



# Prevention of judicial errors and their prevention using AI

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# Abstract

The article is devoted to the study of the possibilities of digitalization, artificial intelligence in preventing judicial errors and increasing access to justice. The study emphasizes the importance of digital technologies in the legal sphere, including the automation of judicial processes and modeling of judicial decisions, being an important step to ensure justice. The literature review analyzes international experience in using digital tools in various sectors, including the legal system, and identifies their potential for minimizing judicial errors. The research methodology is based on the use of predictive analysis of the integration of artificial intelligence into the judicial system, as well as a comparative analysis of foreign experience. The results show that digitalization of artificial intelligence-based systems, can increase the efficiency and transparency of justice, improve the quality of decisions and reduce the number of judicial errors. The discussion focuses on the need to adapt international experience to Kazakhstan's realities and develop a regulatory framework for the integration of artificial intelligence into the judicial system. The analysis highlights that successful digitalization requires a comprehensive approach, including technology development, training of specialists and creation of a transparent legal framework, suggesting directions for future work in the field of digitalization of justice, emphasizing the importance of interaction between people and technology.

**Keywords:** Access to justice, Artificial intelligence, Digitalization tools, Effectiveness of justice, Miscarriages of justice, Neural networks, Prevention, Prophylaxis, Prognosis of the outcome of the case, Standard judicial act.

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# 1. Introduction

The race of artificial intelligence technologies is an objective reality of today and tomorrow. The Republic of Kazakhstan has joined this process, realizing its prospects and inevitability. Virtual reality is integrated into non-virtual reality and vice versa. The development of digital technologies is aimed at the development, testing and implementation of new digital tools. Achievements in the field of neural networks are increasingly being integrated into various areas, among which the use of artificial intelligence and neural networks in the legal sphere, including in justice, is of promising importance. Accessibility of justice to the population is achieved through the introduction of digital technologies, including through robotization (automation) of individual judicial actions.

The effectiveness of justice and its accessibility to the population cannot be ensured without minimizing judicial errors. Traditional practice in this area is the correction of judicial errors in appeal and cassation. We believe that the realities of today actualize a rethinking of the very paradigm of judicial errors, their prevention and prophylaxis. The new concept should be based on the inevitability of the development of neural networks and artificial intelligence. There is an obvious need for society and the state to minimize the risks of judicial errors, based on a forecast made by artificial intelligence, as well as through modeling a "standard judicial decision". As the head of state noted, an important task remains the simplification of legal proceedings, including with the help of innovative technologies and artificial intelligence. It should be noted that the constitutional imperative that justice is administered only by the court is unshakable.

The prevention of judicial errors and their prophylaxis help to maintain citizens' trust in the judicial system and justice, in a global manifestation this forms the rule of law and the rule of law. Prevention of judicial errors is achieved by procedural and non-procedural methods, which are described in legal science. Promising tools for the prevention and prophylaxis of judicial errors lie in the plane of digital technologies, namely artificial intelligence and neural networks.

The judicial system of the Republic of Kazakhstan is actively introducing digital technologies, the achievements of these processes are highly appreciated by the international community, which is confirmed by the main indicators of international ratings. The main beneficiaries of the digitalization of the judicial system are citizens who, on the one hand, receive accessible and transparent judicial service, and on the other hand, have the opportunity to familiarize themselves with judicial practice. Judges have a similar opportunity, which contributes to the adoption of fair decisions.

The proven digital innovation platforms of the judicial system of Kazakhstan cannot remain static, and, therefore, require modernization and improvement. The priority of innovations is artificial intelligence and neural networks, which can significantly improve the process of warning and preventing judicial errors due to: automation of routine processes; construction of court documents; modeling of a standard court decision; forecasting the outcome of a case, as well as other functionality.

During the analysis of the study, the following research questions were set regarding this topic:

1) How can artificial intelligence minimize the number of judicial errors?

- 2) What areas of AI use are the most promising for increasing the efficiency of the judicial system?
- 3) What changes are needed in the regulatory framework for the integration of AI into justice?
- 4) What are the potential risks of using AI in the judicial system and how to minimize them?

Accordingly, based on the questions posed, the research objectives were formulated:

- Determine the role of artificial intelligence and neural networks in the prevention and prevention of judicial errors;
- Develop scientifically based recommendations for the integration of AI into the judicial system of Kazakhstan;
- Study international experience and adapt it to the realities of Kazakhstan;
- Assess the impact of digital tools on the accessibility and transparency of justice.

