International Journal of Law
ISSN: 1694-2442 https://ijl-apm.com/index.php/ijl

ISSUES IN THE USE OF DIGITAL TECHNOLOGIES FOR THE CRIMINOLOGICAL ANALYSIS OF THE CAUSES AND CONDITIONS OF CRIME

Mirzatillayev Umid Izzatillayevich
Senior researcher of the Research Institute of Criminology of the Republic of Uzbekistan,
Doctor of philosophy in legal sciences (Phd)
Doi: https://doi.org/10.5281/zenodo.22643682

Abstract: This article examines the theoretical, methodological, and practical issues associated with the use of digital technologies in the criminological analysis of the causes and conditions of crime. It argues that the identification of crime causation should not be limited to traditional statistical description, but should involve an in-depth analysis of the interrelationships among social, economic, spatial, demographic, psychological, family and domestic, digital, and institutional factors. The article evaluates the national digital platform **"Criminology AI,"** currently being developed in Uzbekistan, as a promising scientific and practical solution for the comprehensive, empirical, and predictive analysis of the causes and conditions of crime. The study substantiates the need to ensure data quality, clearly distinguish between the concepts of causes and facilitating conditions of crime, maintain algorithmic fairness, protect personal data, and incorporate expert assessment into digital criminological analysis.

Keywords: causes of crime, conditions conducive to crime, criminological analysis, digital technologies, "Criminology AI", digital criminology, artificial intelligence, Big Data, Geographic Information Systems, Natural Language Processing, data mining, predictive analytics, criminogenic factors, risk indicators, territorial risk mapping, crime prevention, evidence-based approach.

JINOYATLARNING SABAB VA SHART-SHAROITLARINI KRIMINOLOGIK TAHLIL QILISHDA RAQAMLI TEXNOLOGIYALARDAN FOYDALANISH MASALALARI

Annotatsiya. Mazkur maqolada jinoyatlarning sabab va shart-sharoitlarini kriminologik jihatdan tahlil qilishda raqamli texnologiyalardan foydalanishning nazariy-metodologik va amaliy masalalari yoritiladi. Unda jinoyat sabablarini aniqlash an'anaviy statistik tavsif bilan cheklanmasligi, balki ijtimoiy, iqtisodiy, hududiy, demografik, psixologik, oilaviy-maishiy, raqamli va institutsional omillar o'rtasidagi o'zaro bog'liqliklarni chuqur tahlil qilishni talab etishi asoslanadi. Maqolada, O'zbekiston sharoitida ishlab chiqilayotgan "Criminology AI" milliy raqamli platformasi jinoyatlarning sabab va shart-sharoitlarini kompleks, empirik va prognozli asosda o'rganishga xizmat qiluvchi istiqbolli ilmiy-amaliy yechim sifatida baholanadi. Tadqiqot natijasida jinoyat sabablarini raqamli tahlil qilishda ma'lumotlar sifati, sabab va shart-sharoit tushunchalarini aniq farqlash, algoritmik xolislik, shaxsga doir ma'lumotlarni himoya qilish hamda ekspert bahosini ta'minlash zarurligi asoslab beriladi.

Kalit so'zlar: jinoyat sabablari, jinoyat shart-sharoitlari, kriminologik tahlil, raqamli texnologiyalar, "Criminology AI", raqamli kriminologiya, sun'iy intellekt, Big Data, geografik axborot tizimi, tabiiy tilni qayta ishlash, data mining, prediktiv tahlil, kriminogen omillar, xavf indikatorlari, hududiy xavf xaritasi, huquqbuzarliklar profilaktikasi, dalillarga asoslangan yondashuv.

Introduction

Identifying the causes and conditions conducive to crime is one of the most important scientific and practical tasks of criminology. Crime control and the prevention of offending cannot be limited merely to recording crimes that have already occurred, identifying offenders, or analysing statistical indicators. Effective prevention requires, first and foremost, the identification of the causes that generate criminal behaviour, the conditions that facilitate its occurrence, criminogenic factors, risk indicators, and the interrelationships among them [2]. For this reason, contemporary criminological research increasingly prioritises not simply the question of **"what happened?"**, but rather **"why did it happen, which factors contributed to it, and how can it be prevented?"** [1]

Within traditional criminological approaches, the causes and conditions of crime are commonly examined through criminal case files, investigative documents, judicial decisions, crime-prevention reports, statistical data, and expert assessments. Although these sources are essential, they do not always fully reveal the latent, complex, and multilayered causal structure of crime. Traditional methods may be particularly limited where there is a need to conduct an integrated analysis of multiple factors simultaneously, including the territorial criminogenic situation, economic pressures, family conflicts, youth employment, migration, urbanisation, the digital environment, social control, and the effectiveness of crime-prevention systems [1].

