Performance of Artificial Intelligence Technologies in Banking Institutions

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Abstract: - The development and implementation of innovations in various areas of business is stimulated by the competitive market environment. The use of artificial intelligence technologies for business process transformation is one of the most promising areas. Artificial intelligence is conductive to not only increasing the business process efficiency, but also to reducing the companies' costs required for business process implementation. Artificial intelligence also contributes to reducing the need for human resources to perform routine operations. The aim of the study was to make a list of indicators that describe the performance of artificial intelligence technology in the activities of large companies and calculate them based on the example of the banking branch. Credit Agricole — a bank with foreign investment, one of the leaders of the banking sector of Ukraine — was chosen for the study. The methods of statistical and economic analysis were the main research methods used to contrast performance indicators with the use of artificial intelligence and without it. Quantitative indicators such as the duration of the client's application; the cost of client service; the number of requests processed by the bank's operators and managers; saving money spent on client service business processes were the main indicators for evaluating the performance of artificial intelligence. The results of the study demonstrated practical advantages of using artificial intelligence, which entail savings of working time and financial resources. These results confirm that the labor productivity of the bank branch employees has increased due to the automation of processes implemented through the artificial intelligence systems and technologies. The study opens up new areas of further research, in particular the impact of the use of artificial intelligence on financial performance and market capitalization of companies.

Key-Words: - artificial intelligence, machine learning, business processes, voice bot, chatbot.

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1 Introduction

The digital technologies are increasingly developing, thus entailing their widespread use in various aspects of companies' operation. The introduction of artificial intelligence (AI) in the business process implementation or transformation is the best practice. Artificial intelligence and machine learning (ML) technologies can completely replace humans in certain operations. Moreover, artificial intelligence can perform certain types of operations much faster and with higher efficiency. This urges evaluation of the results and effects of the introduction of artificial intelligence in companies' operation. In this context, the performance evaluation involves not only indicators of economic efficiency, but also increase the utility of the tools for the company's customers.

So, the use of artificial intelligence should increase the utility and level of user satisfaction of the companies' services provided by artificial intelligence directly or through its use.

2 Literature Review

The OECD study, [1], indicates that the use of artificial intelligence can provide competitive advantages to companies. The main advantage is the reduction of costs, which provides increased economic efficiency. On the other hand, the use of artificial intelligence allows optimizing the company's internal business processes by automating certain types of work. The companies can reduce the labor requirement and time outlays by using artificial intelligence to interact with customers. There are several risks along with the benefits of using artificial intelligence. One of the main risks is the error or inaccuracy in the artificial intelligence algorithm, which can lead to significant losses. So, artificial intelligence can provide significant competitive advantages to financial companies given the elimination of the risks.

According to [2] artificial intelligence can change some aspects of business environment. Innovations in products and services using artificial intelligence will create value for customers in the form of personalized service and individual approaches. Artificial intelligence is conductive to business model transformations, thus making financial institutions more cost-effective, highly networked and more specialized. The spread of artificial intelligence will result in increased competition and further development of innovation, entailing the improved quality of services.

Were found many examples of the use of artificial intelligence by large financial companies in various fields, [3]. Financial institutions use artificial intelligence to assess the borrowers' risks when issuing loans, while insurance companies involve it in assessing market insurance contracts. Moreover, artificial intelligence is used to automate the company-client communication. Asset management companies and commercial agents use artificial intelligence to detect signals of underestimated or overestimated profitability of financial assets in the market.

Therefore, as a significant number of reputable international organizations maintain, the introduction of artificial intelligence into business practice is one of the leading trends in the development of modern business, including the banking and financial sectors.

Analyzing the available academic publications on the subject of research, it should be noted that most of them considered artificial intelligence an important driver of the development of modern business and improvement of its interaction with customers, primarily in terms of efficiency, and to a lesser extent — the quality of such interaction. For example, in [4] the author argues that artificial intelligence can significantly improve the current state of financial services sector. Artificial intelligence can be used in the financial services sector for online trading on currency exchanges, asset portfolio creation and optimization, models verification and testing. Besides, there is a space for activities in the field of client service, including online consultations and assistance in resolving issues. Artificial intelligence can also be used to assess regulatory compliance and stress testing.

