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SOCIAL ASSESSMENT OF TECHNOLOGY: RISKS OF IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES

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Abstract. The article highlights the role of social assessment of technology (TA) as a new tool of science and technology policy aimed at finding means for social management of technologies. Development of new information technologies, in particular, AI technologies, has become a subject of research of scientists from various fields, including specialists in TA. In article it is indicated that active implementation of artificial intelligence (AI), robotics and machine learning technologies over recent years not only provide additional opportunities for business, governments and people, while transforming social, professional, cultural sphere of society, but also generate significant concerns and risks of social inequality, transformation of labor market, growth of income differentiation, security threats, etc. The article highlights the risks and concerns of

using AI technologies and possible approaches for their prevention and overcoming in Ukraine and the world. It is discussed the activity of international organizations on development of standards, focused on social and ethical consequences of Al introduction. Specialized types of impact assessment of AI technologies, such as human rights impact assessment and algorithmic assessment, which are reflected in activities of offices and organizations on technology assessment, are analyzed. It is identified the need for development of international standards and creation of ethics code in the field.

Keywords: social assessment of technology, artificial intelligence, social risks, ethics of science, human rights impact assessment, algorithmic impact assessment

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СОЦІАЛЬНА ОЦІНКА ТЕХНОЛОГІЙ: РИЗИКИ ВПРОВАДЖЕННЯ ТЕХНОЛОГІЙ ШТУЧНОГО ІНТЕЛЕКТУ

Анотація. У статті аналізуються причини ризиків впровадження технологій штучного інтелекту та можливі шляхи їх мінімізації, у тому числі за допомогою принципів та підходів соціальної оцінки технологій. У дослідженні використано трансдисциплінарний, прогнозно-аналітичний, історичний підходи, які дозволять розкрити зв'язки між загальнокультурними цінностями, соціальними запитами і оцінками та когнітивними, практичними можливостями технологій штучного інтелекту. Зокрема, використано загальнонаукові та спеціально наукові методи, такі як: методи аналізу, синтезу та порівняння, а також соціокультурний та герменевтичний методи. Встановлено, що соціальна оцінка технологій, окрім орієнтації на вивчення суспільної ролі технологій, яка виникає завдяки впровадженню короткострокових та довгострокових наслідків їх застосування на процес прийняття науково обґрунтованих рішень у науково-технічній політиці, також має зосередитись на формуванні запобіжних заходів, тобто соціальному проєктуванні нових технологій уже на ранніх етапах процесу їх створення. Показано, що впровадження технологій штучного інтелекту, робототехніки та машинного навчання, яке дуже активно відбувається в останні роки, не лише відкриває додаткові можливості для бізнесу, урядів і звичайних людей, трансформуючи соціальну, професійну, культурну сфери суспільства, а й породжує суттєві проблеми та ризики, пов'язані із соціальною нерівністю, трансформацією ринку праці, зростанням диференціації доходів, загрозою безпеки тощо. У статті висвітлюються ризики та небезпеки використання технологій штучного інтелекту та можливі шляхи їх попередження та подолання в Україні та світі. Висвітлено діяльність міжнародних організацій стосовно розробки стандартів, орієнтованих на соціальні та етичні наслідки штучного інтелекту. Досліджено спеціалізовані види оцінювання впливу технологій штучного інтелекту, зокрема впливу на права людини, та алгоритмічного оцінювання, які активно інтегруються в державне управління та нормотворчий процес, а також активно досліджуються і відображаються в діяльності підрозділів та організацій з оцінювання технологій. Проаналізовано правове регулювання у сфері застосування технологій штучного інтелекту, спрямоване на забезпечення стимулювання соціально ефективного використання технологій та мінімізацію ризиків зловживання технологією; визначено необхідність розробки міжнародних стандартів та створення етичного кодексу в цій сфері.

Ключові слова: соціальна оцінка технологій, штучний інтелект, соціальні ризики, етика науки, оцінювання впливу на права людини, оцінювання впливу алгоритмічних систем.

