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## АНАЛІЗ РОЗВИТКУ ІТ В КОНТЕКСТІ РИЗИКІВ, ЯКІ ВОНИ НЕСУТЬ

**Анотація.** У статті досліджено історичний розвиток інформаційних технологій (ІТ) у контексті можливих негативних наслідків. Вона висвітлює позитивний вплив ІТ на розвиток суспільства, але водночас підкреслює проблеми, пов'язані з появою негативних впливів, таких як інформаційна війна, гібридна війна та кіберзагрози. Акцентовано увагу на тому, що оперативна готовність у протидії цим викликам може бути досягнута лише через розуміння розвитку епохи, зумовленої ІТ-технологіями, характеру їх поширення та специфіки застосування. Обґрунтовано необхідність формування членів суспільства розуміння комплексного впливу розвитку ІТ на громадську безпеку. Стаття визнає ранніх вчених, які намагалися проаналізувати генезис розвитку ІТ та його історичні та соціальні наслідки, зокрема Е. Тоффлера, Б. Кастельса та Д. Белла. У ній акцентується увага на думках Е. Месснера щодо можливостей ведення інформаційної війни за допомогою різних інформаційно-психологічних прийомів і засобів, наголошується на важливості розуміння розвитку епохи. Дослідження заглиблюється у феномен інформаційної війни, яка охоплює різні форми інформаційної війни у сфері Інтернету. Визначено загрози, які несуть інформаційні війни. У статті описано генезис поняття «інформаційна війна» та встановлено домінуючу роль інформаційної складової, яка за допомогою різних інформаційно-психологічних прийомів і засобів впливає на світогляд, цінності та суспільну свідомість, створюючи реальну загрозу для націй, особистостей і людства.

Окреслено основні елементи інформаційної війни, серед яких контроль над світовим інформаційним простором, вплив на громадську думку, формування суспільного світогляду, дезінформація, маніпуляції, пропаганда та кібератаки, спрямовані на викриття конфіденційної інформації та дестабілізацію критичної інфраструктури. Обґрунтовується небезпека «гібридних війн», що характеризуються нетрадиційними методами ведення війни (такими як терористичні акти, хакерські атаки, маніпулювання громадською думкою) та потужною інформаційно-пропагандистською складовою. Встановлено, що дослідження в контексті визначеної проблеми, концентруючись на розумінні історико-філософського осмислення проблеми та її наслідків, дає змогу з високим ступенем ймовірності прогнозувати майбутні події, ефективно реагувати на негативні впливи та професійно керувати процесом. У статті визначено перспективні напрями досліджень, зокрема аналіз психологічних, соціальних, педагогічних аспектів розвитку ІТ для утвердження безпечного існування в інформаційному просторі як держави, так і молодшої особистості.

**Ключові слова:** ІТ; інформаційна війна; гібридна війна; інформаційний простір; кіберзагрози; навички безпечного існування в інформаційному просторі; підготовка молоді.

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## ANALYSIS OF THE DEVELOPMENT OF IT IN THE RISKS CONTEXT THEY POSE

**Abstract.** This article explores the historical development of information technology (IT) in the context of possible negative consequences. It highlights the positive impact of IT on societal development, but at the same time, it underscores the problems associated with the emergence of negative influences, such as information warfare, hybrid warfare, and cyber threats. Emphasis is placed on the idea that operational readiness in countering these challenges can only be achieved through an understanding of the era's development driven by IT technologies, the nature of their dissemination, and the specifics of their application. The necessity of forming an understanding of the comprehensive impact of IT development on public safety is justified. The article acknowledges the early scholars who attempted to analyze the genesis of IT development and its historical and social implications, including E. Toffler, B. Castells, and D. Bell. It focuses on the thoughts of E. Messner regarding the possibilities of conducting information warfare through various information-psychological techniques and means, emphasizing the importance of understanding the development of the era. The research delves into the phenomenon of information warfare, which encompasses various forms of information warfare within the realm of the Internet. The threats posed by information wars are identified. The article describes the genesis of the concept of "information warfare" and establishes the dominant role of the information component, which influences worldviews, values, and societal consciousness through various information-psychological techniques and means, posing a real threat to nations, individuals, and humanity.

The main elements of information warfare are delineated, including control over the global information space, influence on public opinion, shaping of the societal worldview, disinformation, manipulation, propaganda, and cyberattacks aimed at exposing confidential information and destabilizing critical infrastructures. The article also examines the danger of "hybrid wars," characterized by unconventional methods of warfare (such as terrorist acts, hacker attacks, and manipulation of public opinion) and a powerful information and propaganda component. It is established that research within the context of the defined problem, concentrating on understanding the historical and philosophical understanding of the issue and its consequences, enables predictions of future events with a high degree of probability, effective response to negative influences, and professional management of the process. The article identifies prospective research directions, including the analysis of psychological, social, and pedagogical aspects of IT development for the establishment of a secure existence in the information space for both states and individuals.

