

## ЕТИЧНІ ВИКЛИКИ ЦИФРОВОЇ ТРАНСФОРМАЦІЇ ПРАВОСУДДЯ

**Горєлова В.Ю.,**

кандидат юридичних наук, доцент,  
доцент кафедри державно-правових дисциплін,  
Університет «КРОК»  
м. Київ, вул. Табірна, 30-32, Україна, 03113  
e-mail: HorelovaVY@krok.edu.ua  
ORCID: <https://orcid.org/0000-0001-6536-2422>

## ETHICAL CHALLENGES OF DIGITAL TRANSFORMATION IN JUSTICE

**Horielova V.Y.,**

PhD in Law, Associate Professor,  
Professor of Department of the State Legal Disciplines of «KROK» University  
Kyiv, Tabirna St., 30-32, Ukraine, 03113  
e-mail: HorelovaVY@krok.edu.ua  
ORCID: <https://orcid.org/0000-0001-6536-2422>

**Анотація.** Актуальність дослідження полягає у вивченні етичних викликів, пов'язаних із цифровою трансформацією правосуддя, яка є невід'ємною частиною сучасного розвитку судової системи. Використання штучного інтелекту, алгоритмічних систем та автоматизації судових процесів підвищує ефективність і прозорість правосуддя, але водночас створює ризики дискримінації, порушення конфіденційності даних та впливу на традиційні принципи судочинства. Зокрема, алгоритмічна упередженість, яка виникає через використання історичних даних, може відтворювати соціальні нерівності, що суперечить принципам справедливості та рівності перед законом. Крім того, зростання обсягів електронних даних створює загрози для конфіденційності та приватності осіб, які беруть участь у судових процесах. Метою дослідження є виявлення та аналіз етичних викликів цифрової трансформації правосуддя, оцінка їх впливу на принципи справедливого суду та розробка рекомендацій для етичного регулювання цифрових технологій у судовій системі.

Методи аналізу включають порівняльно-правовий підхід, системний аналіз, кількісні та якісні методи дослідження, а також вивчення міжнародного досвіду, зокрема практики таких країн, як Естонія, Нідерланди, США, Канада, Великобританія та Сінгапур. Отримані результати підтверджують, що алгоритмічна упередженість, порушення конфіденційності даних та вплив на традиційні принципи правосуддя є ключовими викликами. Для їх подолання запропоновано впровадження незалежного аудиту алгоритмів, розробку законодавчих механізмів регулювання цифрових рішень, забезпечення прозорості судових процесів та інтеграцію міжнародних стандартів захисту даних.

Практична цінність дослідження полягає у формуванні основ для національної стратегії етичної цифровізації правосуддя, спрямованої на забезпечення справедливості, прозорості та довіри до судової системи в умовах глобальних технологічних змін.

**Ключові слова:** алгоритмічна упередженість, цифрова трансформація правосуддя, захист персональних даних, автоматизація судових процесів, етичне регулювання технологій, принципи справедливого суду, міжнародний досвід цифровізації.

**Формул:** 0, рис.: 2, табл.: 3, бібл.: 23.

**Abstract.** The relevance of this study lies in exploring the ethical challenges associated with the digital transformation of justice, which is an integral part of the modern development of the judicial system. The use of artificial intelligence, algorithmic systems, and automation in court processes enhances the efficiency and transparency of justice, but simultaneously creates risks of discrimination, data privacy violations, and impacts on traditional principles of legal proceedings. In particular, algorithmic bias, arising from the use of historical data, can reproduce social inequalities, which contradicts the principles of fairness and equality before the law. Additionally, the increasing volume of electronic data poses threats to the confidentiality and privacy of individuals involved in court proceedings. The purpose of this research is to identify and analyze the ethical challenges of the digital transformation of justice, assess their impact on the principles of a fair trial, and develop recommendations for the ethical regulation of digital technologies in the judicial system.

*The analysis methods include comparative legal analysis, a systemic approach, quantitative and qualitative research methods, as well as the study of international experience - particularly the practices of countries such as Estonia, the Netherlands, the USA, Canada, the UK, and Singapore. The obtained results confirm that algorithmic bias, data privacy violations, and the impact on traditional principles of justice are key challenges. To address these, the study proposes the implementation of independent algorithm audits, the development of legislative mechanisms for regulating digital decisions, ensuring transparency in court processes, and integrating international data protection standards.*

*The practical value of the research lies in forming the basis for a national strategy for the ethical digitalization of justice, aimed at ensuring fairness, transparency, and trust in the judicial system in the context of global technological change.*

**Keywords:** algorithmic bias, digital transformation of justice, personal data protection, automation of court processes, ethical regulation of technologies, principles of a fair trial, international digitalization experience.

**Formulas:** 0, fig.: 2, tabl.: 3, ref.: 23.

**Introduction Problem Statement.** The digital transformation of justice is an integral part of the modern development of the judicial system, aimed at increasing the efficiency, transparency, and accessibility of legal proceedings. However, the adoption of digital technologies in the judiciary introduces a range of ethical challenges that require comprehensive and systematic analysis.

Key issues arising from the digitalisation of justice include ensuring the objectivity and impartiality of algorithmic decision-making, protecting the personal data of litigants, and preserving the traditional principles of justice amid the widespread implementation of artificial intelligence and automated systems.

One of the most pressing concerns is the risk of discrimination and bias inherent in algorithmic decision-making. Algorithms, trained on historical data, may replicate and even amplify existing social and legal inequalities. Furthermore, the integration of digital technologies in court systems necessitates new approaches to safeguarding data confidentiality, as the increasing volume of electronic information about litigants poses a significant threat to the right to privacy.

Additionally, the use of automation and remote formats for judicial proceedings may undermine fundamental legal principles such as the immediacy of hearings and the adversarial nature of trials, potentially affecting the overall quality of justice. The issue of digital inequality is also highly relevant, as not all parties to a case have equal access to technology or digital resources.