Introduction. The nature of technical knowledge undergoes profound changes during its development, the scope of technique and technologies is constantly expanding and simultaneously the importance of conceptual and moral problems caused by them also increases. The main problem of technology-oriented society is not expansion of constantly evolving technologies, but a discrepancy between human and human-made technical world. The emergence of social assessment of technology (TA) phenomenon is caused by increase of unwanted consequences of science and technology progress. Social assessment of technology

is focused precisely on the study of social role of technologies and emerging of social, environmental, etc. conflicts, through its implementation; it is focused on decision-making process for preventing such conflicts and determine the ways of further development of technique and technologies in society. The emergence of social assessment of technology is also driven by the fact that science is more often forced to involve in the process of political decision-making and related process of shaping public opinion. In addition, science is one of the largest social institutions that requires large expenditures and, accordingly, new ways for evaluation of its functioning and potential, as well as a usefulness to society. The direct involvement of science into the process of economic and political decision-making increases the importance of scientific research for economic development and solution of political problems.

Development of new information technologies was a point of particular concern. Thus, digitalization becomes the basis of current technical and technological progress and contributes to global changes in organizing production and daily life. It contributes to emergence of new innovations that will have profound consequences for humanity, change of relations between citizens, government and business, and lead to transformation in structures of society and the economy [25]. Smartphone, Internet of things, digital production, cryptocurrency, block chain, automation, machine training, and artificial intelligence become radical technologies of people's daily life, implementation of which not only provide additional opportunities for business, governments and people, but also generates significant problems, challenges and risks [7]. Rapid development of technologies is ahead of the creation of preventive measures from their misuse and regulative policy making. Among them are artificial intelligence (AI) technologies, which have already become the subject of scientific research, as well as object of state programs, and are already actively used in different spheres of life.

The Aim of the Study. The aim of the paper is to identify causes of the risks of implementing artificial intelligence technologies and possible ways to reduce them, including through the principles and methods of social assessment of technology.

Sources. Ethical reflection and technology assessment were increasingly recognized as integrative part of R&D programmes in works of K. Siune, E. Markus, M. Calloni, U. Felt, A. Gorski, A. Grunwald, A. Rip, V. de Semir, S.Wyatt [20]. The diffusion of ideas of technology assessment (TA) in Europe was originally related to the problems of technology management and forecasting. In studies of R. Smits, P. den Hertog, A. Grunwald, TA has been understood as a contribution to technology governance and innovation policy, in particular, in areas of uncertain knowledge. In addition, TA is increasingly involved in the debates on futures and visions integrating foresight as one of its main elements. G. Bechmann, M. Decker, U. Fiedeler, B.-J. Krings consider technology assessment as an early warning system for risks caused by technology [5].

D. Collingridge in his works presents methodological difficulty related to the fact that technology management is always lagging, that is, risk assessment is carried out in the area of epistemological uncertainty, knowledge deficiency, and regulation is limited to the ethical principle of precaution. The principle of precaution calls upon vigilance over the unknown. A. Grunwald notes in his works that normative uncertainty is the starting point for technical ethics [9].

The transdisciplinary stage of technology assessment and the issues of active and conscious involvement of ordinary citizens with an emphasis on «Responsible Research and Innovation»(RRI) practices in discussion of issues related to scientific and technical policy, which turns into an effective tool for democratization of society, were discussed in the works of A. Grunwald, I. Chernikova, E. Seredkina [10]. J. Hahn, M. Ladikas, C. Merz, C. Scherz discussed global TA model, its various forms and practices.

Emerging moral dilemmas regarding the development of information technologies and, in particular, artificial intelligence technologies are currently discussed in the literature. B. Stahl, D. Schroeder, R. Rodrigues present thematic studies on practical introduction of Al that cause social and ethical issues [21]. There are documents cases related to use of AI that leads to discrimination by gender, when applying for a job, unfair and illegal racial discrimination,

confidentiality and data protection issues, adherence to the principles of democracy, political manipulation during the election period and marketing campaigns, complex problems of humiliation of human dignity while interacting with AI, etc. According to A. Hagerty and I. Rubinov, implementation of AI systems enables increase of social inequality. Such social problems may cause social instability and endanger entire societies. AI systems can also be used for undemocratic purposes, such as intensive surveillance of ordinary citizens and intimidation of activists [11]. S. Sheikh considers that increasing task automation threatens to replace workers in industries. AI might also challenge local businesses, because it tends to support a 'winner takes all' competitive environment. According to researcher, societal challenges include privacy, security, public trust and replication of social biases.