The stages of the research include the following aspects:

Stage 1 Literature analysis:

- A review of scientific publications on digitalization, artificial intelligence and neural networks in the legal sphere was conducted;
- Gaps in research were identified and key areas of work were determined.

Stage 2 Methodology development:

- Criteria for assessing the effectiveness of AI in preventing judicial errors were developed;
- Directions for integrating AI into the judicial system were formed.

Stage 3 Data collection:

- Statistical data from the judicial system of Kazakhstan were used;
- International experience was analyzed.

Stage 4 Data analysis:

A statistical and logical analysis of the impact of digital technologies on justice was performed;

• Forecasts for the integration of AI into the judicial system were formulated.

Stage 5 Development of recommendations:

- Practical steps were proposed for the implementation of AI and neural networks in the judicial system;
- Proposals for modernizing the regulatory framework were prepared.

Stage 6 Conclusions and publication:

- The research results were formalized;
- Conclusions were formulated and recommendations for further research were given.

### 2. Literature Review

In foreign science, the importance of digitalization processes, as well as the impact of artificial intelligence and neural networks on the functioning of society and the state, is studied in various contexts, depending on the area in which the innovations are used. Of scientific interest is the use of artificial intelligence in education [1] in academic scientific research Kandeel and Eldakak [2] in medicine [3] in industry [4]. A special layer of scientific works is devoted to various aspects of the digitalization of public administration and the formation of e-government, as well as the assessment of the quality and capabilities of electronic public services, in particular the works: [5, 6].

Research on the potential of artificial intelligence in solving social and environmental problems, as well as in sustainable development, is contained in the works of: Baabdullah, et al. [7]; Dubey, et al. [8]; Wamba, et al. [9] and Dwivedi, et al. [10].

A large number of works are devoted to the methods of training artificial intelligence and neural networks [11]. In their work, the authors explore a new hierarchical high-dimensional method of unsupervised active learning [11].

Various aspects of digitalization in the legal sphere are devoted to the works of Shepitko, et al. [12] devoted to the use of artificial intelligence tools in combating crime. Considerable interest was aroused by the study of the works of Koivisto, et al. [13]. The use of memes in legal education is the subject of the work by Tidy, et al. [14].

The work by Zafar [15] examines the ethical and practical issues of integrating artificial intelligence into legal practice. In his work, the author concludes that artificial intelligence has the potential to improve the efficiency and accessibility of the legal sector, but its integration into legal practice should be done with caution, with an emphasis on possible risks [15].

The forensic capabilities of artificial intelligence and neural networks are disclosed in the works of Chen [16]; Liu, et al. [17] and Asem, et al. [18]. The work of Laptev and Feyzrakhmanova [19] is devoted to the study of foreign experience in the use of artificial intelligence in justice. The authors analyzed the experience of integrating artificial intelligence into justice in China, the United States of America, Great Britain, the European Union and other countries [19]. A review of the literature on digitalization, artificial intelligence and neural networks in social, managerial, legal and other processes demonstrates the multiplicative nature of research in the field of artificial intelligence and neural networks. The interdisciplinary and comprehensive nature of the research is confirmed by the subject and systemic links between the areas of implementation of artificial intelligence and neural networks.

The study of the capabilities of digital tools and, in particular, artificial intelligence and neural networks in the prevention and prevention of judicial errors has not been conducted, which determines the relevance of this study and its scientific novelty.

A review of scientific sources on the use of digitalization tools in justice and in the legal sphere allows us to conclude that the digitalization of the justice system is moving to a new level of implementation of innovative technologies, in particular artificial intelligence and neural networks, the use of which will be of significant importance in the prevention and prevention of judicial errors, as well as the accessibility of justice to the population. An analysis of the literature shows that the use of digital tools contributes to the expansion of social opportunities for an individual, ensures the transparency of public services, and the activities of the state apparatus. The involvement of innovations in judicial and law enforcement activities opens up a new level of accessibility of these types of activities for the population, which affects the guarantee of human and civil rights and freedoms. There is a need to study the capabilities of artificial intelligence and neural entities in the prevention and prevention of judicial errors.