Against this background, the growing need to employ digital technologies in analysing the causes and conditions of crime arises from the increasing complexity of contemporary criminological phenomena. Big Data technologies make it possible to process and integrate large volumes of heterogeneous information [3]; Geographic Information Systems (GIS) facilitate the identification and analysis of spatial crime concentrations and high-risk areas [4]; artificial intelligence (AI) and machine learning can identify complex patterns and relationships among variables associated with crime and support crime-risk forecasting [5]; and Natural Language Processing (NLP) enables meaningful information and recurring patterns to be extracted from unstructured legal and crime-related textual documents [6]. Collectively, these technologies can expand criminological analysis beyond predominantly descriptive approaches towards more systemic, spatial, data-driven, and predictive forms of analysis.

In Uzbekistan, the importance of scientific research in the fields of evidence-based crime analysis, crime prevention, and public safety has been steadily increasing. In recent years, legal and organisational foundations have been developed to advance applied criminological research, strengthen the scientific basis of crime-control activities, systematically analyse and forecast crime trends, identify the underlying factors of crime through comprehensive scientific diagnosis, and introduce artificial intelligence and modern digital technologies into criminological activity [7]. These developments further underscore the need to introduce modern digital technologies into the process of identifying and analysing the causes and conditions conducive to crime.

In this context, the development of a national digital platform entitled **"Criminology AI"** is of particular scientific and practical significance [8]. Such a platform could facilitate an in-depth analysis of the causes and conditions of crime by integrating data on the type of offence, place and time of commission, characteristics of the offender, circumstances of the victim, socio-economic environment, territorial criminogenic situation, preventive measures, and other relevant factors. Most importantly, such a platform could enable criminological conclusions to be derived not from broad assumptions about the causes of crime, but from specific empirical data, measurable indicators, and identifiable risk factors.

At the same time, analysing the causes of crime through digital technologies is methodologically complex. It requires a clear distinction between such concepts as **"cause," "condition," "factor," "determinant," "risk indicator,"** and **"criminogenic situation."** Criminological research on risk factors itself emphasises that a factor associated with an increased probability of offending cannot automatically be treated as a demonstrated causal

factor [2]. If these concepts are conflated, the results of digital analysis may also be misinterpreted. Unemployment, for example, does not necessarily constitute a direct cause of crime in every case; empirical criminological research demonstrates that the relationship between unemployment and offending varies according to offence type and analytical context [9]. Under certain circumstances, unemployment may therefore operate as a facilitating condition or risk indicator rather than as an independent direct cause of offending. Accordingly, the effectiveness of digital analysis depends upon its foundation in a rigorous criminological methodology [9].

The use of digital technologies also involves the processing of personal data, criminal case materials, and sensitive information concerning victims and offenders. Consequently, legality, confidentiality, data protection and anonymisation, respect for human rights, transparency, non-discrimination, and algorithmic fairness must be regarded as essential requirements of such research [10]. Digital tools may assist in identifying patterns and factors associated with crime; however, ultimate scientific and professional responsibility should remain under meaningful human oversight rather than being delegated entirely to automated systems [11].

From this perspective, the principal aim of this article is to examine the methodological foundations, scientific and practical potential, and existing limitations of using digital technologies in the criminological analysis of the causes and conditions of crime. The article conceptualises digital technologies as contemporary methodological instruments capable of supporting the identification of crime-related causes and conditions, the classification of risk factors, the detection of criminogenic areas, the development of targeted preventive measures, and the early prevention of crime.