**Keywords:** IT; information war; hybrid war; information space; cyber threats; skills of safe existence in the information space; youth training.

**Problem statement.** The digital environment we are accustomed to is considered natural and doesn't require us to contemplate its essence until fundamentally new social, political, economic, or technical events occur as a result of it. Whether an event is positive or negative, it instantly captures the public's attention and prompts reflection on what caused the specific event, what factors contributed to its course, and what potential consequences may arise. This process accompanied the emergence of electronic money, Bitcoin, the organization of e-learning, the first online stores, and more. While progressive achievements that emerge in the global community generate interest and admiration for their appearance, dangerous events such as information warfare, cybercrime, electronic crimes, media manipulation, and fake news demand immediate responses and actions. To ensure such responsiveness, it is only possible through an understanding of the era's development caused by IT technologies, the nature of their dissemination, and the specifics of their application. A logical, structured approach based on fundamental knowledge and an understanding of cause-and-effect mechanisms allows for high-probability forecasting of future events, the prompt countering of negative influences, and professional management of this process.

Therefore, the task at hand is to form a conception, understand the regularities, and evaluate the comprehensive impact of the development of information technologies (IT) on societal security. To achieve this, it is essential to consider their origins and trace the dynamics of changes from historical, philosophical, and social perspectives.

**Analysis of Current Research.** In the field of psychology and pedagogy, three prevalent aspects can be observed in understanding the development of information technology (IT). These aspects provide distinct viewpoints on the role and impact of IT in society.

**Technological Aspect:** This perspective emphasizes the dominant role of information and communication technologies in societal development. It acknowledges the influential role of IT in shaping various aspects of society. Key terms associated with this viewpoint include innovation, the Internet of Things (IoT), artificial intelligence, Big Data, cybersecurity, and mobile technologies.

**Cultural Aspect:** This approach highlights the significance of cultural development for the progress of humanity. It underscores the interconnection between cultural development and the advancement of information technologies.

**Information Aspect:** This viewpoint prioritizes a person's ability to navigate and understand information flows as the hallmark of progress in society.

Notable researchers such as E. Toffler, M. Castells, and K. Shannon play significant roles in analyzing and explaining the patterns of development, especially from a technological perspective. According to M. Castells, the technological aspect of this era influences various aspects of societal life, offering new opportunities but also presenting challenges related to ethics, privacy, and security.

Current comprehension of the technological aspect is closely linked to keywords like innovations, the Internet of Things (IoT), artificial intelligence, Big Data, cybersecurity, and mobile technologies.

The technological aspect of this era impacts various aspects of societal life, creating new possibilities while also introducing challenges related to ethics, privacy, and security.

In the context of contemporary scientific research, works by scholars such as Jin L., Robey D., Boudreau M.-C., Ugli K. M. Z., Leavitt H. J., and Whisler T. L. are noteworthy and warrant attention.

The relevance of studying the historical development of IT technologies and gaining experience in their application is increasing for Ukraine, particularly in light of escalating threats such as cyberattacks, information warfare, and hybrid conflicts.

Given the relevance of the topic, the *purpose* of this article is to examine and analyze the historical development of IT technologies in the context of the dangers they can potentially pose.

**Research methods.** Theoretical research methods include the analysis and synthesis of scientific sources to reveal the main points of the issue under investigation.

**Presentation of the main research material.** One of the distinctive characteristics of societal modernization is its global informatization, which has led to the utilization of new IT technologies in all aspects of life and the creation of a global information space. The nomenclature of eras is primarily determined by the technological processes they have incited.

In the 1970s, American philosopher-futurist E. Toffler and Spanish Information Society researcher B. Castells made initial attempts to analyze the genesis of IT technology development and unveil its historical and social underpinnings [4].

Reflecting on the new phase of societal development and analyzing the clash between technological and cultural revolutions, M. Castells, in his work "The Rise of Network Society," concludes: "There is no longer any doubt that technology subdues the agents of progressive human development: culture, science, economy, and subjects them to technological development" [4, p.28]. Concurrently, in his work "The Third Wave," E. Toffler, while examining historical waves of societal development, underscores the impossibility of a future without considering the cultural and moral components of the socio-historical process. He asserts, "We are entering a period where culture matters more than ever. Culture is not a fossil; we create it every day" [5, p.45].

According to E. Toffler, the information-technological revolution has given rise to a new type of culture (information culture) that alters the essence of societal institutions (from family to educational establishments), raises issues of value orientations in the growing volume of information flows, affects the behavior of all members of society, and influences the further development of civilization [5, p.75]. Only the formation of an information culture will allow us to avoid and prevent the mentioned problems and ensure the safe development of society.