In the study of the use of artificial intelligence by financial companies, [5], was concluded that companies can use it for many aspects of their activities. Companies can conduct and track the results of marketing campaigns to promote their brand or product in the market. Artificial intelligence can also be used to assess the activities risks and develop mechanisms to mitigate them.

The use of artificial intelligence by financial companies in anti-fraud and cybersecurity is no less important. Artificial intelligence can detect fraud attempts, while machine learning helps to update and modernize the detection algorithm. Chatbots discussed in study, [6], are one of the most successful ways of introducing artificial intelligence into the practice of improving banking operations. In the publication, [7], chatbots are considered as an effective tool for improving business-customer interaction.

A significant number of publications deal with the spread of "neo-banks" — banks based on information technologies that actively use artificial intelligence in their activities. In [8] author studied the experience of such banks, while in [9] author focused on the implementation of artificial intelligence in the practice of modern banking and financial institutions.

The next block of the literature survey covers the implementation of artificial intelligence in the banking and financial sector.

A meta-analysis of research on the use of artificial intelligence in finance showed that artificial intelligence has a positive impact on accounting, audit, and finance, [10]. The authors note that in the reviewed studies provide evidence of a positive impact of artificial intelligence on the accounting efficiency. Besides, the use of artificial intelligence systems in the audit was found to improve the efficiency of identifying errors and risks peculiar to the accounting system. The need for additional training of the company's staff, as well as the need for hardware and software required to set up artificial intelligence are one of the main obstacles to the introduction of artificial intelligence.

In his study of the challenges and opportunities of using artificial intelligence in finance, [11], researcher notes that the use of artificial intelligence is primarily related to data analysis. The modern world of finance produces large data volumes that can provide quality information for decision-making upon their proper analysis. Besides, artificial intelligence can conduct textual analysis of information, which is especially important for publicly listed companies. This analysis can also be useful for monitoring the company's external environment and market sentiment.

In [12] the researchers noted that the use of artificial intelligence in financial services provides many benefits. Artificial intelligence can promote the company's performance by automating either individual stages of business processes, or the entire business process. Besides, artificial intelligence allows reducing the number of mistakes in management decisions caused by psychological or emotional factors. The algorithmic conclusions of artificial intelligence eliminate shortcomings related to the emotional human nature. Artificial intelligence enables detecting long-term trends and anomalies that cannot be detected through the classical analysis of economic indicators.

Studying the limits of the use of artificial intelligence in finance, [13], was emphasized that artificial intelligence can provide much greater benefits than working with data. Artificial intelligence in stock trading is a necessity. Analysis and forecasting of trends, detection of anomalies is possible only through artificial intelligence. Transaction and data storage security is another important area of using this tool. Artificial intelligence can independently detect and block threats, thus significantly increasing the security of financial information.

In [14] the researchers state that the use of artificial intelligence in financial services promotes overcoming the barriers to the expansion of this market segment, namely difficulty in pledging or verifying credit history. Moreover, it contributes to improving management quality, which is the key to the security of financial transactions. Artificial intelligence technologies can analyze large data volumes in real time and further automate business processes. A combination of the said benefits ensures the reliability and speed of operations in the financial markets and provide the competitive advantages to companies that use artificial intelligence.

So, the use of artificial intelligence is considered in the context of possible potential advantages in different studies, but the issue of assessing the quantitative effect of its use has not been covered. This is the main problem of the surveyed studies because this issue is extremely important in the context of practical application of the theoretical concepts that are considered in the surveyed studies.