Research Methods

This article employs a comprehensive methodological approach to examine the use of digital technologies in the criminological analysis of the causes and conditions of crime. The underlying methodological premise is that digital technologies should not be regarded as autonomous systems capable of automatically "discovering" the causes of crime. Rather, they are treated as **analytical tools** that facilitate the processing of large volumes of data, the identification of latent relationships, the classification of criminogenic factors, and the empirical substantiation of scientific conclusions [13].

First, the study applies the **systems analysis method**. This method makes it possible to examine the causes and conditions of crime not as an isolated collection of individual factors, but as a system of interconnected social, economic, spatial, psychological, familial, digital, and institutional processes. Through this systemic perspective, the study proceeds from the premise that criminal behaviour can rarely be explained by a single circumstance and is more commonly shaped by the combined and interacting effects of multiple factors [12].

The **criminological analysis method** constitutes one of the principal methods employed in the study. It is used to analyse the relationships among the causes and conditions of crime, criminogenic factors, risk indicators, characteristics of offenders, circumstances of victims, the territorial environment, and the crime-prevention system. This approach makes it possible to assess the causes and conditions of crime not merely through statistical indicators, but also in terms of their criminological meaning, social context, and preventive significance [12].

The article also employs a **conceptual-analytical approach**. This method is used to distinguish among the concepts of **cause, condition, factor, determinant, risk indicator,** and **criminogenic situation**. For the purposes of this study, a cause is understood as a principal mechanism or driving force contributing to the emergence of criminal behaviour; a condition refers to circumstances that facilitate the commission of crime; and a risk indicator denotes an observable characteristic or signal associated with an increased likelihood of offending [2].

Such conceptual differentiation is essential for preventing the misinterpretation of results generated through digital analysis.

The **comparative analysis method** is used to compare traditional criminological approaches with the capabilities offered by digital technologies. Traditional criminological analysis examines the causes of crime through documentary materials, statistical data, observations, and expert assessments [12]. A digital approach, by contrast, enables the integration of these sources, the identification of recurring patterns and latent relationships, the construction of spatial risk maps, and the forecasting of potential trends [13]. On this basis, the study argues that traditional and digital approaches should not be viewed as mutually exclusive; rather, they should function as complementary components of a unified criminological research methodology.

The **legal and regulatory analysis method** is applied to determine the legal boundaries governing the use of digital technologies in the study of crime causation. Digital criminological research may involve personal data, investigative and judicial documents, crime-prevention reports, and information concerning individuals or groups identified as being at heightened risk. Accordingly, legality, confidentiality, anonymisation, secure data processing, and respect for human rights are treated as mandatory methodological requirements in the collection, storage, processing, and use of such information [11].

An **empirical approach** is also established as a separate methodological criterion. The reliability of digital analysis of the causes and conditions of crime depends primarily on the quality of the empirical data used [14; 15]. Accordingly, official statistics, criminal case files, investigative and judicial documents, crime-prevention reports, sociological surveys, expert interviews, information concerning territorial criminogenic conditions, and digital databases are regarded as important sources of empirical evidence [12]. Where the quality, completeness, or representativeness of the underlying data is poor, even sophisticated digital technologies may generate inaccurate, biased, or superficial conclusions [14; 15].

Finally, the study employs a **digital analytical approach** as one of its key methodological foundations. Within this framework, the potential applications of Big Data, GIS, artificial intelligence, Natural Language Processing, data mining, and predictive analytics in identifying the causes and conditions of crime are examined. Big Data technologies enable the processing of large and diverse datasets [3]; GIS supports the spatial mapping and identification of criminogenic areas [4]; AI and machine-learning techniques can reveal latent relationships among relevant factors [5; 13]; NLP can extract meaningful indicators relating to causes and facilitating conditions from textual documents [6]; and data-mining and predictive techniques can identify recurring patterns and potential crime-related trends within large datasets. Taken together, these instruments provide new opportunities for conducting more comprehensive, evidence-based, and analytically sophisticated criminological research [13].

Results

The findings of the study demonstrate that the use of digital technologies in the criminological analysis of the causes and conditions of crime provides significant methodological opportunities for improving the quality of national criminological research, developing a deeper understanding of crime, and formulating evidence-based preventive decisions [16]. In this context, digital technologies should not be regarded as autonomous systems capable of automatically identifying the causes of crime. Rather, they should be understood as **scientific and analytical tools** that enhance criminological analysis, reveal latent relationships within data, and provide empirical support for expert conclusions [18].