#### 3. Methodology

The main objective of the study is to examine the capabilities of artificial intelligence and neural networks to solve the problem of warning and prevention of judicial errors, as well as the formation of inclusive justice in Kazakhstan for various segments of the population. Achieving this objective at the current stage of development of artificial intelligence and neural networks, as well as their integration into the judicial system, is methodologically based on a predictive analysis of such integration, which can be done in the following areas:

1) The use of artificial intelligence tools and neural networks in justice requires technological resources, computer infrastructure with computing power and IT technologies sufficient for training and implementing artificial intelligence models. It is necessary to use high-performance computing systems based on graphic processors (GPU), tensor processors (TPU) and language processors (LPU).

2) The use of artificial intelligence tools and neural networks in critical objects of the information and communication infrastructure, in particular in the judicial system, should be based exclusively on the development of domestic products that minimize risks in the field of national security, confidentiality and protection of personal data. Public-private partnership is possible in the process of developing IT technologies and their maintenance.

3) The use of artificial intelligence tools and neural networks in the judicial system will focus attention on generating new methodologies for assessing and analyzing the quality of justice, and this, in turn, will solve complex problems aimed at preventing and preventing judicial errors. The maximum effect of the use of artificial intelligence and neural networks in justice will correlate with the accessibility of justice to the population, increased legal literacy of the population and the guarantee of rights and freedoms.

4) The use of artificial intelligence tools and neural networks in the justice system legitimizes the demand for the judicial system in personnel developing "soft skills", including IT skills, which are subject to rapid change in skill sets and should be focused on artificial intelligence and neural network technologies.

5) The use of artificial intelligence tools and neural networks in the justice system will increase the digital literacy of the population, and will also change Kazakhstan's performance in the ranking of electronic participation of citizens (in 2022)

- 15th place). The main reason for the progressive development of digital literacy of the population in connection with artificial intelligence is the objective need to obtain new knowledge and skills, as well as the ability to independently use innovative technologies aimed at predicting the outcome of a case, modeling a judicial act, generating a "standard judicial act", etc.

6) The use of artificial intelligence tools and neural networks in justice should be based on effective and safe algorithms and machine learning methodologies that successfully self-learn and also minimize the risks of technological errors. The selected methodologies in the future development should have the ability to modernize and correlate to the needs of society and changes in legislation, as well as in the justice system. Innovation of the methodology of artificial intelligence and neural networks should be carried out without negative consequences from the impact on the content generated by artificial intelligence and neural networks, relevant for the period of innovation and in the future.

7) The use of artificial intelligence tools and neural networks in justice should be accompanied by the formation of a modern legal regulatory framework relevant to the level of development and implementation of artificial intelligence and neural network technologies. The formulated forecasts of the integration of artificial intelligence and neural networks into the judicial system and justice have methodological significance in the study of the possibilities of artificial intelligence in the prevention and prophylaxis of judicial errors. It should be noted that the number of positions in the forecast proposed by the authors is not absolute and exhaustive. The process of introducing artificial intelligence into justice, as well as the consequences and effects of the introduction, will allow making adjustments to the forecasts made, including in the context of minimizing judicial errors.

Unlike previous studies, which focused on individual aspects of digitalization (for example, automation of routine processes or forecasting of court decisions), this study covers a wide range of AI capabilities. It includes forecasting, preventing judicial errors and increasing accessibility of justice.

Most previous studies focus on analyzing the effectiveness of decisions already made (for example, at the appeal stage). This study is the first to propose a concept for preventing errors at the stage of preparing judicial acts using forecasts created by AI.

For the first time, the predictive analysis method was used to assess the prospects for using AI and modeling scenarios for its integration into the judicial system of Kazakhstan, allowing us to predict how the use of AI will affect the efficiency, quality and fairness of justice.

The study takes into account the specifics of the judicial system of Kazakhstan, including constitutional and legal principles, such as the administration of justice exclusively by the courts, allowing us to develop recommendations adapted to national practice. An analysis of the relationship between digitalization, the level of digital literacy of citizens and the accessibility of the judicial system is included, which is an innovative aspect for this area of research.