The future social implications of implementation of AI technologies are huge, and require further thorough study.

Basic material and Results. Introduction of new technologies is always associated with uncertainty, since modern technology is so complicated that the forecasting of its side effects becomes almost impossible. Social responsibility of scientists and engineers is increasing in society, and make them constantly reflect on their own scientific and technical activity. The focus should not be solely on technique and technology, but their link with society.

Analysis of the impact of new technologies and possibilities for preventing or reducing the negative effects of science and technology progress required development of special social technologies that are currently being created within the so-called «social assessment of technology» (TA). This term refers to the field of interdisciplinary research, which deals with the study of existing or potentially positive and negative consequences of scientific and technical development at the intersection of technical, natural, social and humanitarian sciences, and introduction of preventive measures, that is social design of new technologies at early stages of its development [6]. TA is a problem-oriented and interdisciplinary research. It is required for science-based decision-making (in terms of natural, technical and social sciences) in science and technology policy. STS (Science-Technology-Society), «risk research», «analysis of technical innovations», and more, are related concepts to TA.

The concept «technology assessment» dates back to 1960s in the United States, where within the concept such problems as consequences of environmental pollution, supersonic transport, and genetic screening ethic were discussed [4]. In many spheres, problems with unintentional side effects of technologies implementation, such as environmental pollution and severe accidents, have become the subject of public debates concerning further science and technology progress. In many countries social conflicts have arisen due to controversial technologies such as nuclear energy (since 1970s) and genetically modified organisms (since 1990s), etc [8]. Scientists are concerned about the impact of new technologies not only on modern society, but also next generations, for instance, in case of radioactive waste storage or human-induced climate change.

In recent years the study of social consequences of implementation of new information technologies, in particular, artificial intelligence technologies, which are currently rapidly developed and has already accumulated an arsenal of tools and methods for its use, has gained an attention.

Artificial intelligence (AI) – algorithmic systems – includes technologies, essence of which whole world is trying to understand, in order to evaluate their impact and risks. Public and international organizations are continually re-evaluate existing laws, human rights and ethical rules for identifying legal gaps that need to be regulated in the sphere. Risks of AI technologies should be particularly considered now due to their rapid development. In 2023, after summit in Hiroshima (Japan), G7 leaders, being concerned about intensive development of AI technologies, called for urgent «restrictions» for their implementation. On March 22, 2023, thousands of tech leaders and researchers also signed an open letter regarding AI technologies, expressing anxiety about their potential harm in the future, when artificial intelligence will become a reality, calling up to a 6-month pause in development of AI systems [2]. According to experts, the concerns are related to increase of incidents

of AI misuse, strengthening of existing prejudices, as well as a tendency of facilitating the spread of misinformation.

Artificial Intelligence and intelligent systems are changing ways humans interact with each other and the world around us. AI impacts every aspect of people's lives and transforms social, professional, cultural spheres of society. It is able to make human life easier in modern world, where the speed of information processing and efficiency of resource distribution matters a lot. Autonomous artificial intelligence agents can perform the work in health, security, production, life, transport and other areas, without human involvement.

Built-in artificial intelligence is usually used as auxiliary mean for making decisions by a person. However, when artificial intelligence completely replaces a person, and at the same time its decisions can have adverse impact for users or other parties, there is serious moral dilemma arising, which has been discussed in the literature recently. Existing and other challenges contribute to developing new areas of ethical research – «morally competent robots», «machine ethics» and «machine morality» [3].

The use of AI in areas related to service, communications, education can potentially bring psychological harm to people, even result in dehumanization of human relationships and society as a whole. In addition, there are concerns about the criminal misuse of Al, for example, for personal data theft, spreading misinformation, discrimination, information manipulation, rise of excessive inequality, spreading of isolation and threats to cultural diversity, etc.

The usage of AI in the field of creativity leads to interesting results, as well as new tasks, for example, to rethinking key regulatory principles and concepts, such as «authorship», «original work», «plagiarism». The other danger is a potential risk of increasing number of works that infringe copyrights of others.