1. The need for a new digital approach to analysing the causes and conditions of crime.

Within traditional criminological analysis, the causes and conditions of crime are generally examined through criminal case files, investigative and judicial documents, crime-

prevention reports, statistical data, sociological surveys, and expert assessments. Although these sources remain indispensable, they may be insufficient to fully explain the complex and multifactorial nature of contemporary crime. Criminal behaviour is rarely the result of a single cause; rather, it often emerges from the interaction of social, economic, familial, psychological, spatial, demographic, digital, and institutional factors [2].

For this reason, the analysis of crime causation requires a transition from a purely descriptive approach towards **multifactorial, data-driven, and systemic digital analysis** [16]. Such an approach focuses not merely on the observable manifestations of crime, but on identifying the underlying mechanisms that contribute to its occurrence. Digital technologies make it possible to conduct an in-depth analysis of the causes and conditions of crime across several dimensions [18]:

first, by type of crime and modus operandi;
second, by territorial criminogenic conditions;
third, by characteristics of the offender and circumstances of the victim;
fourth, by socio-economic and family-related factors;
fifth, by the influence of the digital environment and information technologies;
sixth, by the effectiveness of the crime-prevention system and existing gaps within it.

Such analysis makes it possible to identify the causes and conditions of crime not on the basis of general assumptions, but through empirical data, indicators, and measurable risk characteristics [16].

2. The need to distinguish between "cause," "condition," "factor," and "risk indicator" in digital analysis

The findings further demonstrate that conceptual clarity is of particular importance when digital technologies are used to analyse the causes and conditions of crime. In criminological research, the concepts of **cause, condition, factor, determinant, risk indicator,** and **criminogenic situation** are sometimes used interchangeably. Such conceptual ambiguity may not only reduce the scientific precision of conclusions, but may also lead to the misinterpretation of results generated through digital analysis [2].

From this perspective, it is appropriate to distinguish these concepts in digital criminological analysis as follows:

cause of crime — the principal social, psychological, economic, or individual mechanism that directly contributes to or triggers the commission of an offence;

condition conducive to crime — the environment, situation, circumstance, or organisational and legal deficiency that facilitates the commission of an offence;

criminogenic factor — an element that increases the likelihood of crime, but does not necessarily constitute its direct cause in every case;

risk indicator — a measurable characteristic signalling an increased probability of offending;

criminogenic situation — a combination of factors within a particular territory, social group, or social environment that increases the probability of criminal behaviour [1].

For example, unemployment may, under certain circumstances, constitute a contributing cause of criminal behaviour, while in other contexts it may function merely as a risk indicator. Empirical criminological research demonstrates that the relationship between unemployment and offending varies according to offence type and analytical context [9]. Family conflict may play a causal or risk-enhancing role in domestic and intimate-partner violence, while in relation to other forms of crime it may constitute only one component of a broader criminogenic environment [19]. Consequently, a digital system should not automatically classify every identified factor as a "cause"; instead, it should categorise each factor according to established criminological criteria.

From this standpoint, it would be methodologically appropriate for the "Criminology AI" platform to include a dedicated module for separately classifying causes, conditions, criminogenic factors, and risk indicators. Such a module could increase the scientific accuracy of digital analysis and contribute to the development of more targeted preventive recommendations.

3. Opportunities for Identifying the Causes of Crime Through Digital Technologies

According to the findings of the study, digital technologies can be effectively applied in several principal areas to identify and analyse the causes and conditions of crime [18].

The first area involves the **integration of multi-source data through Big Data technologies**. Information relevant to the causes of crime is contained not only in criminal case materials, but also in crime-prevention reports, territorial socio-economic indicators, community-level data, citizens' complaints and applications, judicial decisions, investigative documents, sociological surveys, and expert assessments. Integrating these sources within a unified digital system makes it possible to develop a more comprehensive understanding of the causal structure of crime [16].

The second area concerns the **mapping of territorial criminogenic conditions through Geographic Information Systems (GIS)**. Spatial mapping can reveal where crimes are concentrated and how their distribution may be associated with social infrastructure, population density, transport flows, commercial facilities, leisure venues, migration patterns, or the territorial coverage of preventive services. This makes it possible to interpret the causes and conditions of crime in their spatial context [17].