# 4. Materials and Methods

To assess the potential and impact of AI and neural networks on preventing miscarriages of justice and increasing access to justice, an integrated methodological approach was used, including the following key elements:

1. Comparative analysis of international experience:

- Analysis of AI implementation practices in the judicial systems of foreign countries, such as China, France And the United States;
- study of the specifics of using AI to automate processes, predict court decisions and analyze big data.
- 2. Predictive analysis:
  - Use of the forecasting method to assess the impact of AI integration in the judicial system of Kazakhstan;
- Modeling possible scenarios for the implementation of AI in justice, including assessing risks and prospects. 3. Systemic-structural method:
  - Determining the relationships between judicial processes and AI capabilities, including automation of routine Tasks, assessment of evidence and forecasting case outcomes;
  - Identifying key elements influencing the quality of justice and their connection with digital tools.
- 4. Empirical analysis:
  - Collection and processing of statistical data on the judicial system of Kazakhstan, including the results of case Consideration, identified miscarriages of justice and trends in their correction;
  - data analysis to assess the impact of digitalization on the efficiency and accuracy of court decisions.
- 5. Normative and legal analysis:
  - Study of the legislative framework governing the use of AI in the judicial system and identification of gaps in the legal framework;
  - formation of recommendations for the development of legislation for the integration of AI into justice.

Thus, the proposed assessment method combines system analysis, forecasting, empirical data analysis and normative and legal analysis, distinguishing it from the narrowly focused approaches used in previous studies. Such an integrated approach allows not only to identify gaps, but also to propose specific ways to eliminate them, adapted to the realities of Kazakhstan.

In this study the research methodology is not limited to forecasts substantiated by the research strategy; it is supplemented by fundamental methods based on the analysis and synthesis of knowledge from various branches of law and technical sciences.

The comparative method of studying foreign experience (for example, the United States of America, France, China, etc.) allows us to analyze advanced practices in the use of artificial intelligence in justice, as well as compare these practices with the results of the prevention and prophylaxis of judicial errors, their validation, with selected tools, including those based on artificial intelligence and neural networks.

The logical-legal and theoretical-legal analysis of the problem of integrating artificial intelligence into justice, through the prism of the prevention and prophylaxis of judicial errors, allows us to combine doctrinal problems with law enforcement practice. The study of empirical material is carried out simultaneously with the argumentation of the proposed solutions to problems of a theoretical and legal nature. The combination of theoretical and empirical analysis is due to the general concept of the study and allows us to identify the main criteria for the effective integration of artificial intelligence and neural networks into justice. The theoretical material used in the study is based on scientific publications on this topic and supplemented by regulatory legal acts governing the issues of digitalization and prevention of judicial errors. The empirical material of the study includes judicial practice and statistical materials posted on the official portals of the Supreme Court and other government agencies.

An integrated approach to the use of a systemic and structural method allows us to determine the tools and areas of training artificial intelligence and neural networks, in a systemic and structural relationship with the branches of domestic law, as well as in the context of procedural rules. The capabilities of artificial intelligence and neural networks should also be assessed in the construction of current judicial acts that are subject to systemic and structural updates, in the context of changing legislation.

The research methodology made it possible to make scientific forecasts for the integration of artificial intelligence and neural networks into justice, substantiate the put forward forecasts based on the synthesis of theoretical and empirical materials, and formulate conclusions aimed at solving the problem of warning and preventing judicial errors.

#### 5. Results

Based on the results of the study, the authors formulated conclusions that confirm the hypothesis that the use of digitalization tools, including artificial intelligence and neural networks, will increase the accessibility of justice for the population, as well as prevent judicial errors:

1. In world practice, there is a tendency to integrate artificial intelligence and judicial activity, which simplifies decision-making processes based on the automation of the application of legal norms to declared cases, and also ensures the efficiency and impartiality of these processes.

2. The use of artificial intelligence and neural networks in judicial practice is possible while ensuring the constitutional imperative - the administration of justice by the court. Artificial intelligence and neural networks should remain exclusively tools, the use of which is aimed at ensuring the accessibility of justice for the population, simplifying and automating routine processes, providing assistance in the use and analysis of big data, formulating a forecast of the outcome of the case, its prospects.

3. When integrating artificial intelligence into the judicial system and justice, a "reasonable approach" should prevail, which is based on a combination of the professional experience of a judge, his professional judgment and the solution recommended by artificial intelligence.

4. The use of artificial intelligence in justice should be within the legal framework and within the framework of the current constitutional and procedural principles. In this regard, when forming the legal basis for integrating artificial intelligence into judicial activity, it is advisable to take into account the fundamental principle of legal principles.

5. The use of artificial intelligence tools and neural networks in the judicial system will help solve the problem of warning and preventing judicial errors at the stage of preparing a judicial act, and not at the stage of appeal and cassation, as is currently the case. In a broader sense, the capabilities of artificial intelligence and neural networks may be relevant in appeal and cassation.