A literature review has shown that the companies benefit from the use of artificial intelligence. At the same time, the areas of use of artificial intelligence are quite diverse and, accordingly, there are different options for evaluating performance of artificial intelligence depending on the company's line of business and the areas where the AI is used. Our study is different, as we quantify the parameters of the use of artificial intelligence in the activities of large companies, which was not the case in the reviewed studies.

The aim of the study was to make a list of performance indicators of artificial intelligence technology in the activities of large companies, as well as to calculate them. The aim involved the following objectives:

— identify areas for the use of artificial intelligence in large corporations;

— evaluate performance of artificial intelligence technology in banking institutions.

3 Methods

3.1 Research Design

The performance of artificial intelligence technologies in banking institutions was evaluated by using the data on the operation of the Credit Agricole bank branch "before" and "after" the introduction of AI-based technological innovations. This bank is the oldest foreign bank in Ukraine, [15], which has been operating on the market since 1993 and providing a full range of banking services.

The bank is among the TOP-5 most reliable and most comfortable banks of Ukraine and among the TOP-10 banks in terms of assets according to the National Bank of Ukraine. In QII 2022, this bank ranked third in the ranking of the Ministry of Finance Internet portal, [16], with a total score of 3.83, yielding only to Raiffeisen Bank (4.05) and Ukrsibbank (3.90). Therefore, it is a representative of the group of leaders of the Ukrainian banking market in terms of stability, all of which are banks with foreign capital. At the same time, the largest Ukrainian state-owned bank — Privatbank, which is considered quite progressive and innovative in terms of introducing client-oriented banking services based on the latest technologies, is inferior to Credit Agricole in this rating (4th place with 3.81 points). Similarly, Universalbank with its Monobank project, which is the leading mobile-only neo-bank in Ukraine with the most dynamic growth of the client base due to the offer of innovative online banking solutions, ranks only 13th in this ranking.

This bank was chosen for the study as it has actively implemented artificial intelligence technologies in recent years, and it is possible to monitor the effectiveness of innovations at the level of the bank branch.

The AI-based technological innovations were implemented in the bank in 2020-2021 as part of the innovation strategy, which implied involving employees in more complex and creative tasks that are beyond the capacity of artificial intelligence, [17]. The introduction of appropriate technologies to speed up and improve customer service is the main subject of AI-related improvement in the bank. In particular, the following areas of improvement were implemented:

- use of artificial intelligence in the work of a call center operator for legal entities;
- use of a voice bot to serve individuals;
- use of artificial intelligence to prepare legal opinions.

The resulting indicator of the economic effect from the introduction of AI-based technological innovations was calculated according to the results of the analysis of measures to improve work in the bank branch using the data for the said three areas.

3.2 Methods

The statistical and economic analysis was used for data contrasting to achieve the aim. Quantitative indicators were used as the main indicators for evaluating the performance of artificial intelligence: the duration of the client's application; the cost of client service; the number of requests processed by operators and managers of the bank; saving money spent on client service business processes.

The effect in the form of savings from the use of artificial intelligence was evaluated by comparing the number of resources required for the implementation of business processes before the introduction of artificial intelligence and after its introduction.

Savings from the use of artificial intelligence in the work of a call center operator for servicing legal entities is defined as the ratio between the indicators $V_{i,j}$ (the cost of servicing one telephone call of legal entity without (i) and with the use of artificial intelligence (j)), which is calculated by the following formula:

$$V_{i,j} = \mathrm{T}_{le_{i,j}} * Q_{\text{юо } i,j} * W$$

where $V_{i,j}$ – the cost of servicing one telephone call from a legal entity (le), EUR;

$\mathrm{T}_{le_{i,j}}$ – working hours of the call center operator;

$Q_{le\ i,j}$ – the number of phone calls from the legal entity to the call center (per month);

W – call center operator wage (per hour);

i – without the use of artificial intelligence;

j – with the use of artificial intelligence.

