, features of their development at the present stage, problems of formation of the digital society in Ukraine and the world, management of financial transactions in the context of ecosystem development and formation of necessary competencies of company personnel in the context of digitalization.

We fully share the ideas of [18], [19], [20], [21] regarding use of artificial intelligence and the impact of digitalization on sustainable business development, which are based on how implementation of digital technologies, in particular artificial intelligence, contributes to creation of sustainable consumption and increased social responsibility of business.

In turn [22], [23] prove relevance of digital business transformation in the face of global challenges, such as the COVID-19 pandemic and military aggression.

Bist et al. [24], Solosich et al. (2024) [25] justify introducing artificial intelligence into business processes by identifying possibilities of introducing artificial intelligence into business processes for

automation, obtaining information through data analysis and interaction with customers and employees, and identifying potential challenges (for example, job losses and the need to adapt employees to new technologies). In addition to benefits, using artificial intelligence also has certain risks. These include ethical issues, in particular using personal data and algorithmic bias [26], [27]. Researchers emphasize the need to regulate AI at the legislative level to avoid negative consequences Leavy [28].

We fully support the ideas of [29], [30] regarding the study of the impact of intellectual capital and artificial intelligence on digital transformations by identifying the role of intellectual capital and artificial intelligence in modern economic environment and their interaction with digital initiatives. The key mechanisms through which these factors contribute to digital transformations are identified, and their relationship is clarified.

Artificial intelligence as one of the key drivers of digital transformation of the economy is studied by [31], [32] through consideration of the prospects for the use of AI in various economic and social spheres, as well as determining its role in creating sustainable economic growth and ensuring competitive advantages of organizations.

This study adds to the knowledge on understanding the impact of artificial intelligence on development of the digital business ecosystem.

## 6. CONCLUSIONS

For widespread use of artificial intelligence technologies and transformations of management, the company's management must have information about possible implementation leading digital technologies and directions of their impact on various areas of economic activity. Implementation of artificial intelligence, digital platforms and neural networks becomes appropriate: when conducting analysis, planning, forecasting and design, including processing large data sets; when implementing monitoring and control processes of production and sales activities; when making complex intelligent management decisions.

Considering the impact of artificial intelligence technologies on functioning of digital business ecosystems, it is advisable to pay attention to security aspect as one of the priorities. Thus, using artificial intelligence and machine learning technologies to protect data and prevent challenges and threats in the information environment is becoming popular direction in the future. However, due to rapid changes in the environment, dynamism of digital threats and emergence of new malicious software, artificial intelligence systems require constant modernization, and degree of their automation should be constantly increased. Using artificial intelligence by companies should take place subject to development of appropriate regulatory and legal support, state support policies, formation of prerequisites for development of the digital economy infrastructure, and training of specialists in digital technologies.

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