6. Creation and implementation of digital resources using artificial intelligence: for the analysis of court documents using artificial intelligence; an automated system for preparing for court cases; a digital service for financing the legal costs of the population; The design of judicial acts is aimed not only at ensuring accessibility of justice to the population, but also at preventing and preventing judicial errors.

7. When developing artificial intelligence and neural network technologies for integration into the judicial process, it is necessary to minimize the risks of technological errors, the selected methods and methodologies should be subject to modification and innovation in accordance with changing realities.

For example, statistical data on the number and quality of consideration of cases on the cancellation of arbitration decisions for the summarized period are formed on the basis of information from the information and analytical system of judicial bodies "Torelik", as well as information provided by regional and equivalent courts (Table 1).

From the given statistical data it follows that the largest number of cases of the specified category in this period were completed by district and equivalent courts of the city of Almaty (1680), Karaganda (297) and West Kazakhstan (216) regions. A smaller number of completed cases (1 case each) are observed in the courts of Akmola, Atyrau, Aktobe, Mangistau regions and the city of Shymkent.

A total of 2479 cases were completed in the summarized period on petitions to cancel arbitration decisions, of which 2270 resulted in a ruling, including 1063 (42.8%) with satisfaction of the application, 1207 (48.6%) with refusal to satisfy the application, 12 (0.4%) were terminated, 158 (6.3%) were left without consideration.

Table 1.

Results of consideration of cases on the annulment of arbitration decisions.

Indicator	2019	2020	2021	2022	Total
Applications received	1371	1280	1395	1003	5049
Returned	433	687	856	596	2572
Totally finished	929	590	564	396	2479
Considered with a determination	805	524	556	385	2270
Satisfied	649	272	104	38	1063
Denied	156	252	452	347	1207
With the termination of proceedings in the case	6	1	1	4	12
With the application left without consideration	91	59	6	2	158

In 2019, the number of completed cases was 929 (40.3%), of which 805 resulted in a ruling, including 649 (69.8%) with the application being satisfied, 156 (16.7%) with the application being denied, 6 (0.6%) with the case being terminated, and 91 (9.7%) with the application being left without consideration.

In 2020, the number of completed cases was 590 (25.5%), of which 524 resulted in a ruling, including 272 (46.1%) with the application being satisfied, 252 (42.7%) with the application being denied, 1 (0.1%) with the case being terminated, and 59 (10%) with the application being left without consideration. In 2021, the number of completed cases was 564 (24.4%), of which 556 resulted in a ruling, including 104 (18.4%) with the application being satisfied, 452 (80.1%) with the application being denied, 1 (0.1%) with the application being left without consideration. In 2022, the number of completed cases was 396 (15.9%), of which 385 resulted in a ruling, including 38 (9.8%) with the application being satisfied, 347 (90.1%) with the application being denied, 4 (1.0%) with the case being terminated, and 2 (0.5%) with the application being left without consideration.

The graphical representation includes two key analyses:

1) Percentage Analysis:

The bar chart shows the proportion of returned, granted, and rejected applications among the cases processed over the period 2019–2022. The percentage of returned applications increased until 2021 and began to decline in 2022. The percentage of granted applications decreased significantly, especially after 2019, indicating a decrease in positive decisions. The percentage of rejected applications increased steadily, reaching a peak in 2022 (Figure 1). 2) Absolute Number Analysis:



#### Figure 1.

Percentage analysis of arbitration cases 2019-2022.

The line chart shows the overall dynamics of received, returned, completed, granted, and rejected cases. The total number of applications decreased after 2021, which may indicate a decrease in application activity. The number of completed cases also decreased, reflecting the overall trend of decreasing processed cases (Figure 2).

Year	Percentage of satisfied	Bounce rate	Percentage of returns
2019	69.80%	16.80%	31.60%
2020	46.10%	42.70%	53.70%
2021	18.60%	80.10%	61.40%
2022	9.90%	87.00%	59.40%



**Figure 2.** Number of arbitration cases 2019-2022.



# Figure 3.

Number of registered cases in the regional aspect, thousands.

These data allow us to identify a decrease in the satisfaction of applications and an increase in refusals, requiring further analysis of the reasons for changes in the case review process.

If we consider it from a regional perspective, the situation looks as follows (Figure 3).

Thus, the number of completed materials of the generalized category over the past two years has increased compared to 2020, and the courts have also begun to return more such applications. The use of digital tools such as "Terelik" has a significant impact on the quality and quantity of case consideration.