Thus, the digitalisation of justice is not merely a technological shift but also a deeply ethical transformation that demands careful regulation, adherence to legal standards, and the development of robust mechanisms to protect the fundamental principles of judicial fairness.

**Relevance of the Research.** The digital transformation of justice is an inevitable trend in the modern world, driven by technological advancement, the exponential growth of legal information, and the urgent need to optimize judicial procedures. As courts increasingly rely on digital tools, there is a critical need to assess the ethical implications of this transition and ensure that the implementation of new technologies does not compromise the core values of justice. The use of artificial intelligence, distributed registry technology, automated case management systems and electronic judiciary is significantly changing approaches to the administration of justice, opening up new opportunities for its efficiency, transparency and accessibility. At the same time, these changes raise a number of ethical issues related to the protection of human rights, the objectivity of court decisions, responsibility for the use of algorithmic systems, and the risks of digital inequality.

Particular attention should be given to the problem of algorithmic bias, which can lead to discrimination against certain groups of people. Since artificial intelligence systems are trained on historical data, they may reproduce systemic errors and entrenched biases, which runs counter to the principles of justice and the rule of law. At the same time, the issue of confidentiality of judicial data is becoming increasingly relevant, as digital storage and processing introduce risks of unauthorized access and data leakage. Ensuring the security and protection of such sensitive information is a critical task in the digital era.

In addition, digitalisation is transforming the very structure of the judicial process, challenging traditional legal approaches to adversarial proceedings, the right to a fair trial, and the principle of immediacy. Automated decision-making may deprive individuals of the opportunity to critically evaluate the unique circumstances of a case, which undermines the

ethical foundations of justice.

In the context of international trends in the digitalisation of judicial proceedings, it is essential to develop comprehensive legal and ethical standards that strike a balance between technological advancement and the protection of fundamental human rights and freedoms. The absence of proper regulation in this area may lead to legal conflicts, a decline in public trust in the judicial system, and violations of the rule of law.

Thus, the study of the ethical challenges posed by the digital transformation of justice is of critical importance, as the effectiveness and fairness of judicial systems in the context of global digital transformation largely depend on how these challenges are identified, addressed, and regulated.

**Analysis of the latest research and publications.** In recent years, the issue of ethical challenges of the digital transformation of justice has attracted considerable attention from scholars and practitioners. Among the modern studies on the ethical challenges of digital transformation in justice, the following works should be highlighted: 1) Zghama, A. O. (2024) «On the digital transformation of justice and prospects for the sphere of economic activity» [1], discusses the issues of introduction of digital technologies in the field of justice and their impact on economic activity; 2) Petryshyn, O. V., & Gilyaka, O. S. «Human rights in the digital age: challenges, threats and prospects» [2], addresses the impact of digital technologies on human rights; 3) in the article «The use of digital technologies in law: prospects and challenges» the impact of digital technologies on the legal system of Ukraine is considered. The authors analyse the role of digital technologies in improving access to justice and the efficiency of the judicial system; 4) The project “Supporting Digital Transformation” [3], funded by USAID (U.S. Agency for International Development, 2023) and UK Dev [4] aims to expand Ukraine’s digital capabilities and create sustainable ecosystems for a secure and successful future; 5) in the collective monograph “Ukraine in the context of social and digital transformation: ways to recovery” [5] under the general editorship of O. V. Petryshyn, O. F. Skakun and Yu. S. Shemshuchenko, the legal, ethical, social, economic and technical aspects of digital transformation in Ukraine are considered;

6) The monograph “Legal Regulation of the Digital Economy” [6] edited by T. O. Kolomoiets and V. S. Sheludko, examines the current challenges and opportunities related to the legal regulation of the digital economy in Ukraine.

These studies emphasize the importance of a comprehensive approach to the introduction of digital technologies into the justice system. This should include a special emphasis on ethical aspects that ensure the protection of human rights, personal data protection and adherence to the principles of justice.

**Justification for the Relevance of the Study.** The digital transformation of justice is one of the key trends in contemporary legal development. The implementation of artificial intelligence, automated decision-making systems, distributed ledger technologies [7], and electronic document management introduces new opportunities to enhance the efficiency, transparency, and accessibility of judicial proceedings. However, the integration of these technologies also presents a number of ethical challenges that require comprehensive analysis and appropriate regulatory responses.

One of the primary concerns is the risk of algorithmic bias, which may lead to discrimination and violations of the principle of equality before the law. Since algorithmic systems operate based on the analysis of large datasets, they can replicate and even reinforce existing social and legal inequalities embedded in historical data.

Another critical issue is the protection of personal data belonging to litigants. The growing volume of electronic information increases the risk of unauthorized access, data breaches, and violations of the right to privacy.

Moreover, the automation of judicial proceedings may undermine traditional principles of justice, particularly the principles of immediacy and the adversarial nature of court processes. The use of AI for evidence analysis or for predicting court decisions could diminish the roles of judges and legal representatives, thereby jeopardizing the right to a fair trial. [8]

International initiatives also confirm the importance of ethical regulation of digital technologies in justice. The European Commission on the Efficiency of Justice (CEPEJ) [9] and the UN [10] are developing recommendations on the ethical use of artificial

intelligence in the judiciary. In Ukraine, the active implementation of digital reforms requires the development of a national strategy that will strike a balance between technological progress and respect for fundamental human rights.

The lack of clear ethical standards and mechanisms to control the use of digital technologies in the judiciary can lead to legal conflicts, a decrease in trust in justice and a threat to the rule of law [11]. That is why the study of the ethical challenges of the digital transformation of justice is extremely relevant, as its results can contribute to the formation of an effective and fair judicial system in the context of digitalisation.