Savings from the use of a voice bot for servicing individuals is defined as the ratio between the indicators $X_{i,j}$ (the cost of servicing one individual client without (i) and with the use of artificial intelligence (j)), which is calculated by the following formula:

$$X_{i,j} = T_{ic_{i,j}} * Q_{\text{фо } i,j} * W$$

where $X_{i,j}$ – the cost of servicing one telephone call from an individual client (ic), EUR;

$T_{ic_{i,j}}$ – the average duration of servicing an individual client to the call center;

$Q_{ic\,i,j}$ – the number of telephone calls from an individual client to the call center (per month);

W – call center operator wage;

i – without the use of artificial intelligence;

j – with the use of artificial intelligence.

Savings from the use of artificial intelligence for the preparation of legal opinions were defined as the ratio between $Z_{i,j}$ (the cost of one legal opinion for a legal entity without (i) and with the use of artificial intelligence (j)), which is calculated by the following formula:

$$Z_{i,j} = T_{le\,i,j} * W_{le}$$

where $Z_{i,j}$ – the cost of one legal opinion for a legal entity (le), EUR;

$T_{le_{i,j}}$– time for the preparation of the legal opinion;

$Q_{le\,i,j}$ – the number of prepared legal opinions (per month);

W_{le} – legal adviser wage;

i – without the use of artificial intelligence;

j – with the use of artificial intelligence.

3.3 Instruments

Calculations were made and charts were created in the Microsoft Excel.

4 Results

The economic effect of the use of artificial intelligence technologies in the Credit Agricole bank branch in the form of cost savings was evaluated by using the data on operational activities of this branch before and after the implementation of AI-based innovative technologies. In particular, the data summarized in the Table 1 were the source data for the calculations.

Table 1. Source data for calculating the economic effect of the use of artificial intelligence technologies in the Credit Agricole bank branch in the form of cost savings

Indicator	Values in the case of operation without the use of artificial intelligence, monthly average values for the previous year (2020)	Values in the case of operations with the use of artificial intelligence, average monthly values for the reporting year (2021)
$T_{le_{i,j}}$ – working hours of the call center operator when servicing a telephone call of a legal entity	30 minutes (0.5 hour)	20 minutes (0.33 hour)
$T_{\phi o_{i,j}}$ – working hours of the call center operator when servicing a telephone request of an individual client	15 minutes (0.25 hour)	10 minutes (0.17 hour)
W – call center operator wage	2.25 EUR/h	2.25 EUR/h
$Q_{le\,i,j}$ – the number of telephone calls from a legal entity to the call center	300/month	250/month
$Q_{\phi o\,i,j}$ – the number of telephone calls from an individual client to the call center	550/month	540/month
$T_{le\,i,j}$– time for the preparation of the legal opinion	2 h	1 h
W_{le} – legal adviser wage	3.75 EUR/h	3.75 EUR/h
$Q_{le\,i,j}$ – the number of prepared legal opinions	70	90
Average annual number of call center operators of the department	11	9
Average annual number of legal advisers of the department	3	3

Source: data on the operational activity of the Credit Agricole bank branch

Table 2 presents calculations of the economic effect of the use of artificial intelligence technologies in the Credit Agricole bank branch in the form of cost savings.

It should be noted that there was a relatively stable volume of services provided by this department a year before and during the year after the introduction of artificial intelligence technologies. Therefore, when interpreting the results of the analysis, it should be taken into account that the resulting resource savings will be largely associated not only with saving money, but also with a certain release of working time of employees (call center operators and legal advisers).