The third area involves the **extraction of causes and facilitating conditions from textual documents through Natural Language Processing (NLP)**. Investigative documents, judicial decisions, complaints, explanatory statements, records of preventive interviews, and expert opinions often contain valuable information relating to the circumstances and causes of criminal behaviour. NLP technologies can assist in extracting recurring expressions, circumstances, motives, conflicts, behavioural patterns, and risk signals from such textual materials [6].

The fourth area involves the **identification of latent relationships among factors through machine learning**. Certain criminogenic factors may appear relatively weak when examined independently but may substantially increase crime risk when combined with other factors. For example, unemployment, family conflict, alcohol consumption, prior offending, and weak preventive supervision may jointly increase the likelihood of particular forms of criminal behaviour. Machine-learning algorithms can assist in identifying complex combinations, interactions, and patterns among multiple variables [18].

The fifth area concerns the **identification of recurring criminogenic patterns through data mining**. Data-mining techniques can detect recurring patterns in criminal activity and reveal similarities associated with particular times, places, individuals, behavioural circumstances, or combinations of conditions. Such findings can assist crime-prevention authorities in identifying situations in which the probability of offending may increase [16].

The sixth area involves the **identification of future risk concentrations through predictive analytics**. The study of the causes of crime should not be limited to explaining crimes that have already occurred. It should also help determine in which territories, among which social groups, and under the influence of which factors the probability of future criminal activity may increase [18].

4. The "Criminology AI" Platform as a Tool for the Comprehensive Analysis of Crime Causation

In the context of Uzbekistan, the **"Criminology AI"** platform currently being developed may serve as an important scientific and practical instrument for the comprehensive analysis of the causes and conditions of crime [20]. The platform is intended to facilitate the examination

of crime-related information not as isolated datasets, but as interconnected elements within a unified chain of criminological analysis. The official project framework specifically envisages the creation of an AI-based crime-analysis system, a large crime-related database, mechanisms for analysing factors associated with offending, and predictive algorithms aimed at early crime prevention.

The potential functions of the "Criminology AI" platform in analysing the causes of crime may include:

the integrated analysis of the type, location, time, and modus operandi of criminal offences;

the identification of risk factors associated with offender characteristics and victim circumstances;

the assessment of territorial criminogenic conditions on the basis of empirical data;

the extraction of meaningful indicators relating to causes and facilitating conditions from investigative and judicial documents;

the classification of criminogenic factors into social, economic, familial, psychological, digital, and institutional categories;

the assessment of risk levels across territories and social groups on the basis of measurable indicators;

the development of targeted recommendations for crime-prevention measures [20].

Such a platform could facilitate the development not of broad or generalised conclusions regarding the causes of crime, but of **data-supported, indicator-based, and practice-oriented criminological recommendations** [16]. Most importantly, "Criminology AI" could make it possible to assess crime causation not only retrospectively, on the basis of past events, but also prospectively, from the perspective of emerging and potential future risks [20].

Discussion

The use of digital technologies in the criminological analysis of the causes and conditions of crime represents a field that is scientifically relevant, practically necessary, and methodologically complex. Although digital technologies provide substantial opportunities for conducting deeper analyses of crime causation, identifying latent relationships, and developing more precisely targeted preventive measures, they cannot fully replace criminological reasoning, theoretical interpretation, or expert judgement [18].

The first issue for discussion concerns the relationship between **digital technologies and criminological theory**. Digital technologies are capable of rapidly processing large volumes of data; however, they cannot independently explain the social meaning and underlying mechanisms of crime. For example, a digital system may detect an increase in theft within a particular area, but determining whether this trend is associated with economic pressures, poorly supervised commercial environments, migration, youth employment, or weaknesses in the crime-prevention system requires criminological interpretation. Digital analysis should therefore not replace criminological theory, but rather strengthen and complement it.