**Purpose of the study.** The purpose of the study is to identify and analyze the ethical challenges of the digital transformation of justice, assess their impact on the principles of fair trial, and develop recommendations for the ethical regulation of digital technologies in the judicial system.

The objectives of the study are as follows: 1) to analyse the conceptual foundations of the digital transformation of justice and its impact on judicial procedures; 2) to identify the main ethical issues related to the use of digital technologies in judicial proceedings; 3) to analyse the algorithmic bias in court decisions and propose methods to minimise it; 4) to assess the international experience of ethical regulation of digital technologies in justice and the possibility of its adaptation in Ukraine; 5) to propose recommendations for the development of a national strategy for the ethical digitalization of justice.

The scientific novelty of this study lies in its comprehensive analysis of the ethical dimensions of the digitalisation of justice and the development of practical proposals for the ethical regulation of digital technologies within the judicial system.

In particular, the paper explores the main ethical risks associated with the digital transformation of justice by analysing international experience – notably the case law of the European Court of Human Rights, the recommendations of the CEPEJ [9], and the United Nations standards [10] on the ethical use of artificial intelligence in the legal domain. A critical analysis of international regulatory practices in the field of judicial

digitalisation is conducted, focusing on the following: 1. Examination of approaches to the regulation of algorithmic decision-making in the U.S. judiciary and the implementation of automated court systems in countries such as Singapore, the United Kingdom, Canada, the Netherlands, and Estonia. 2. Assessment of the effectiveness of mechanisms for protecting the personal data of litigants, with reference to the General Data Protection Regulation (GDPR) [12]. 3. Development of proposed mechanisms for eliminating algorithmic bias in judicial decision-making. 4. Outlining of the prospects for regulating digital technologies in Ukraine's judicial system, taking into account both international standards and the specific features of the national legal framework.

The results of the study may serve as a foundation for the development of a national strategy for the ethical digitalisation of justice and contribute to the improvement of legal regulation in this rapidly evolving area.

**Materials and methods.** The study of the ethical challenges of the digital transformation of justice was based on an interdisciplinary approach that integrates legal, sociological, technological and ethical aspects. The article uses a set of methods to analyse international experience, identify key issues and develop recommendations for the legal system of Ukraine. The materials, methodology and procedures of the study are described.

The study was based on a wide range of information sources, including: 1) review of scientific articles, monographs, and reports on the digital transformation of the judiciary, including the work of leading researchers in this area; 2) analysis of legislative documents of selected countries (USA, Estonia, Singapore), international standards GDPR [12], рекомендації CEPEJ [9], ООП [10]; 3) studying statistical indicators on the use of algorithmic systems in court practice, analysing reports of independent organisations; 4) Consideration of specific examples of algorithmic bias e.g., COMPAS [13] (in the United States) and successful application of digital technologies in judicial proceedings (Estonia, the Netherlands).

Countries for analysis were selected based on the following criteria: 1) the level of digitalisation of justice: the study covered both leaders of digital reforms (Estonia, Singapore)



and countries undergoing active modernisation (Ukraine, Canada); 2) regulatory mechanisms: countries with developed ethical standards (UK, Netherlands) and countries with insufficient legal regulation (Ukraine) are included; 3) availability of empirical data: the emphasis is on countries where independent studies and audits of algorithmic systems are published (USA, Canada).

The methods of data collection and analysis were carried out, namely: 1) in the comparative legal analysis, we studied legislative approaches to the regulation of algorithmic justice, assessed the effectiveness of personal data protection mechanisms in different jurisdictions (for example, comparing the GDPR [12] and Ukrainian legislation; 2) the systemic approach analyses the relationship between technological innovations and traditional principles of justice and analyses the impact of algorithmic bias on different social groups; 3) quantitative and qualitative methods were used to analyse the content of court decisions in which algorithmic systems were used, and to conduct a statistical analysis of the results of the operation of algorithmic systems, including a study of their discriminatory effects; 4) A study of the situation was conducted, namely, analysing digital reforms in the justice sector of individual countries and assessing the effectiveness of algorithmic audit mechanisms in the United States, the European Union, and other countries.

The research methodology was based on: 1) the theory of algorithmic justice 2) legal theories of the rule of law and the right to a fair trial; 3) sociological concepts of digital inequality and the impact of technology on social institutions.

Ensuring compliance with the ethical standards of the study was achieved by depersonalising data when using confidential information, minimising bias through the use of various sources, and ensuring openness through a clear description of the methodology.

The study's limitations include the lack of a localised empirical base on algorithmic bias in Ukraine, the different levels of digitalisation of the selected countries (which affects the generalisability of the findings), and the dynamism of technology (which can lead to rapid changes in the relevance of some findings).

The approach used provided a comprehensive assessment of the ethical

challenges of the digital transformation of justice, taking into account both technological aspects and socio-legal implications. The use of interdisciplinary analysis allowed for a deeper understanding of the problem, and a comparative study of international experience became the basis for developing practical recommendations for Ukraine. The limitations of the study highlight the need for further local research and adaptation of international approaches to the national context. The results obtained can be used to develop regulatory recommendations aimed at creating mechanisms for controlling algorithmic decisions and ensuring transparency of automated court proceedings.

**Results and discussion.** The study of the ethical challenges of the digital transformation of justice has identified a number of key issues that require attention from legislators, judges, lawyers and other participants in the judicial process. The main findings of the study can be divided into several categories: algorithmic bias, digital implementation and the impact of digital technologies, personal data protection, traditional principles of justice and international experience in regulating digital technologies in judicial proceedings.

Algorithmic bias is one of the main threats to the fairness of digital justice. The use of artificial intelligence and algorithmic systems in court decisions creates a risk of reproducing and reinforcing existing social and legal inequalities. The most common source of bias is the historical data on which algorithms are trained. If in the past, court decisions were made with certain inequalities in relation to different social groups, algorithms may unconsciously reproduce such imbalances.