Table 2. The result of the calculation of the economic effect of the use of artificial intelligence technologies in the Credit Agricole bank branch in the form of cost savings (per employee)

Area of evaluation	Intermediate indicators				Estimated indicator of economic effect	
	Without the use of artificial intelligence		With the use of artificial intelligence			
	Indicator	Calculated value	Indicator	Calculated value	Indicator	Calculated value
the use of artificial intelligence in the work of the call center operator for servicing legal entities	V_i – cost of servicing one telephone call from a legal entity, UAH $V_i = le * Q_{le\,i} * W$, where le_i– working hours of the call center operator; $Q_{le\,i}$ – the number of telephone calls from a legal entity to the call center W – call center operator wage	0.5*300*2.25= =337.5 EUR/month/person = =337.5*11*12= = 44,550 EUR/year/branch	V_j – cost of servicing one telephone call from a legal entity, UAH $V_j = le_j * Q_{le\,j} * W$, where $T_{le\,j}$ – working hours of the call center operator; $Q_{le\,j}$ – the number of telephone calls from a legal entity to the call center W – call center operator wage	0.33*250*2.25= =185.62 EUR/month/person =185.62*9*12= =20,045 EUR/year/branch	The effect of the use of artificial intelligence in the work of a call center operator for servicing legal entities Eccr = $\frac{V_i}{V_j} * 100\%$ (relative) (Ecca = V_i/V_j (absolute))	Saving 55% 24505 EUR/year/branch
the use of a voice bot for servicing individuals	X_i – cost of servicing one individual client, UAH $X_i = T_{ic_i} * Q_{ic\,i} * W$ where T_{ic_i} – the average duration of servicing an individual client by the call center; $Q_{ic\,i}$ – the number of calls from an individual client to the call center; W – call center operator wage	0.25*550*2.25= =309.37 EUR/month/person = =309.37*11*12= =40836.84 EUR/year/branch	X_j – cost of servicing one individual client, UAH $X_j = T_{ic\,i,j} * Q_{ic\,j} * W$ where $T_{ic\,j}$ – the average duration of servicing an individual client by the call center; $Q_{ic\,j}$ – the number of calls from an individual client to the call center; W – call center operator wage	0.17*540*2.25= =206.55 EUR/month/person = = 206.55*9*12 = =22307.40 EUR/year/branch	The effect of using a voice bot for servicing individuals Eler = $\frac{X_i}{X_j} * 100\%$ (relative) (Elea = $X_i - X_j$ (absolute)	Saving 45% 18529,44 EUR/year/branch
use of artificial intelligence for the preparation of legal opinions	Z_i – cost of one legal opinion for a legal entity, UAH $Z_i = T_{lo_i} * W_{la}$ where T_{lo_i}– the time of preparation of the legal opinion; $Q_{lo\,i,j}$ – the number of prepared legal opinions; W_{lo} – legal adviser wage	2*70*3.75= =525 EUR/month/person = =525*3*12= =18,900 EUR/year/branch	Z_j – cost of one legal opinion for a legal entity, UAH $Z_{i,j} = T_{lo\,j} * W_{la}$ where $T_{lo\,j}$– the time of preparation of the legal opinion; $Q_{lo\,i,j}$ – the number of prepared legal opinions; W_{lo} – legal adviser wage	1*90*3.75= =337.5 EUR/month/person = =337.5*3*12= =12,150 EUR/year/branch	Savings from the use of artificial intelligence for the preparation of legal opinions Elor = $\frac{Z_i}{Z_j} * 100\%$ (relative); (Eloa = $Z_i - Z_j$ (absolute))	Savings 35.7% 6,750 EUR/year/branch
Total economic effect in the form of cost savings (amount of absolute savings according to Article 7, UAH)	24,505 + 18,529.44 + 6,750 = 49,784.44 EUR/year/branch					

Source: author's calculations based on data on the operational activity of the Credit Agricole bank branch

The calculation of the economic effect of the use of artificial intelligence technologies in the Credit Agricole bank branch in the form of annual cost savings (for the number of employees) showed that the implementation of artificial intelligence technologies in the work of a call center operator for servicing legal entities provided annual cost savings at EUR 24,505 per regular branch operators. There was also a significant reduction in the workload, and the working hours were reduced by a third. Therefore, there is an opportunity to use this time to perform other tasks, or to redistribute the load of the call center between employees and to optimize staff by reducing positions that do not have a workload.