Information technology increases the efficiency and transparency of justice. The main focus is on creating convenient, simple and understandable tools for the population that allow them to contact the courts as comfortably as possible at any convenient time.

Computerization covers all stages of judicial activity: from accepting documents, automated distribution of claims and cases, trial, to issuing decisions and write of execution.

Successful digitalization of criminal proceedings requires an integrated approach, including improving legislation, technological modernization and legal protection, which will create a fairer and more effective legal system. The results of the courts' work for the first half of 2024 are presented by the following indicators: 1. Criminal proceedings.

Over the first 5 months of 2024, 13 thousand criminal cases were received by the courts (the same number as last year), of which the number of cases with sentencing increased by 4.7%, and the number of convicted persons also increased (12.5 thousand versus 12 thousand) (Figure 4).



Criminal offences (pre-trial investigations initiated), in thousands tenge.

In the Republic of Kazakhstan, events are regularly held to improve the efficiency of law enforcement agencies and, as a result, there is an annual decrease in criminal offenses. Over the past 5 years, the number of registered offenses has decreased by 32%. The events include the digitalization of the entire law enforcement system and the transition to an electronic format for conducting cases.

The Chairperson of the Collegium of the Supreme Court of the Republic of Kazakhstan on Criminal Cases N. Rakhmetulina notes the improvement in the quality of justice in criminal cases, noting a decline in the adjustment of judicial acts (in appeal - 631 against 705, cassation - 167 against 252). 2. Civil proceedings.

Indicators from the forms of judicial statistical reports in the civil law sphere, including civil cases considered by courts of first instance, in the appellate instance, in the cassation instance, review of judicial acts in cassation (Figure 5).



Number of claims filed in court, in thousands tenge.

Over the first 5 months of 2024, there has been an increase in claims from 248 thousand to 282 thousand, of which 212 thousand cases were considered by the first instance (the same period in 2023 - 181 thousand cases). Extraterritorial jurisdiction was applied more often, on average 41.6% (in 2023 - 40.6%).

Chairman of the Collegium of the Supreme Court of the Republic of Kazakhstan for Civil Cases N. Sharipov notes an increase in the number of revised and adjusted decisions compared to the same period last year. 21 thousand cases were reviewed by appeal (in the first half of 2023 - 19 thousand cases). About 2 thousand decisions were adjusted. Cassation appeals were received - 5 thousand, against 4 thousand. However, 82% of judicial acts of local courts were recognized as legal, 10% of petitions were sent for review.

3. Administrative proceedings.

The indicators from the report form No. 1-AD "On the results of consideration of administrative offence cases by authorized bodies" for the republic, as well as for regions and each subject of administrative practice are generated in an automated mode in the central office of the Committee on Legal Statistics and Special Accounts of the Prosecutor General's Office of the Republic of Kazakhstan based on information from the centralized database of the automated information system "Special Accounts" (Figure 6).



During the first 9 months of 2024, 74,122 inspections carried out by state control and supervision bodies were registered, which is 74.8% more than for the same period of the previous year (42,415). The number of inspections of private business entities was (by type):

- Micro 17,735, which is 3.1 times more than in the same period of the previous year (5,701;
- Small 30,947, which is 2.4 times more than in the same period of the previous year (12,824);
- Medium 5,015, which is 15.0% more than in the same period of the previous year (4,359);
- Large 3,672, which is 9.4% less than in the same period of the previous year (4,053).
- The largest number of inspections were registered in the following regions of the country:
- Almaty (10,137), Astana (5,862), Shymkent (4,406), Turkestan (5,973), Kostanay (4,186) and Almaty (4,145) regions. The smallest number of inspections were registered in the following regions:
- Military (336), in transport regions (113), Ulytau (957), Atyrau (1894) and North Kazakhstan (2098) regions. The number of refusals to register inspections was 725, which is 2.8 times more than in the same period of the previous year (262).

Statistical indicators of the quality of justice in the Republic of Kazakhstan demonstrate instability and clearly demonstrate the presence of judicial errors that are corrected in appeal and cassation. An analysis of the digital resources of the judicial system of the Republic of Kazakhstan showed that the realities of today actualize the introduction of artificial intelligence and neural networks in justice. We believe that the use of these tools will contribute to the prevention and prevention of judicial errors. An analysis of the relationship between the use of digital tools, such as the information and analytical system of judicial bodies "Terelik", and the quality of consideration of cases on the annulment of arbitration decisions for the period 2019-2022 shows the following trends:

1 Increased speed of case consideration:

- The share of cases considered with the issuance of a ruling remains consistently high (over 85%) throughout the analyzed period, which indicates the acceleration of processes due to automation and digitalization.
- 2 Reduction in procedural errors:
- The use of "Terelik" helps to reduce the number of decisions overturned upon appeal, which indicates better preparation of materials and analysis of cases.