In the United States, digital technologies – including artificial intelligence (AI) and machine learning algorithms – are being actively integrated into the criminal justice system to predict recidivism, assess risk levels, and determine release conditions. One of the most well-known tools in this area is the COMPAS (Correctional Offender Management Profiling for Alternative Sanctions) system. It analyzes historical data, including prior convictions, socioeconomic status, arrest history, and demographic information.

However, a well-known investigation by ProPublica [14] uncovered significant racial bias

in the COMPAS system. Specifically, African-American defendants were assigned inflated recidivism risk scores in 77% of cases compared to white defendants, even when the underlying criminal circumstances were similar. This results in unjust judicial decisions, violations of human rights, and a decline in public trust, particularly among ethnic minority communities.

The root of algorithmic bias lies in the fact that such systems are trained on historical data, which often reflect structural inequalities. For instance, neighborhoods with higher concentrations of ethnic minorities are more frequently labeled as high-crime areas, attracting disproportionate police attention and reinforcing a cycle of prejudice and over-policing. To address this problem, several algorithm auditing mechanisms have been introduced in the U.S. For example, Wisconsin, Illinois, and California have established special commissions to evaluate

the objectivity of algorithms used in the criminal justice system [15]. Additionally, in 2021, the White House launched an initiative to develop ethical standards for the use of AI in the legal sector [16].

Despite these efforts, algorithmic bias remains a persistent issue, due in large part to the lack of uniform federal standards and the inherent difficulty of correcting social inequalities embedded in training data. Achieving fairness in algorithmic decision-making requires continued research, the development of more sophisticated data analysis methods, and greater transparency in how algorithms operate. Only a comprehensive, multi-faceted approach – combining regulatory action, technological innovation, and public oversight – can effectively mitigate the discriminatory effects of AI in the justice system and uphold the principle of equality before the law for all citizens.

Table 1. Comparative analysis of algorithmic bias in different countries:

Country.	Description of algorithmic bias	Strategies to combat bias
USA	Algorithms often reflect existing social biases, especially in face recognition and hiring.	Use of various data sets, algorithmic audits, regulatory frameworks.
Ukraine	The problem of bias is less studied, but there are cases of discrimination in various fields.	Raising awareness, developing ethical standards.
Singapore	High level of technological development, but there are also cases of bias	Inclusive approach to AI development, regulatory framework.
United Kingdom	Algorithms can reflect bias, especially in justice and healthcare systems [17]	Use of various data sets, algorithmic audits.
Canada	Problems of bias in hiring and facial recognition systems [18]	Data diversity, regulatory framework.
Netherlands	Cases of bias in justice systems and social services [19]	Algorithmic audits, an inclusive approach to AI development.
Estonia	High level of digitalisation, but there are also cases of bias.	Use of various data sets, regulatory frameworks.

*Table 1 was developed by the author based on the analysis of the sources cited therein.*

Algorithmic bias presents a serious challenge for Ukraine, where the digitalisation of justice is only beginning to gain momentum [20].

The main risks identified include: 1) Lack

of independent auditing of algorithmic systems [20]; 2) Lack of transparency in the use of automated decision-making in judicial practice [20]; 3) Absence of legislative provisions regulating algorithmic justice [21]; 4) Risk of

corrupt influence on algorithms and potential manipulation of data.

Given these challenges, it is essential to develop legal mechanisms for the oversight

of algorithmic decision-making, establish independent monitoring systems, and ensure transparency throughout all stages of digital justice processes.

Table 2. Risks of algorithmic bias in different countries.

Country	Algorithm type	Risk of bias
USA [22]	Predicting recidivism	High
Estonia	Automated solutions	Medium
Netherlands	Analysing the evidence	Low
Ukraine	E-justice	High
Singapore	Centralised digital solutions	Medium
United Kingdom [21]	Forecasting crime	High
Canada	Ethical control of algorithms	Low

*Table 2 was developed by the author on the basis of the analysis of the sources cited therein.*

The impact of digital technologies on the principles of justice and the digitalisation of the judicial system as a direction of modernisation are significantly transforming traditional approaches to justice. Digital tools, such as artificial intelligence and algorithmic systems, contribute to the efficiency, transparency and accessibility of justice. However, their implementation requires careful analysis, in particular with regard to technological security, human rights protection and the ethical use of algorithmic solutions. The experience of different countries demonstrates both the benefits of digital reforms and the potential risks associated with the automation of court processes.

Estonia, recognized as a world leader in digital justice, effectively utilizes distributed ledger technology to preserve the integrity of judicial data and prevent manipulation. The implementation of independent algorithm audits facilitates ongoing monitoring of digital decisions, thereby helping to uphold the principle of judicial independence. However, the increased automation of court processes may impact the principle of immediacy, as judges might increasingly rely on algorithmic outputs rather than direct case hearings.

In the Netherlands, the ProJustitia system automates the analysis of evidence in criminal cases, significantly enhancing judicial efficiency. Nevertheless, this automation raises concerns regarding the adversarial principle, since it may diminish the roles of judges and

lawyers in decision-making. To mitigate these risks, multi-level control mechanisms have been introduced to ensure the objectivity of court decisions.

Canada pursues judicial digitalisation through its National Digital Justice Strategy, which emphasizes strict ethical oversight of algorithms. This approach strives to balance technological innovation with respect for human rights. Despite this, automation poses challenges to the principle of immediacy, as judicial reliance on algorithmic recommendations grows. Public engagement in discussions around digital reforms serves as a key tool to maintain transparency.

In the United Kingdom, the algorithmic system HART (Harm Assessment Risk Tool), used for crime prediction, sparked significant public backlash due to evident biases. This controversy prompted a revision of auditing standards for algorithmic solutions. The broader impact of digital technologies on the principles of judicial competitiveness and independence remains contested, underscoring the need for enhanced regulatory frameworks [23].