It was determined in a similar way that the implementation of artificial intelligence technologies in the work of call center operators for servicing individuals resulted in annual cost savings of EUR 18,529.44 per branch. There was also a significant reduction in the workload — by a third (1-0.17/ 0.25=0.32). Therefore, there is also an opportunity to use this time to perform other tasks, or to redistribute the load of the call center between employees and optimize the staff by reducing positions that do not have a workload. The use of artificial intelligence to prepare legal opinion enabled saving EUR 6,750 per year in the analyzed branch of the bank, which also makes it possible to load specialists with additional work, as half of their working time was spared, or to optimize the staff.

Figure 1 presents the results of calculations of annual costs for the provision of services before and after the introduction of artificial intelligence technologies. Figure 2 shows the annual savings obtained by the areas of implementation of these technologies in the branch and in general.

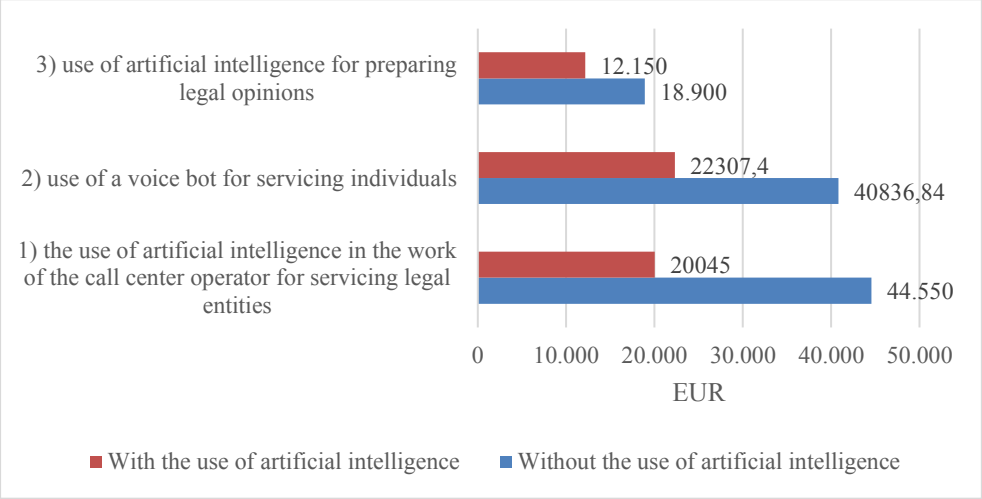

Fig. 1: Comparison of costs related to the activities of the bank branch before and after the introduction of artificial intelligence technologies

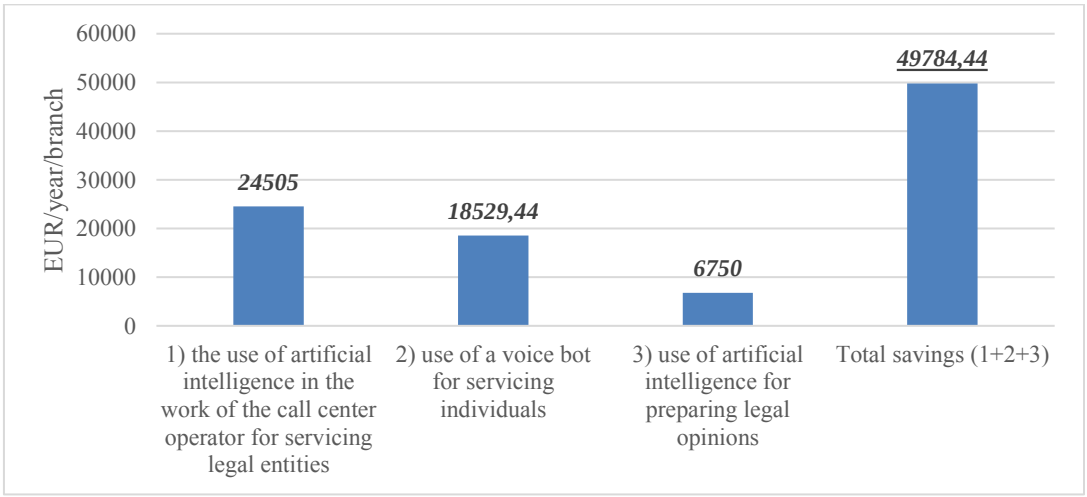

Fig. 2: Cost savings related to bank branch activities as a result of the introduction of artificial intelligence technologies