The widespread use of digital technologies and automation will potentially also have consequences in rising income inequality, concentration of wealth, formation of subjects' deviant behavior, loss of jobs [24]. Particularly, changes in nature of work, caused by digitalization, exacerbate the problem of informal employment, when employees lack access to virtually social protection system and minimal prospects for future pension provision. Another concern deals with corporate and government expenditures increase linked to the need for employees' social and labor adaptation to the impact of digital technologies on their professional skills and their demand in the labor market [17].

AI regulation is dynamically developed and being improved. AI regulations and laws, addressing ethical, legal, and technical aspects, vary across the globe, with different countries and regions implementing their own approaches to govern the development and use of artificial intelligence technologies. Currently, the Artificial Intelligence Act (AI Act), the European Union bill, is in the process of discussion and submitting proposals; the purpose of the bill is to create a secure environment for the use and development of AI. It will be the first AI law in the world, which must be approved by the end of 2024. It is expected to come into force until 2026, as it requires a grace period during which interested parties can adapt their activities to the AI Act.

AI Act was a response premised on the need to regulate the rapid pace of AI technologies development and their impact on society. According to the bill, the use of artificial intelligence should be limited for systems that can have «socially dangerous» and «manipulative» properties. [15]. The AI Act classifies AI systems into risk categories and establishes requirements for high-risk AI. The proposed rules prohibit intrusive and discriminatory use of AI. On 28 September 2022, the European Commission also released the proposal for an Artificial Intelligence Liability Directive that deals with claims for harm caused by AI systems, or the use of AI, adapting non-contractual civil liability rules to artificial intelligence. The Directive complements the Al Act by introducing a new liability regime that ensures legal certainty, enhances consumer trust in AI, and assists consumers' liability claims for damage caused by AI-enabled products and services [1]. Alongside the AI Act and Directive, other important legislations in the realm of AI are in the pipeline.

Considering example of the United Kingdom, which in terms of AI startups and scaleups, private capital invested and conference papers submitted, sits in the top tier of AI nations globally, it must be noted that its government wants to avoid heavy-handed legislation that could stifle innovation. The UK hasn't rolled out a comprehensive AI regulation. In 2022, the UK Government published the AI Regulation Policy Paper, as a part of the UK Government's National AI Strategy and its AI Action Plan, which sets out the Government's vision for the future «pro-innovation» and «context-specific» AI regulatory regime in the UK. The major differences between UK Government's Policy Paper and the EU AI Act, is that unlike the EU's AI Act proposal, the Policy Paper sets out a de-centralized approach to AI regulation, leveraging the experience and expertise of existing regulators and making them issue guidance to highlight the relevant regulatory requirements applicable to businesses they regulate; while the EU's AI Act proposal includes a list of prohibited AI practices that are unacceptable in all circumstances as well as a list of high-risk AI systems, the Policy Paper does not seek to ban specific uses of AI but will leave it up to regulators to decide if the use of AI in specific situation should not be allowed or should be subject to higher regulatory burden; while the EU's AI Act is directly applicable in all EU Member States, the UK Government proposes to initially put the cross-sectoral principles on a non-statutory footing, for example, by issuing executive guidance or a specific mandate to regulators without introducing new legislation [27]. AI White Paper, which was published on 29 March 2023, has become the continuation of the AI Regulation Policy Paper. It outlines the principles of safety, transparency, fairness, governance and contestability in regulation of AI technologies. According to White Paper UK government intend to continue development of UK domestic policy position on AI regulation, progress action to promote AI opportunities and tackle AI risks, build out the central function and supporting regulators, encourage effective AI adoption and providing support for industry, innovators and employees and maintain international collaboration on AI governance [23].

Specialized types of impact assessment that are increasingly created in the field of development and implementation of new technologies and integrated into public administration and regulatory process are reflected in AI regulations in different countries. Technology assessment units and organizations included them in the published reports on use of AI technologies. So, for example, in 2017, Rathenau Institute (RATH, the Netherlands) published report «Human Rights in the Age of Robots: issues, related to use of robotics, AI, virtual and augmented reality". In order to safeguard human rights in the robot age, it was recommended to the Parliamentary Assembly of the Council of Europe (PACE) to call for the preparation of a convention on robot ethics, or safeguarding human rights in the robot age, which would create common guiding principles to preserve human dignity in the way humans apply innovations in the field of the Internet of Things, including the Internet, robotics, AI, and virtual and augmented reality. Report has suggested the Council of Europe: to provide guidelines on engineering techniques and methods that permit AI and robotics to fully respect the individual's dignity and rights; shed light on how algorithmic accountability or fairness can be facilitated and how the developers of algorithms can be enabled to devise automated decisions that respect human rights and will not discriminate against individuals; to form an opinion about how ICTs can be designed in such a way that they comply with the right to respect for family life, and so on [26]. The report of Parliamentary Office for Scientific and Technological Assessment (France) "Facial recognition" (2019) is focused on development of legislative framework, which makes it possible to support testing in the field of facial recognition that would be operational at the latest by the 2024, and which ensure respect for fundamental freedoms, French sovereignty and the development of ethical AI.