Singapore adopts a centralized model for judicial digitalisation via the Digital Justice Centre, which improves the efficiency of judicial proceedings. However, concerns about excessive state control arise, potentially threatening judicial independence. To address these concerns, Singapore is actively developing ethical standards governing the use of artificial intelligence in justice.

Ukraine is at the initial stage of digital transformation of the judicial system. The introduction of e-justice increases the accessibility of justice, but poses risks to the principles of immediacy and competition. To overcome these challenges, it is necessary to develop legislative mechanisms to regulate digital judgements, introduce independent audit of algorithms and ensure transparency of processes.

Digital technologies are having a significant impact on traditional principles of justice,

including the immediacy, competitiveness and independence of the judiciary. The experience of countries shows the need to develop effective mechanisms for controlling algorithmic systems, ensuring transparency of judicial processes and taking into account international experience. For Ukraine, which is at the initial stage of digital transformation, it is particularly important to take these aspects into account for the successful implementation of digital technologies in the judicial system.

Table 3. Comparative analysis of the international experience of the impact of digital technologies on the principles of justice and digitalisation of the judicial system for the countries listed.

Country	Key events and achievements
Estonia	Independent audit of algorithms, monitoring of digital court decisions, distributed registry technologies.
Netherlands	ProJustitia system for analysing evidence, multi-level control over digital technologies
Canada	National strategy for digital justice, ethical control, public engagement
United Kingdom	AI ethics committee to review control rules due to HART scandal
Singapore	Digital Justice Centre, a centralised approach to digital solutions
Ukraine	Implementation of e-justice, digitalisation of court proceedings, use of mobile applications
USA	Use of algorithms to predict recidivism, introduction of digital technologies in judicial proceedings

*The table 3 was created by the author based on the messages indicated in the text.*

Thus, the international experience of the impact of digital technologies on the principles of justice and the digitalisation of the judicial system of the digitalisation of justice demonstrates a wide range of approaches to the introduction of digital technologies in the judicial system. An important aspect is to ensure transparency, technological security and human rights protection, which remains a key challenge for most states in the process of digital transformation of justice.

**Prospects and recommendations for Ukraine.** For the effective implementation of digital justice in Ukraine, it is necessary to: develop legislative mechanisms for regulating digital judgements and algorithmic justice.

1) introduce independent audits of algorithmic systems to monitor possible biases.

2) increase the transparency of digital processes by providing open access to information on the operation of judicial algorithms.

3) protect personal data in accordance with international standards, including the GDPR.

4) introduce public control mechanisms to ensure compliance with ethical principles in digital justice.

The impact on the traditional principles of justice that analyse evidence may reduce the role of judges and lawyers in the decision-making process, which may lead to a violation of the right to a fair trial for several reasons: 1. Reduction of human factor (automated systems may reduce the role of judges and lawyers in the decision-making process, as they can quickly analyse large amounts of data and provide recommendations, which may lead to judges and lawyers relying more on the results of automated systems rather than their own experience and intuition) [24]; 2. Algorithmic bias (algorithms may reflect existing social prejudices, which can lead to discrimination against certain groups of people. For example, recidivism prediction



algorithms can be biased against minorities, which can lead to unfair decisions) [25]; 3. Lack of transparency (automated systems can be difficult to understand, which can complicate the process of appealing decisions, and lack of transparency in the operation of algorithms can lead to the fact that litigants cannot understand how the decision was made, which can violate the right to a fair trial) [26]; 4. Reducing the role of lawyers (automated systems may reduce the need for lawyers to analyse evidence and prepare cases, which may lead to a decrease in the quality of legal aid and restrict access to justice for some groups of people) [23]; 5. Ethical issues. (The use of automated systems in the judiciary raises ethical issues regarding

responsibility for decisions. If a decision is made based on the recommendations of an automated system, the question arises as to who is responsible for possible errors or bias).

These factors underline the importance of ensuring transparency, ethics and accountability in the use of automated systems in judicial proceedings to guarantee the right to a fair trial. The use of digital technologies, in particular artificial intelligence, may affect such principles as the immediacy and adversarial nature of the judicial process. For example, automated systems that analyse evidence can reduce the role of judges and lawyers in the decision-making process, which can lead to a violation of the right to a fair trial.