In addition to the actual annual saving of resources, the potential of the analyzed measures can also include the opportunities for additional staff loading with new services and/or staff optimization (its reduction due to a decreased personnel workload caused by a reduction in the man-hours (increased labor productivity)).

4.1 Research limitations and Implications

This study has certain methodological and practical limitations. The choice of Credit Agricole Bank as a research object is a methodological limitation. Besides, the calculations do not take into account costs for the development and implementation of artificial intelligence technologies, which determine the need to fix a certain level of effect from the implementation of measures in view of a certain payback period of investment in the implementation of AI technologies.

At the same time, it is possible to fully assess the performance of artificial intelligence only after the full development and spread of this technology and the resolution of related organizational issues. At the moment, Credit Agricole Bank is engaged in the improvement of artificial intelligence technologies, therefore investment costs are constantly growing. The number of areas where artificial intelligence can be used is also constantly increasing. For this reason, it is inappropriate to assess the return on investment in the development and implementation of artificial intelligence in a classical way, as this process is not complete.

At the same time, artificial intelligence is unique in each case, which makes it difficult to objectively contrast the effect of its use, as the conditions for its implementation and use are incomparable. That is why the limitation of the implementation of theoretical and practical solutions is that the results and effect of the use of artificial intelligence can differ significantly and depend on the specifics of a particular banking institution.

5 Discussions

So, the analytical conclusions and calculations confirmed the possibility of using the proposed analytical tools in practice, and confirmed the effectiveness of the AI-based technological solutions in the example of a bank branch where those solutions were implemented.

As the Report states, [18], the use of artificial intelligence by market intermediaries and asset management companies can generate significant benefits and improve performance. These findings are in line with the results of our research, as evidenced by the cost savings on servicing legal entities and individuals. Besides, the benefits may also include an increased investment and speed of implementation. At the same time, the use of artificial intelligence technology may create or intensify certain risks that could potentially affect the efficiency of financial markets and lead to unpredictable losses for consumers of financial services. Special emphasis is placed on cybersecurity to prevent the use of artificial intelligence to commit illegal acts, fraud and money laundering.

At the same time, when interpreting the results of this study, it should be taken into account that the use of artificial intelligence in financial management entails business model transformation. In [19] the researchers studied the use of artificial intelligence in the financial sector and concluded that the use of artificial intelligence technology for risk control, marketing, customer service, transactions and operations is conductive to the creation of new business models. Despite all the benefits of its use, the AI algorithms must, however, be controlled by man, especially if machine learning is used. It is implied that the results of the work of artificial intelligence algorithms must be checked by a person to identify possible failures in its work. Our research proved out these results, because the introduction of artificial intelligence transforms business models, in particular, certain types of operations such as the call center operation, the creation of documentation or the consumer loan approval are automated.

The study on the regulation of the use of artificial intelligence in finance is of interest, [20]. The use of artificial intelligence is accompanied by technical, ethical and legal issues which may interfere with the financial regulation objectives with regard to data security and privacy, cybersecurity, systemic risk and ethics. In [21] the author notes that surpassing human intelligence is not the main danger of artificial intelligence, while straining human errors is. The modern methods of artificial intelligence mostly detect patterns in historical data, so the use of these methods will usually yield the same results that are currently obtained through human calculations. The financial sector greatly depends not only on forecasting the company's standing, but also on forecasting that of competing companies and their behavior. This is the reason why even minor errors in the evaluation of artificial intelligence can entail unpredictable consequences. The use of artificial intelligence is not currently regulated in Russia, so each company can use it as they may think fit in compliance with the legislation in force.