4 Increased efficiency of judicial work:

• The system ensures automation of document flow, which minimizes the influence of the human factor and increases the accuracy of decisions. However, there is an increase in the share of refusals to satisfy applications, especially in 2021-2022, which may be due to the tightening of criteria and standardization of requirements.

6 Support of the analytical function: - "Terelik" provides tools for the analysis of judicial practice, which helps prevent judicial errors and make more informed decisions.

#### 6. Discussion

Before talking about the capabilities of artificial intelligence and neural networks in the prevention and avoidance of judicial errors in the Republic of Kazakhstan, authors considered the foreign experience of integrating artificial intelligence into the judicial system. The most illustrative experience is the digital transformation of the judicial system of China. This process began at the "National Conference on Judicial Communications and Computers" in 1996. Since then, according to Laptev and Feyzrakhmanova [19] three main stages of digitalization have taken place. At the first stage, all files were digitalized. At the second stage, Internet technologies began to be introduced for conducting court hearings. The third stage began in 2014, and, in terms of timing, coincided with the beginning of the digital transformation of the judicial system of the Republic of Kazakhstan. At this stage, more complex technologies began to be introduced and the concept of a "smart court" was realized. Work was completed on the creation and implementation of online platforms: China Judgments Online and China Judgments Enforcement Information Online [19].

A special concept in the development of the judicial system and justice in China is associated with the integration of artificial intelligence into justice. The first step towards such integration was made in 2019, when the WeChat messenger was introduced into legal proceedings. This messenger identifies the person, allows the use of an electronic signature, the process takes place in the format of a video chat, and the decision is made by artificial intelligence [19]. The practice of Shanghai and a number of regions of China based on a pilot project for the use and analysis of a large array of data by artificial intelligence is indicative. The capabilities of artificial intelligence are used in the analysis of testimony, including speech recognition, analysis of the defendant's personality, when choosing the optimal punishment, etc. The results of the analysis are offered to the judge as assistance, but the final decision remains in the judge's functionality.

One of the favorites of the European Union in the field of integration of artificial intelligence into justice is France. The Case Law Analytics and Predictice systems were created and tested as digital assistants in the justice system, the main purpose of which is to predict legal risks and model possible outcomes of a case, and select similar judicial precedents [19]. These systems are of purely optional importance; the country has a complete ban on the automation of the decision-making process, since justice is administered only by the court.

The main message of the introduction of artificial intelligence technologies into the judicial system of the United States of America is risk assessment in the decision-making process by the court and assistance to judges in making decisions. The Correctional Offender Management Profiling for Alternative Sanctions (hereinafter referred to as COMPAS) system assesses the risk of recidivism on a ten-point scale. The Public Safety Assessment (hereinafter referred to as PSA) system is

used by judges in the process of choosing a preventive measure. The Ravel Law system allows predicting the outcome of a case based on the analysis of similar precedents.

Analysis of foreign experience in using digital tools in justice and in the judicial system, as well as an analysis of the integration of artificial intelligence into the justice system of foreign countries showed that these processes take place:

• Firstly, within the framework of procedural activities of participants in the trial and the court (filing a claim, registering it, forming a panel of judges, providing documentary support, etc.);

• Secondly, providing assistance to judges in assessing risks and predicting the outcome of a case, based on the analysis of judicial practice and big data;

• Thirdly, consideration of the case by artificial intelligence.

Comparing foreign experience with the Kazakhstan practice of digital transformation of the judicial system, we note that similar directions of digitalization can be traced in many positions, and promising areas of modernization of the activities of the courts also correlate with world practice.

Considering the prospects for the development of artificial intelligence in the legal sphere, Ammar Zafar identifies two stages. He calls the first "moderately innovative", which is characterized by a combination of traditional legal practices with software and technical tools. The main purpose of such a combination is to help the legal community (judges, lawyers, prosecutors, etc.). The second stage, according to the author, is characterized by significant progress in the field of automation and optimization of legal processes. At this stage, artificial intelligence is actively integrated, and methodologies of machine learning, processing and analysis of large databases, pattern recognition, analysis of natural (human) language, etc. are implemented. The main result of this stage is forecasting the judicial perspective, assistance in decision-making. This stage assumes that many legal procedures will be automated, and this is associated with the use of complex algorithms in courts of first instance [15].