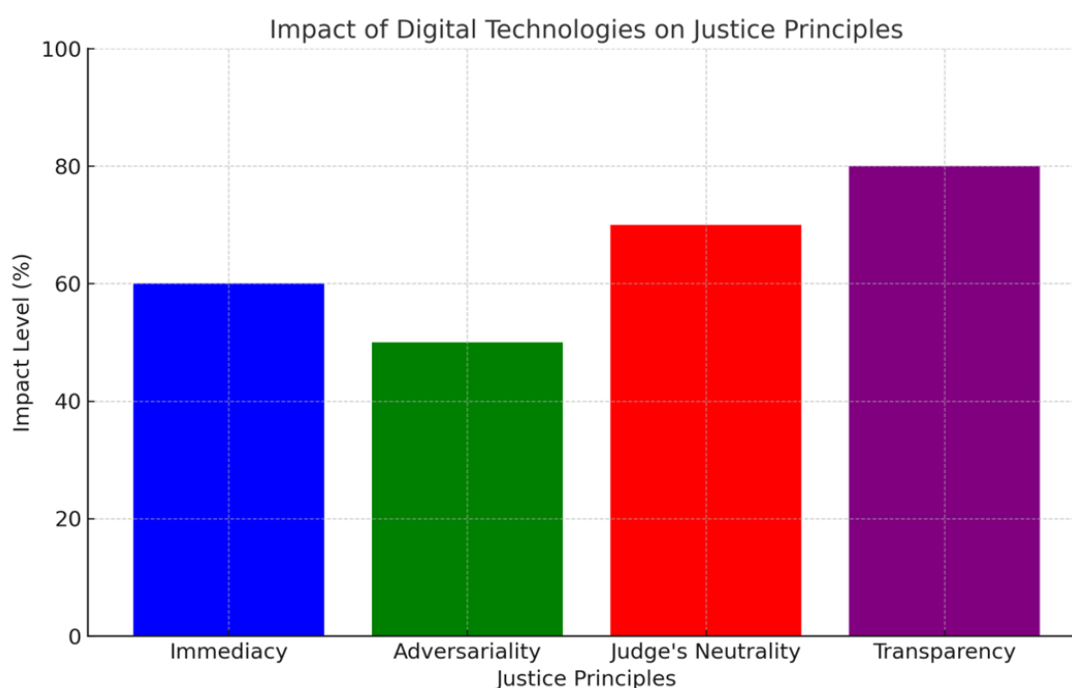


Figure 1. The digital transformation of judicial systems around the world is accompanied by significant ethical challenges, in particular with regard to data protection and information confidentiality. An analysis of the practice of various countries, including Estonia, the Netherlands, the USA, Canada, the UK, Singapore and Ukraine, demonstrates both the achievements and serious risks associated with the digitalisation of justice.

Estonia, as one of the leaders in the field of digital justice, actively uses distributed registry technologies to ensure the integrity of judicial data. However, even with strict data protection regulations in place, there are still risks of unauthorised access to confidential

data, which can undermine confidence in digital court procedures. This underscores the need for continuous improvement of data protection mechanisms in the context of rapid technological development.

In the Netherlands, the ProJustitia system, which automates the analysis of evidence in criminal cases, is an example of the effective use of digital tools.

However, even multi-level control does not exclude the possibility of confidentiality violations, which may affect the right to a fair trial.

This underscores the importance of developing additional data protection mechanisms during the process of digital

transformation.

The United States illustrates the difficulty of balancing the use of algorithmic systems, such as COMPAS, which predict recidivism, with the protection of litigants' rights. Despite stringent data protection regulations, cases of unauthorized access to confidential information remain a serious problem, requiring further improvement of legislative and technical mechanisms.

Canada, in implementing its National Digital Justice Strategy, focuses on the ethical control of algorithms. However, risks of unauthorized access to confidential information persist, underscoring the need to integrate international data protection standards into national practice.

In the UK, the Ethics Committee for Artificial Intelligence concentrates on auditing algorithmic systems such as HART, which has caused controversy due to bias and privacy violations. This demonstrates the importance of developing transparent mechanisms to regulate the use of digital technologies in justice [27].

Singapore, through a centralized approach via the Digital Justice Centre, has made significant progress in the digitalisation

of the judiciary. However, risks of excessive government control and data privacy violations remain relevant, requiring further improvement of ethical standards [28].

Ukraine, currently at the initial stage of digital transformation of its judicial system, faces similar challenges. The introduction of e-justice increases the accessibility of justice, but risks of unauthorized access to confidential information remain a serious concern. To address these issues, it is necessary to develop comprehensive data protection mechanisms, taking into account international experience [29].

Overall, the digital transformation of justice opens up new opportunities to increase the efficiency and transparency of judicial processes, but at the same time poses serious ethical challenges, including those related to data protection. The experience of countries around the world underlines the need to develop strict privacy standards, transparent control mechanisms, and continuous monitoring of the use of digital technologies in justice. For Ukraine, this is a key task that requires the integration of international best practices and the development of its own effective solutions.

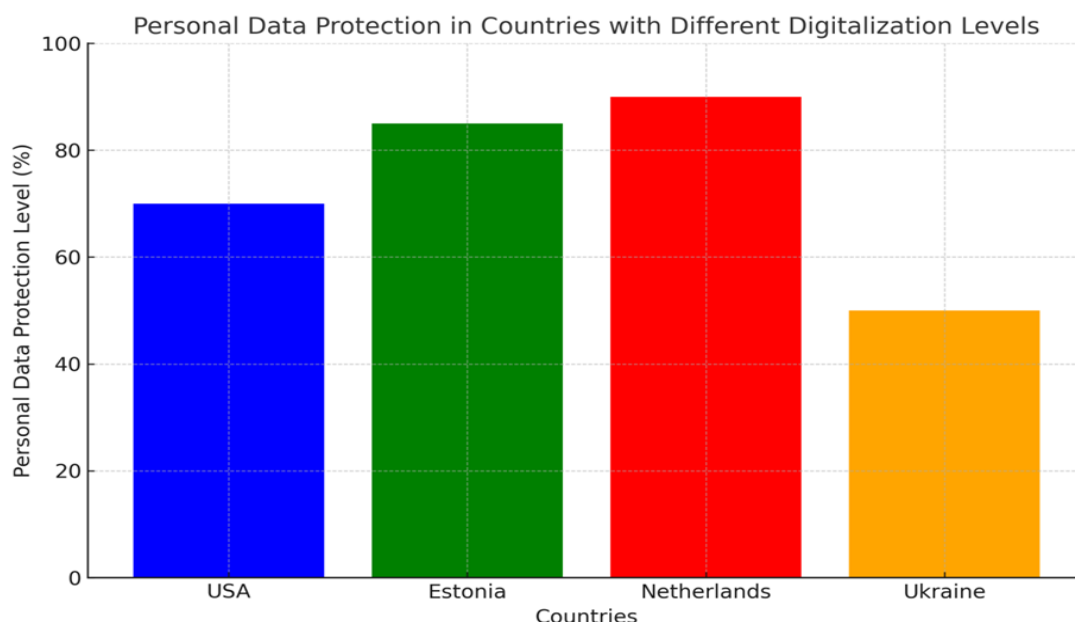


Figure 2. Personal Data Protection in Countries with Different Digitalization Levels was developed by the author based on the data provided in this source [30].