As the public and private sectors increase their efforts to implement AI impact assessments, calls to require Human Rights Impact Assessments (HRIAs) for AI are also on the rise. HRIAs can help AI developers and deployers (government agencies or businesses) anticipate and mitigate the impacts of AI systems on human rights before and after the systems are available to the general public. In June 2011, HRIAs was initially introduced by U.N. Human Rights Council in the U.N. Guiding Principles on Business and Human

Rights, which required businesses to carry out due diligence to ensure that they are not infringing on human rights [22]. The CM/Rec (2016) Recommendation of the Committee of Ministers of the Council of Europe for Human Rights and Business suggests this assessment to be carried out by companies, as well as the Council of Europe members States while implementing legislative regulation and other measures. In January 2017, The Council of Europe Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data (T-PD) approved the guiding principles for the protection of individuals regarding processing of personal data in the world of Big Data, which provide for the creation of special ethics councils by all personal data operators. In January 2019, the Committee also approved the Guidelines of artificial intelligence and data protection, which enable developers, manufacturers and providers of AI services to assess the impact on human rights. In May 2019, the Commissioner of the Council of Europe on Human Rights published recommendation «Artificial Intelligence: 10 steps to protect human rights». Wherein the Council of Europe member states must create a legal framework to establish procedures for human rights impact assessments of Al systems by the state authorities [28].

Particular attention to the impact of digital technologies, including AI, on human rights has led to the development of special Impact Assessment of Algorithmic Systems. Algorithmic assessment involves risking for human rights, ethical and social consequences of algorithmic systems. There are different models of such assessment. In particular, GDPR performs the impact of how data is protected (Data Protection Impact Assessment), while the Council of Europe is promoting the concept of human rights impact assessment as a whole. There is still an open question about voluntariness and obligation of such assessment. In 2020, the Committee of Ministers of the Council of Europe developed Recommendations on the human rights impacts of algorithmic systems, urging the Council of Europe member states to apply precautionary principle in the development and use of algorithmic systems, as well as to adopt legislation, policy and practice that will be fully consistent with human rights [16].

International organizations and partnerships between countries are working on frameworks to guide AI regulation, whereas collaborative efforts are essential to ensure responsible AI development and its ethical use worldwide. Hence activities of international organizations, such as OECD, IEEE, UNESCO, WHO, etc., has become very important. Their activities are aimed at the issues within their respective spheres of competence. For example, OECD has initiated the 'Going Digital' project, which aims to help policymakers in all relevant policy areas to better understand digital revolution that is taking place across different sectors of economy and society as a whole. The OECD has also created an expert group (AIGO) to provide guidance in scoping principles for artificial intelligence in society. WHO has established a Focus Group on "Artificial intelligence for Health" [14].

IEEE focuses on development of standards aimed at social and ethical consequences of artificial intelligence implementation. One of the first international standards, focused on social and ethical consequences of Al, is the "Standard of the Institute of Electrical and Electronics Engineering (IEEE) (Std) 7010-2020. The recommended practice of assessing the impact of autonomous and intellectual systems on human well-being». It is noticeable for the Standard to emphasize the impact of AI on human well-being, enforcement of human rights, promoting ideals of justice, accountability, transparency, that is the priority of humanistic values during development and use of AI. Although IEEE 7010 is advisory in nature, it should be considered not only as a component of self-government of private sector, it can play a certain part and have political legitimacy [19].