More daring assumptions about the development of artificial intelligence in justice were expressed by V. Laptev, D. Feyzrakhmanova. In their opinion, there are short-term, medium-term and long-term prospects for the introduction of artificial intelligence in justice. In the short term, artificial intelligence acts as an assistant to a human judge on certain matters of office work (minutes of a court hearing, formation of a panel of judges, preparation of writs of execution). In the medium term, artificial intelligence will be a companion judge to a human judge, including in the assessment of evidence and other procedural aspects (determination of the category and legal characteristics of a transaction; verification of claim calculation; determination of the limitation period; proposal for reconciliation of the parties, etc.). In the long term, the authors consider the possible replacement of a human judge with artificial intelligence to perform certain functions in the administration of justice. According to the authors, the conditions for independent decision-making by artificial intelligence are: the absence of evaluative norms regulating controversial legal relations; the parties' claims are based on digitalized written evidence or evidence obtained from automated information systems; the rights, obligations and responsibilities of the parties are clearly defined in the legislation [15].

# 7.Conclusion

#### 7.1. Implications and Limitations

This study aims to solve an important scientific and practical problem — modernization of the judicial system of Kazakhstan using the latest technologies, ensuring fairness and accessibility of justice for all citizens. Judicial errors and shortcomings in law enforcement practice remain a significant problem for many countries, including Kazakhstan. Ensuring accessible, fair and high-quality justice requires a revision of traditional approaches and the introduction of innovative technologies. In this context, the use of AI is a promising direction, since it allows:

- Promptly processing large volumes of data;
- Automating decision-making;
- Analyzing judicial acts and predicting case outcomes.

Digital modernization of the judicial system has reached a qualitatively new level, many digital resources and their capabilities have become commonplace today. But the development of these processes cannot be stopped; many of them are irreversible and obvious. Such an obvious and irreversible process is the integration of artificial intelligence and neural networks into the judicial system and justice of the Republic of Kazakhstan. Similar processes can be traced in foreign countries. Different states go through these processes differently, have similar periods, and there are unique ones inherent only to a particular country.

# 7.2. Future Research Suggestions

It is imperative to note several areas in which digital tools can be used to prevent judicial errors:

1. Intelligent decision support systems

Analysis: Systems can analyze huge arrays of court decisions, identifying patterns and trends, helping judges make more informed decisions.

Evidence assessment: Artificial intelligence can assess the reliability and weight of evidence, identifying contradictions and inconsistencies.

Predicting case outcomes: Based on data analysis, the system can predict likely case outcomes, helping parties to the process make informed decisions.

2. Digital archives and databases

Unified digital archive: The creation of a unified digital archive of court cases will ensure the availability of information for all participants in the process, reduce the risk of document loss and increase the transparency of judicial activity.

Intelligent search: Search systems will allow you to quickly find the necessary documents and information, which will significantly speed up the judicial process.

3. Data visualization

Interactive graphs and charts: Data visualization will allow you to clearly present complex information, making it easier for judges and participants in the process to understand.

Animations and simulations: Animations can be used to simulate various scenarios and demonstrate expert opinions.

4. Electronic document management

Automation of routine operations: Automation of document preparation and approval processes will reduce the risk of human errors.

Digital signatures: Using digital signatures will increase the level of trust in documents and eliminate the possibility of forgery.

5. Training and advanced training of judges

Online courses and trainings: Digital platforms will allow judges to constantly improve their skills, learn new technologies and methods.

Trial simulators: Simulators will allow you to practice various court scenarios and develop decision-making skills.

6. Citizen participation in the trial

Electronic platforms for filing complaints: Citizens will be able to file complaints electronically, which will simplify the procedure and increase accessibility of justice.

Online broadcasts of court hearings: Openness of court proceedings will increase trust in the judicial system and reduce the risk of biased decisions.

At the conclusion of this research, there is a need to use the irreversibility of technological processes in a positive way. In legal proceedings, artificial intelligence can process large volumes of data, replace routine functions, and assist the judge and participants in the process. A promising direction is the prevention and prophylaxis of judicial errors due to artificial intelligence and neural network technologies. Today, there is no doubt about the relevance of human (judge) interaction with artificial intelligence to solve a single problem.

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