**Discussion.** The results of the study confirm that the digital transformation of justice is not only a technological but also a deeply

ethical process. Algorithmic bias, which is evident in many countries, is a serious challenge to the principles of fairness and equality before the law. This is especially true in countries where social inequalities have historically existed, and these inequalities can be exacerbated by the use of algorithms based on historical data.

Personal data protection is also a critical aspect of digital transformation. While the GDPR in the EU provides a high level of protection, in countries without such mechanisms, the risks of privacy breaches remain significant. This is particularly relevant in Ukraine, where the digital infrastructure is still in its infancy.

The impact of digital technologies on traditional principles of justice, such as immediacy and adversarialism, also requires attention. Automated systems can increase the efficiency of judicial proceedings, but they can also reduce the role of humans in the decision-making process, which may lead to violations of the right to a fair trial.

The digital transformation of justice is a complex process that requires a careful balance between technological progress and ethical principles. The research findings confirm that algorithmic bias, personal data protection, and the impact on traditional justice principles are key challenges that require close attention from lawmakers and practitioners.

**Conclusions.** The study found that the use of artificial intelligence (AI) and algorithmic systems in justice significantly threatens the principles of objectivity and equality. The historical data on which the algorithms are based reproduce structural social inequalities, which leads to discrimination against certain groups (for example, the COMPAS system in the United States). To minimise these risks, independent audits of algorithms, the use of diverse data sets, and the integration of regulatory mechanisms at the state level are required.

The growth of electronic information in litigation poses threats to confidentiality and privacy. The experience of EU countries [12] and Estonia (distributed ledger technology) proves the effectiveness of strict data protection standards. It is critical for Ukraine to adapt international practices, develop mechanisms for

technological security and prevent unauthorised access.

Automation of court processes reduces the role of immediacy, competition and the human factor in decision-making. This can lead to the devaluation of the right to a fair trial, especially in the context of insufficient transparency of algorithms. In order to maintain a balance between technological progress and ethical standards, it is necessary to ensure the participation of judges, lawyers and the public in the evaluation of digital solutions.

International experience as a basis for reforms. An analysis of the practices of Estonia, the Netherlands, Canada and other countries has shown that successful digitalisation requires a comprehensive approach: from developing codes of ethics to creating mechanisms for public control. For Ukraine, the key is to implement a national strategy that combines technological innovation with respect for human rights, taking into account the recommendations of the CEPEJ [9] and UN [10].

At the initial stage of digital transformation, Ukraine should focus on developing legislation to regulate algorithmic justice, introducing independent audits of algorithmic systems, increasing digital literacy among litigants, and integrating international data protection standards.

The digital transformation of justice is an inevitable process that opens up new opportunities for efficiency and accessibility of justice. However, its success depends on overcoming ethical challenges related to algorithmic bias, data protection, and preserving traditional principles of justice. The scientific recommendations proposed in this study can form the basis for the development of an ethical digitalisation strategy aimed at ensuring fairness, transparency and trust in the judiciary in the context of global technological change.

#### References:

1. Engvin D., Larson D., Mattu S., Kirchner L. Mashynna uperezhnenist. *ProPublica*. 2016. URL: <https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing> (accessed: 06.07.2025).
2. Shtuchnyy intelekt v ES i Velykiy Brytaniyi: porivnyannya rehulyatornykh pidhodiv. *Dnistrianskyi tsentr*. 2023. URL: <https://dc.org.ua/news/shtuchnyy-intelekt-v-es-i-brytaniyi-porivnyannya-regulyatornyh-pidhodiv> (accessed: 06.07.2025).
3. Basiuk O. P. Rekomendatsiyi shchodo vprovadzhennya tekhnolohiy rozpodilenoho reyestru (blokcheyn) u derzhavnomu sektori Ukrayiny na osnovi svitovoho dosvidu. *Aktualni problemy derzhavnoho upravlinnya*. 2023. № 1. P. 131–154. DOI: 10.26565/1684-8489-2023-1-08.
4. Bielov D. M., Bielova M. V. Shtuchnyy intelekt u sudovomu protsesi ta sudovykh rishennyakh: potentsial i ryzyky. *Uzhhorodskyi natsionalnyi universytet*. 2023. URL: [https://www.researchgate.net/publication/373627051\\_Artificial\\_intelligence\\_in\\_judicial\\_proceedings\\_and\\_court\\_decisions\\_potential\\_and\\_risks/fulltext/64f34ba3827074313ff23093/](https://www.researchgate.net/publication/373627051_Artificial_intelligence_in_judicial_proceedings_and_court_decisions_potential_and_risks/fulltext/64f34ba3827074313ff23093/)

Artificial-intelligence-in-judicial-proceedings-and-court-decisions-potential-and-risks.pdf (accessed: 06.07.2025).

5. Buolamwini J., Gebru T. Gendered bias in facial analysis: mizhsektoralni vidminnosti v tochnosti komertsiyinykh system klasyfikatsiyi za statyu. *Pratsi konferentsiyi z mashynnoho navchannya*. 2018. Vol. 81. P. 1–15. URL: <http://proceedings.mlr.press/v81/buolamwini18a.html> (accessed: 06.07.2025).

6. Artificial intelligence for higher education: benefits and challenges. *Frontiers in Education*. 2024. URL: <https://www.frontiersin.org/journals/education/articles/10.3389/educ.2024.1501819/full> (accessed: 06.07.2025).

7. Tsyfrova derzhava: alhorytm uspiyku vid Singapuru. *UASpectr*. 2020. URL: <https://uaspectr.com/2020/12/21/alhorytm-uspihu-vid-singapuru/> (accessed: 06.07.2025).