UNESCO's materials [14] noted that AI not only transforms professional activity of intellectual workers, such as doctors, scientists, judges, as well as security workers, even artists, but also changes the world of professions in general, and requires new forms of stability and flexibility of human labor. AI becomes a challenge for modern education, since collection and analysis of information become a routine procedures that can be easily performed by AI, in turn a person must be able to critically comprehend, interpret and communicate the results. Modern requirements to «life-long learning» may require transformation of continuous, diverse and multifaceted learning model. In 2023, UNESCO also published

Recommendation on the ethics of artificial intelligence that offers a procedural framework for solving and reducing the risks of its introduction.

Ukraine is currently slipping further behind in many areas of legal regulation of AI. Among the documents governing the development of AI technologies in Ukraine is the Concept of development of digital economy and society of Ukraine for 2018-2020, approved by the Decree of the Cabinet of Ministers of Ukraine from January 17, 2018, which determines necessity for creation of revised concept of "smart production", that identified with the "fourth industrial revolution" and rising of cyber-physical systems. Industry 4.0 – the next stage of digitalization of production and industry, where such technologies and concepts as «Internet of Things» (IoT), «Big Data», «Cloud Calculations», Predictive Analytics, machine training, machine interaction, artificial intelligence, robotics, 3D printing, supplemented with reality have a primary role [18]. In 2020, the government approved «The Concept of Artificial Intelligence Development». This framework document defines artificial intelligence as a computer program, respectively, where legal regulation of the AI technologies usage is similar to legal regulation of other software products. On January 1, 2022, the Law of Ukraine "On Copyright and Related Rights" [29] came into force; it will regulate particularly the issues of intellectual property right protection for AI-generated objects. As a result of generation, there is a rise of special kind of rights, so called sui generis, instead of copyrights, and copyright to the content will belong to the party specified in agreement on use of AI systems (end-user license agreement (EULA)). In 2023, The Ministry of Digital Transformation of Ukraine has developed a Roadmap for the regulation of AI in Ukraine, which will help Ukrainian companies to prepare for the adoption of a law analogous to the EU's AI Act. It implies the human rights impact assessment of technology, signing voluntary codes of conduct on ethical use of AI by companies, development of a White Paper that will acquaint businesses with approach, timing and stages of implementation of AI regulation, and publishing general and sectoral recommendations for adaptation to the future AI law [13].

Considering that Ukraine is an EU candidate country, it is assumed that in the future our AI legislation will be harmonized with European one. Effective legal regulation of AI in Ukraine will ensure a balanced approach to the use of AI systems, protection of citizens' rights and support for innovative development of the country.

It can be argued that the legal framework for AI technologies in the world and Ukraine still requires coordination and finalization, since the norms don't keep pace with technology.

Scientists discuss inability to stop the development of technologies. V.I. Borysov notes that technologies, however dangerous they could be, will necessarily be invented and diffused regardless of our desire and attitude towards them [12]. The absolute prohibition of AI systems development is impossible, so legal regulation in this area should ensure socially efficient use of technologies and minimization of risks of technology misuse.

Conclusion. In the process of technology assessment science entering new humanistic dimension, where emerging technologies should be relevant to social values and ensure sustainable development of humanity. The use of AI technologies in various spheres of life creates opportunities and prospects for development, as well as generates risks and requires rethinking of certain established concepts, which have characterized principles of social, professional, interpersonal relationships for centuries. Development and use of AI in areas related to moral decision-making must proceed on an interdisciplinary basis, and bring together specialists in information technologies, philosophers, jurists, psychologists, sociologists, also public. National and international organizations, professional associations, universities and scientific institutions, ethics committees, civil society should join the study of social and moral problems concerning use of AI systems. Specialized types of impact assessment of AI technologies, integrated into public administration and rulemaking process, particularly, human rights impact assessment and algorithmic assessment should be actively studied and reflected in activities of offices and organizations on technology assessment. Legal regulation in the field of AI technologies implementation requires coordination and finalization, since the norms don't keep pace with technology.

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ІСТОРИЧНА АНТРОПОЛОГІЯ ЯК СУЧАСНА ФІЛОСОФІЯ ІСТОРІЇ: МІКРОІСТОРИЧНИЙ АСПЕКТ

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Анотація. Метою статті є розкриття сутності теоретичних особливостей «мікроісторичних» концепцій як складників історично-антропологічного горизонту сучасної філософії історії та їх значущості для розвитку філософсько-історичних студій. **Методологія** цієї