The second issue concerns the distinction between **causation and correlation**. Digital technologies can identify statistical associations among variables, but not every association necessarily implies a causal relationship [24]. For instance, crime rates and unemployment may simultaneously increase within a particular area. This does not, however, justify the conclusion that unemployment is the direct cause of every offence committed there. Depending on the context, unemployment may operate as a causal factor, a facilitating condition, or merely a risk indicator [9]. Criminological research has repeatedly demonstrated that causal conclusions require considerably stronger methodological justification than the mere observation of statistical associations [24]. Consequently, unless the results of digital analysis are interpreted within a sound criminological methodology, there is a risk of generating scientifically misleading conclusions.

The third issue relates to the **translation of digital analytical findings into practical crime-prevention measures**. If the digital analysis of crime causation results only in an academic article or research report, its practical value remains limited. Evidence-based approaches require research findings to be translated into concrete preventive strategies and subsequently evaluated in terms of their effectiveness. For example, if digital analysis indicates that family and domestic conflicts are contributing to an increased risk of crime in a particular mahalla or local community, the findings should be converted into a concrete inter-agency cooperation algorithm involving prevention inspectors, community representatives, psychologists, and social-service providers [21].

The fourth issue concerns the **adaptation of the "Criminology AI" platform to national conditions**. Various digital systems are used internationally for crime analysis, yet their direct transplantation into Uzbekistan may not necessarily produce the desired results. Uzbekistan possesses distinctive social and institutional characteristics, including the mahalla system, the activities of prevention inspectors, territorial governance structures, family and domestic relations, demographic patterns, and mechanisms of informal and formal social control [25]. Current national crime-prevention practice also places particular emphasis on territorial analysis, targeted "road maps," early prevention at the mahalla level, inter-agency coordination, and digital monitoring. Accordingly, the national "Criminology AI" platform should be developed on the basis of indicators specifically adapted to the legal, social, institutional, and criminological conditions of Uzbekistan [7; 25].

The fifth issue relates to the **conversion of digital analytical results into crime-prevention management decisions**. The principal purpose of identifying the causes and conditions of crime is not merely to describe them scientifically, but to develop effective measures for their prevention. Digital analysis should therefore result in specific management decisions addressing such questions as: which territories demonstrate the highest level of risk; which factors play the most significant role; which institution or actor is responsible for intervention; which preventive measures are likely to be effective; and how their outcomes should be evaluated [21; 22]. Evidence from place-based policing demonstrates that concentrating preventive resources on objectively identified high-risk locations can produce measurable crime-control benefits [17; 22]. This approach makes it possible to transform crime-prevention activity from broadly formulated general measures into a **risk-oriented management model** [21; 23].

Overall, the discussion demonstrates that the use of digital technologies in the criminological analysis of the causes and conditions of crime offers significant prospects for the development of national criminology. However, such potential can produce meaningful scientific and practical results only where technological innovation is accompanied by rigorous methodology, high-quality data, conceptual clarity, ethical and legal safeguards, algorithmic fairness, expert assessment, and measurable practical effectiveness. Therefore, the "Criminology AI" platform should be developed in Uzbekistan as a **national model of digital criminological analysis** designed to identify the causes and conditions of crime, assess criminogenic risks, and support evidence-based preventive decision-making.

Conclusion

Based on the findings of the study, the following scientific and practical recommendations are proposed.

First, it is necessary to develop a **national methodology for the digital analysis of the causes and conditions of crime**. Such a methodology should clearly define the concepts of cause, condition, factor, determinant, risk indicator, and criminogenic situation, while establishing criteria for their identification, assessment, and classification on the basis of digital data.

Second, a **system of digital indicators relating to the causes and conditions of crime** should be developed within the "Criminology AI" platform. These indicators should be classified into social, economic, family and domestic, psychological, spatial, demographic, digital, and institutional categories.

Third, a **data quality protocol** should be introduced for the digital analysis of crime causation. Each analytical process should clearly identify the source, period, completeness, updating procedure, reliability, limitations, and level of anonymisation of the data used. Without adequate data quality, even the most advanced digital technologies cannot generate well-founded criminological conclusion.

Fourth, the systematic development of **territorial criminogenic risk maps** should be introduced into criminological practice. Using GIS technologies, high-risk locations should be identified at the level of districts, cities, mahallas, sectors, public spaces, and social facilities. The underlying criminogenic factors associated with these areas should then be assessed, and crime-prevention resources should be targeted accordingly.

