velopment for the world economy", Innovatsiini idei v ekonomichnii nautsi: poshuky vyrishennia suchasnykh problem (2018): materialy naukovo-praktychnoi konferentsii, 19-20 kvitnia 2018 roku [Innovative ideas in economic science: the search for solutions to contemporary problems (2018): Proceedings of the Scientific and Practical Conference, April 19-20, 2018], National University Of Kyiv-Mohyla Academy, Ukraine, pp. 46–50 [in Ukrainian].

Shapoval Y.
State Organization "Institute of the Economy and Forecasting Of the National Academy of Sciences of Ukraine", Kyiv

ARTIFICIAL INTELLIGENCE IN FINANCIAL SERVICES: BENEFITS AND RISKS

The use of artificial intelligence (AI) technologies is profoundly changing the industry of financial services worldwide because AI assists in the processing of large quantities of information using advanced analytical methods. Such an innovative transformation of the financial sector creates not only new opportunities for enhancing financial inclusion, but is also accompanied by potential risks.

In turn, Ukraine is one of the countries with a high potential for the introduction of AI due to its developing IT sector. As of 2018, Ukraine is the leader in the number of outsourcing companies in the field of AI not only in Eastern, but also in Western Europe (there are 26 such institutions in the country, while all over the world – 226). Most Ukrainian companies, specialized on AI, are working on software (38%). Other popular areas include information technology, chatbots and AI assistants, Fintech solutions, and entertainment products [1].

Particularly, AI technologies are effectively used in processes in which the result is dependent on incoming data or on feedback. Appealing to the definition coined by the Financial Stability Board AI is the theory and development of computer systems able to perform tasks that traditionally have required human intelligence [2, p.35]. In whole, the access of AI creates *advantages* in such areas as: *customer service* (through voice-enabled computer customer representatives or chatbots to manage a significant portion of tasks); *analytics* (analysis of Big data with the aim of identification the insights); *security*

(for authentication and verification of facial, and voice imagery or sound) [3, p. 45].

In line financial organizations are thinking about implementing AI, since it has associated with the following *benefits*:

- *deeper* operation and with a *huge amount* of data;
- *automation* of the machine learning and searching through data: reduction in repeatable or low added-value tasks and faster response;
- achievement of *extreme precision and lower operational risk*: thanks to the ability of AI to seek out addictions that cannot be found by humans;
- *personalization*: generation of customer insights and their transformation into an intelligent product that works on user requests.

To sum up, algorithms and models of AI are built around optimizing financial decisions and stimulating positive behavior for people by "pushing" them to certain actions that will lead to a positive financial result.

On the other hand, there are *risks* of AI impact [2, p. 31, 33; 4, p. 16-18]:

- *unpredictability*: new trading algorithms based on AI may be less predictable than current rule-based applications and may interact in unexpected ways, may also enhance the interconnectedness of financial markets and institutions in unexpected ways;
- *lack of law interpretability in law:* falling outside the regulatory perimeter or unfamiliarity of AI methods with applicable law has the potential to contribute to macro-level risk if not appropriately supervised by microprudential supervisors;
- *cybersecurity issues*: AI increases possible attack points and new attacks are designed to alter the functioning of AI algorithms;
- *risk of players' dependency, the change of the type and degree of concentration in financial markets*: high prices, limited access to certain services that would use AI, unbalanced trade relationships; sovereignty issues related to technologies and data, poor control by users and increased opacity of the algorithms, difficulties in accessing and as well auditing the financial activities;
- *risk of financial stability*: technology directional trading, market vulnerability to attacks, a risk that machine learning will exacerbate financial market crises in the absence of training during crises.

The practice of using AI by financial institutions in their activities is already widespread in the world. The field of AI concerns with *granting credit*: a) ZestFinance helps companies assess borrowers with little/no credit information or history; b) DataRobot provides machine learning software on issues like fraudulent credit card transactions, digital wealth management, direct marketing, blockchain, lending; c) Scienaptic Systems connects myriad unstructured/structured data, learns from each interaction and offers contextual underwriting intelligence; d) Underwrite.ai analyzes thousands of data points from credit bureau sources to assess credit risk for consumer and small business loan applicants. In the area of *managing risks*: a) Kensho offers analytical solutions using a combination of cloud computing and natural language processing to leading financial institutions like J.P. Morgan, Bank of America, Morgan Stanley, and S&P Global; b) Ayasdi prepares anti-money laundering detection solutions. In the area of *product customization*: a) Kasisto provides customers with self-service options and solutions, and chatbots give users calculated recommendations and help with other daily financial decisions; b) Abe AI integrates with web and mobile; c) Trim is a money-saving assistant that connects to user accounts and analyzes spending. In the area of *fraud detection*: a) Shape Security curbs credit application fraud, credential stuffing, scraping and gift card cracking by pinpointing fake users; b) Darktrace creates cybersecurity solutions for a variety of industries and financial institutions are no exception [5].

Today, the main fields of use of AI by Ukrainian financial intermediaries are credit scoring, investing in securities, risk management and fraud control, robotic collectors, and retail network development. Instead of traditional chat-operators, Raiffeisen Bank Aval's chatbot is suitable for solving tasks such as online purchases and access to proactive services (reminders and a personal calendar of daily tasks). PrivatOchBot provides the ability to transfer funds from card to card, receive information on exchange rates, apply for loans and participate in promotions. Oschadbot informs about account, limit change, card lock. Otpbank_bot notifies about account payments, bank currency rates, bank branches/ATMs, change of limits. Tascombot keeps advising about exchange rates, the address of the nearest branch/ATM, and assists with the payment/credit card. Another example of the use of AI by domestic banks is fraud prevention and detection. For example, PrivatBank uses AI to identify clients

who are more likely to fall victim to frauds. In addition, OTP Bank, Raiffeisen Bank Aval are working on applying Big data and AI technologies in their work.

Overall, the use of AI makes it possible to automate banking services, as the work is "trained" and constantly refined to fulfil the tasks set in the research and development of new products and services, increasing labour productivity, and as well improving customer service. Despite that, today not many Ukrainian banks can conduct projects related to such expensive high-tech AI technologies (costs for acquiring and maintaining the infrastructure, the skilled workers), which do not fully cover the business need and are not ready to tackle the key challenges of banks. At the same time, the Ukrainian financial authorities have to rethink regulatory issues relating to innovation in financial services, namely in the areas of personal data protection, of intellectual property rights, and, in fact, regulation in AI data access.

References

Artificial intelligence industry in Eastern Europe (2018). *Overview of Deep Knowledge Analytics*. URL: https://dka.global/ai-in-eastern-eu-rope/?fbclid=IwAR3JzxTwjHDFUrOkjutiW8LblmyiX94nNuuwGWmKWVb5ckzpTVjDmq4pONo

2. Artificial intelligence and machine learning in financial services. Market developments and financial stability implications (2017, November 1). *Financial Stability Board*. URL: https://www.fsb.org/wp-content/uploads/P011117.pdf

3. The future of digital banking (2019, September). *KPMG*. URL: https://assets.kpmg/content/dam/kpmg/ua/pdf/2019/09/future-of-digital-banking-in-2030-cba.pd.pdf

4. Fliche O., & Yang S. (2018, December). Artificial intelligence: challenges for the financial sector. *Discussion paper ACPR*. URL: https://acpr.banque-france.fr/sites/default/files/medias/documents/2018_12_20_intelligence_artificielle_en.pdf

5. Schroer A. (2019, May 23). AI and the bottom line: 15 examples of artificial intelligence in finance. URL: https://builtin.com/artificial-intelligence/ai-finance-banking-applications-companies