8. Yevropeyska komisya z efektyvnosti pravosuddya (CEPEJ). Etychna khartiya shchodo vykorystannya shtuchnoho intelektu v sudovykh systemakh. 2018. URL: <https://www.coe.int/en/web/cepej/ethical-charter> (accessed: 06.07.2025).

9. Bil'she 12 000 osib buly profil'ovani defektnym instrumentom prohnovuvannya politsiyi Darema. *Fair Trials*. 2022. URL: <https://www.fairtrials.org/articles/news/foi-reveals-over-12000-people-profiled-by-flawed-durham-police-predictive-ai-tool/> (accessed: 06.07.2025).

10. Zahal'nyy rehulyament zakhystu danykh (GDPR). *Yevropeys'kyy parlament i Rada*. 2016. URL: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32016R0679> (accessed: 06.07.2025).

11. Holovats'kyy N. T. Pravove rehulyuvannya zakhystu personal'nykh danykh: GDPR ta ukrayins'ke zakonodavstvo. *Visnyk yurydychnoho fakultetu Uzhhorods'koho natsional'noho universytetu*. 2024. № 44. P. 1–10. URL: <https://visnyk-juris-uzhnu.com/wp-content/uploads/2024/11/44-1.pdf> (accessed: 06.07.2025).

12. Mizhnarodnyy dosvid vykorystannya tsyfrovoyi informatsiyi v kryminal'nomu protsesi. *Journal of Legal Studies*. 2019. № 4. URL: [http://www.lsej.org.ua/4\\_2019/61.pdf](http://www.lsej.org.ua/4_2019/61.pdf) (accessed: 06.07.2025).

13. Koval'chuk O. Ya. Pravovi ramky zastosuvannya shtuchnoho intelektu v sudoviy systemi. *Internauka*. URL: <https://www.inter-nauka.com/uploads/public/17179636116454.pdf> (accessed: 06.07.2025).

14. Larson D., Engvin D., Mattu S., Kirchner L. Alhorytmichni otsinky ryzyku u kryminal'niy yustyttsiyi: uroky z debativ navkolo COMPAS. *Harvard Data Science Review*. 2022. Vol. 4. № 3. P. 1–25. DOI: 10.1162/99608f92.1e2b3a1a.

15. Obermeyer Z., Powers B., Fogeli K., Mullainathan S. Analiz rasovoyi uperezhnosti v alhorytmu, shcho vykorystovuyetsya dlya upravlinnya zdorov'iam naselennya. *Science*. 2019. Vol. 366. № 6464. P. 447–453. URL: <https://science.sciencemag.org/content/366/6464/447> (accessed: 06.07.2025).

16. Ocheretyanyy V. V., Osisky Y. O. Tsyfrova transformatsiya sudovykh posluh v Ukraini: dosyahnennya ta perspektyvy. *Vinnyts'kyy navchal'no-naukovyy instytut ekonomiky Zakhidnoukrayins'koho natsional'noho universytetu*. 2024. URL: [http://www.lsej.org.ua/4\\_2024/162.pdf](http://www.lsej.org.ua/4_2024/162.pdf) (accessed: 06.07.2025).

17. Paskar A. Etychni aspekty vykorystannya shtuchnoho intelektu v pravosuddi: shlyakh do zabezpechennya prav lyudyny. *Naukovyy zhurnal Chernivets'koho natsional'noho universytetu imeni Yuriya Fed'kovycha*. 2023. URL: <https://journals.chnu.chernivtsi.ua/index.php/main/article/download/70/52/103> (accessed: 06.07.2025).

18. Petryshyn O. V., Hilyaka O. S. Prava lyudyny u tsyfrovu epokhu: vyklyky, zahrozy ta perspektyvy. *Visnyk Natsional'noyi akademiyi pravovykh nauk Ukrainy*. 2021. Vol. 28. № 1. P. 7–35.

19. Bernazyuk Ya. Tsyfrova era pravosuddya: rol' shtuchnoho intelektu u zabezpechenni yednosti sudovoyi praktyky v Ukraini. *Protocol*. 2023. URL: [https://protocol.ua/ru/tsifrova\\_era\\_pравosuddya\\_rol\\_shi\\_u\\_zabezpechenni\\_ednosti\\_sudovoi\\_praktiki\\_v\\_ukraini/](https://protocol.ua/ru/tsifrova_era_pравosuddya_rol_shi_u_zabezpechenni_ednosti_sudovoi_praktiki_v_ukraini/) (accessed: 06.07.2025).

20. Bilyy dim vyrobyv rekomendatsiyi shchodo zakhystu hromadyan vid shtuchnoho intelektu. *MediaSapiens*. 2022. URL: <https://ms.detector.media/trendi/post/30381/2022-10-04-bilyy-dim-vyrobyv-rekomendatsii-shchodo-zakhystu-gromadyan-vid-shtuchnogo-intelektu/> (accessed: 06.07.2025).

21. Tlyopova-Demura M. Vykorystannya alhorytmiv shtuchnoho intelektu u kryminal'niy yustyttsiyi: mizhnarodnyy dosvid ta vitchyzniani perspektyvy. 2021. URL: <https://www.academia.edu/80992767/> (accessed: 06.07.2025).

22. Zgama A. O. Tsyfrova transformatsiya pravosuddya ta perspektyvy dlya biznesu. *Analychna ta porivnyal'na yurysprudentsiya*. 2024. № 320. P. 320–325.

23. Zyuderven Borgezius F. Y. Dyskryminatsiya, shtuchnyy intelekt i alhorytmichne pryattya rishen'. Rada Yevropy. 2018. URL: <https://rm.coe.int/discrimination-artificial-intelligence-and-algorithmic-decision-making/1680925d73> (accessed: 06.07.2025).

**Стаття надійшла до друку 15 липня 2025 року**