Fifth, **Natural Language Processing technologies** should be employed to extract information concerning the causes and conditions of crime from investigative documents, judicial decisions, crime-prevention reports, citizens' applications, and explanatory statements. This would enable the identification of recurring motives, conflicts, risk signals, and criminogenic circumstances within large volumes of textual material.

Sixth, **targeted preventive intervention algorithms** should be developed on the basis of digital analytical findings. Such algorithms should specify which crime-prevention actor must respond when a particular risk indicator is identified, what measures should be taken, within what timeframe, and how the outcome should be evaluated. This approach can facilitate the transition from general preventive measures towards a risk-oriented management model.

Seventh, the "Criminology AI" platform should incorporate an **expert assessment and verification module**. Causal relationships, risk indicators, and territorial risk assessments identified by the digital system should be reviewed and verified by criminologists, investigators, prevention inspectors, judicial and investigative practitioners, sociologists, psychologists, and data analysts. Such human oversight is particularly important where algorithmic outputs may influence decisions affecting individuals, social groups, or territories.

Eighth, a system should be developed for the **implementation and evaluation of digital criminological findings in practice**. This system should continuously monitor how recommendations generated through digital analysis affect crime trends, the effectiveness of preventive measures, territorial risk levels, and the precision of management decisions. Evidence-based crime-prevention models require not only the introduction of interventions but also systematic evaluation of whether they actually produce the intended outcomes.

Ninth, **ethical and legal safeguards** governing digital criminological analysis should be strengthened. When processing information concerning personal data, minors, victims, offenders, vulnerable families, and at-risk groups, strict requirements relating to confidentiality, anonymisation, legality, respect for human rights, data protection, and algorithmic fairness should be observed.

Tenth, interdisciplinary research teams should be established in this field. The digital analysis of crime causation requires cooperation among criminologists, legal scholars, sociologists, psychologists, data analysts, GIS specialists, information-security experts, and practitioners from relevant law-enforcement and crime-prevention agencies.

Overall, the criminological analysis of the causes and conditions of crime through digital technologies has the potential to advance criminological science in Uzbekistan to a new stage, deepen the understanding of contemporary crime, and transform crime-prevention practice into an evidence-based, targeted, and predictive model. Achieving this objective requires the integration of digital technologies with a robust criminological methodology, reliable empirical

data, appropriate legal safeguards, expert oversight, and measurable practical effectiveness . Only under these conditions can national platforms such as “Criminology AI” become effective scientific and practical instruments for identifying the causes of crime, assessing criminogenic risks, and improving the prevention of offending.