The Artificial Intelligence and Big Data in the Financial Services Industry Report substantiated the need for qualified specialists to implement and use artificial intelligence in finance, [22]. The financial services sector may be transformed through the introduction of artificial intelligence technologies by means of improving existing proposals, regulations and business models. Consumers will get new services and innovative products. Artificial intelligence is expected to be a primary driver for the development of the financial services market and financial management of different levels. But only those companies that can attract relevant qualified specialists will benefit from artificial intelligence. Sberbank established special departments and centers intended to develop and implement artificial intelligence in order to maintain superiority in the market.

Evaluation of the implications of using artificial intelligence for the financial system allowed Xie, [23], to conclude that artificial intelligence technology materially transforms the existing financial industry system. The use of AI results in creation of an innovative market for financial products led by artificial credit and investment advisers. This entails risks related to the liability for errors and the legitimacy of the operation of artificial advisers.

In [24] the authors indicate intensification of the use of artificial intelligence and machine learning in asset management. The regulatory bodies in charge of oversight and regulatory compliance encourage the spread of this technology. Artificial intelligence tracks all transactions in real time and detects the least deviations. The pressing issue is the evaluation of the scope and implications of errors caused by artificial intelligence. Machine learning will significantly reduce the incidence of the errors.

A study of the systemic risks of artificial intelligence, [25], found a dichotomy between macro- and microfinance problems that directly affect the effectiveness of artificial intelligence. In general, artificial intelligence will have positive consequences when used for macro-level supervision, as well as micro-level regulation of financial transactions and risk control. Using artificial intelligence to reduce the companies' costs will also be a positive aspect. Replacing workers with artificial intelligence will have adverse implications.

Exploring the use of artificial intelligence in decision-making, was established that many companies use AI to detect market anomalies, [26]. Besides, artificial intelligence builds optimal investment strategies, thus mitigating risks. Determining the correct role of artificial intelligence in making long-term decisions, which may impact the company's value, by the owners and senior management is important. Artificial intelligence is not a decision-maker, it's just a tool. In [27] the authors also underline the role of artificial intelligence as a tool for substantiating decisions in a decision-making process.

The prospects for the use of artificial intelligence in terms of achieving other than economic effects are worth noting among other things. According to many scholars, [28]-[30], artificial intelligence has significant potential for achieving sustainable development goals. Besides, the use of artificial intelligence can promote market-share gain by diversifying services and expanding the directions of customer service, [31], [32].

Contrasting our findings with the results obtained in other studies demonstrates significant advantages and benefits provided by the use of artificial intelligence technology. We assume on this ground that this technology will further become increasingly widespread, accompanied by the extension of the scope of implementation in the business processes of different companies. This will result in business process transformation and their improved efficiency.

6 Conclusions

Artificial intelligence technology is developed to make certain routine business processes fully automated. This entails improved efficiency of business processes and involved related resource saving. Calculation of the economic effect in the form of annual saving of resources (money, working time) in three areas, in which artificial intelligence technologies were implemented in Credit Agricole Bank (the use of artificial intelligence in the work of the call center operator for servicing legal entities; the use of a voice bot for servicing individuals; use of artificial intelligence for preparing legal opinions) showed a significant (30-50% savings) increase in the operational efficiency.

In addition to the actual saving of resources, the potential of the analyzed measures was found in the opportunities for additional staff loading with new services and/or staff optimization (its reduction due to a decreased personnel workload caused by a reduction in the man-hours). The indicated results confirm the fact that the labor productivity of the bank branch employees increased because of the automation of processes implemented through artificial intelligence systems and technologies.

In general, this study revealed the practical advantages of the use of artificial intelligence, which entails time and financial resource savings. The research findings may be used as an economic substantiation of investment projects aimed at the implementation of artificial intelligence.

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