REFERENCES

1. Wikström, P.-O. H., & Kroneberg, C. (2022). Analytic Criminology: Mechanisms and Methods in the Explanation of Crime and its Causes. *Annual Review of Criminology*, 5, 179–203. DOI: 10.1146/annurev-criminol-030920-091320.
2. Farrington, D. P., & Welsh, B. C. (2006). Understanding Risk and Protective Factors. In *Saving Children from a Life of Crime: Early Risk Factors and Effective Interventions* (pp. 17–36). Oxford University Press. DOI: 10.1093/acprof/9780195304091.003.0012.
3. Chainey, S., & Ratcliffe, J. (2005). *GIS and Crime Mapping*. Chichester: John Wiley & Sons.
4. Jenga, K., Catal, C., & Kar, G. (2023). Machine Learning in Crime Prediction. *Journal of Ambient Intelligence and Humanized Computing*, **14**, 2887–2913. DOI: 10.1007/s12652-023-04530-y.
5. Bifari, E., Basbrain, A., Mirza, R., Bafail, A., Albaradei, S., & Alhalabi, W. (2024). Text Mining and Machine Learning for Crime Classification: Using Unstructured Narrative Court Documents. *Cogent Engineering*, 11(1), 2359850. DOI: 10.1080/23311916.2024.2359850.
6. O‘zbekiston Respublikasi Prezidentining 2024-yil 15-yanvardagi PQ–22-son “Kriminologiya sohasida ilmiy-amaliy tadqiqot ishlarini tashkil etish chora-tadbirlari to‘g‘risida”gi qarori.
7. Aaltonen, M., Macdonald, J. M., Martikainen, P., & Kivivuori, J. (2013). Examining the Generality of the Unemployment–Crime Association. *Criminology*, 51(3), 561–594. DOI: 10.1111/1745-9125.12012.
8. Berk, R., Heidari, H., Jabbari, S., Kearns, M., & Roth, A. (2021). Fairness in Criminal Justice Risk Assessments: The State of the Art. *Sociological Methods & Research*, 50(1), 3–44. DOI: 10.1177/0049124118782533.
9. UNESCO. (2021). *Recommendation on the Ethics of Artificial Intelligence*. Paris: UNESCO.
10. Maxfield, M. G., Babbie, E. R., & Schuck, A. M. (2025). *Research Methods for Criminal Justice and Criminology*. 9th ed. Cengage. ISBN: 978-0-357-76373-5
11. Perry, W. L., McInnis, B., Price, C. C., Smith, S. C., & Hollywood, J. S. (2013). *Predictive Policing: The Role of Crime Forecasting in Law Enforcement Operations*. Santa Monica, CA: RAND Corporation. RR-233-NIJ.
12. Lum, K., & Isaac, W. (2016). To Predict and Serve? *Significance*, 13(5), 14–19. DOI: 10.1111/j.1740-9713.2016.00960.x.
13. Ensign, D., Friedler, S. A., Neville, S., Scheidegger, C., & Venkatasubramanian, S. (2018). Runaway Feedback Loops in Predictive Policing. *Proceedings of Machine Learning Research*, 81, 160–171.
14. Oatley, G. C. (2022). Themes in Data Mining, Big Data, and Crime Analytics. *WIREs Data Mining and Knowledge Discovery*, 12(2), e1432. DOI: 10.1002/widm.1432.
15. Weisburd, D. (2015). The Law of Crime Concentration and the Criminology of Place. *Criminology*, 53(2), 133–157. DOI: 10.1111/1745-9125.12070.
16. Berk, R. A. (2021). Artificial Intelligence, Predictive Policing, and Risk Assessment for Law Enforcement. *Annual Review of Criminology*, 4, 209–237. DOI: 10.1146/annurev-criminol-051520-012342.

17. Capaldi, D. M., Knoble, N. B., Shortt, J. W., & Kim, H. K. (2012). A Systematic Review of Risk Factors for Intimate Partner Violence. *Partner Abuse*, 3(2), 231–280. DOI: 10.1891/1946-6560.3.2.231.
18. O‘zbekiston Respublikasi Oliy ta’lim, fan va innovatsiyalar vazirligi huzuridagi Innovatsion rivojlanish agentligi. (2025). *“Sodir etilgan jinoyatlarning sabab va sharoitlarini tahlil qilish asosida jinoyatlarning barvaqt oldini olishga qaratilgan milliy ‘Criminology AI’ – sun’iy intellekt texnologiyasini ishlab chiqish” amaliy loyiha mavzusi*. Ilmiy faoliyatga oid davlat maqsadli dasturi, “Huquq fanlari” yo‘nalishi, 7.3-band.
19. Sherman, L. W. (1998). *Evidence-Based Policing*. Ideas in American Policing. Washington, DC: Police Foundation.
20. Braga, A. A., Turchan, B., Papachristos, A. V., & Hureau, D. M. (2019). Hot Spots Policing of Small Geographic Areas Effects on Crime. *Campbell Systematic Reviews*, 15(3), e1046. DOI: 10.1002/cl2.1046.
21. Andrews, D. A., Bonta, J., & Wormith, J. S. (2011). The Risk-Need-Responsivity (RNR) Model: Does Adding the Good Lives Model Contribute to Effective Crime Prevention? *Criminal Justice and Behavior*, 38(7), 735–755. DOI: 10.1177/0093854811406356.
22. Nagin, D. S., & Sampson, R. J. (2019). The Real Gold Standard: Measuring Counterfactual Worlds That Matter Most to Social Science and Policy. *Annual Review of Criminology*, 2, 123–145. DOI: 10.1146/annurev-criminol-011518-024838.
23. President of the Republic of Uzbekistan. (2025, July 8). *Measures on Ensuring a Safe Environment in Mahallas Presented*. Official Website of the President of the Republic of Uzbekistan.