Organically integrated into E. Toffler's concept is D. Bell's idea, in which he identifies the main reasons for the transition from the industrial to the post-industrial era as the development of IT and the "space-time continuum determined by the global nature of communications" [6]. The scholar identifies eleven important features of the new society, six of which are closely related to the dissemination of information, the development of information technologies, and their impact on the social, political, and economic spheres of society. Of interest to our research are the thinker's thoughts on the ways to use and control information flows, as well as on abuses related to illegal disclosure or criminal concealment of information. He emphasizes the importance of electronic democracy and the accessibility of information for all members of society. The main hypothesis of both scholars is the realization that a qualitatively new communicative environment will change all aspects of human life - the economy, culture, education, and society as a whole.

M. Castells, in his works, asserts that the main feature of the transition to an information society is networks that connect people, institutions, and states. However, the thinker hints that besides their "connecting" function, networks also serve a function of social "exclusion." M. Castells, in his works, suggests that access to the network is a kind of indicator, a boundary between the masses and individuality.

The intensification of information and communication processes has significantly affected the mental state of people, their societal and personal behavior patterns, moral and ethical norms, and spiritual values. As a result, the destructive impact on societal consciousness has increased significantly, the efficiency of manipulation has grown, and there has become a real threat to the information security of individuals, specific social communities, and society as a whole.

The new level of societal development highlights the role of the information component, specifically the potential of conducting information warfare, employing various information-psychological tactics and tools to influence individuals' consciousness.

E. Messner predicted the future role of information in such warfare. In his work "World Conspiracy War," he stated: "In former wars, conquering territory was considered important. But in the future, the most crucial thing will be conquering souls in the enemy state. Warfare will no longer take place in two-dimensional space, as in ancient times, nor in three-dimensional space as it was during the advent of military aviation, but in four-dimensional space where the psyche of the warring nations becomes the fourth dimension. In the near future, the battle will be fought by propagandists, saboteurs, terrorists, and saboteurs" [7].

Over the last decade, a significant portion of modern information warfare has unfolded in cyberspace, posing a threat to the information security of countries as a whole and individuals in particular. Such conflicts are referred to as information wars.

M. McLuhan, in his analysis of the content and role of information in the information society, concludes that "The truly total war is war through information" [8].

An analysis of wars and armed conflicts in the 20th and 21st centuries confirms the assertions of E. Messner and M. McLuhan, highlighting the significant role of the information component and demonstrating that humanity has transitioned to a new level of information warfare through its impact on worldviews, value orientations, societal consciousness, using various information-psychological tactics and tools. The issue of information and hybrid wars has become more relevant and poses a real threat to humanity.

The phenomenon of information warfare became possible only due to the development of information technology (IT). Therefore, it is crucial to explore this indirect form of conflict from the aspects relevant to our research. A theoretical analysis of scientific sources reveals that there is no single term for it due to the complexity of the research subject, its journalistic nature, and the theoretical and methodological positions of researchers belonging to different scientific schools. Information warfare is a comprehensive technology aimed at achieving humanitarian domination of one group of people by others. The main elements of the geopolitical aspect of information warfare include:

- Control over the global information space with an impact on public opinion and the formation of societal worldviews; disinformation, manipulation, and propaganda aimed at influencing socio-political processes.
- Cyberattacks and cyber threats targeting the disclosure of confidential information, and destabilization of critical infrastructures to gain an advantage over the opponent.
- The information dominance in geopolitical conflicts, using mass media, social networks, the Internet, and other information transmission channels to shape the image of the adversary, mobilize society, and support one's interests.

Technological progress has led to the emergence of "hybrid wars," characterized by unconventional methods of warfare (such as terrorist acts, hacker attacks, and manipulation of public opinion) and a powerful information and propaganda component [9].

P. Pomerantsev notes that in hybrid warfare, "critical importance is given to the information battle for people's minds and souls. The primary actors are not the military but the internet, mass media, television, and other means of mass communication" [10].

The final establishment of the information civilization brings about fundamental changes in people's lives, the information culture of society and individuals, and the overall philosophy of global development. Information and communication technologies, such as web technologies, smartphones, artificial intelligence, the Internet of Things, and cloud computing, occupy a significant portion of modern individuals' time. This influence of media affects all segments of the population, especially children and youth. The information flow shapes an individual's artistic-aesthetic, moral-spiritual, intellectual, and social values, influencing their behavior, and national identity, and becoming a driving force for certain actions.

#### **Conclusions and prospects for further research:**

1. The analysis of theoretical domestic and foreign scientific sources has revealed the relevance of the need to study the development of IT technologies and the dangers they can pose. Cyber threats, hybrid, and information warfare are contemporary hazards.

2. Research within the defined problem context is concentrated on understanding the historical and philosophical understanding of the issue and its consequences. Only by understanding the development of the era brought about by IT technologies, the nature of their dissemination, and the specifics of their application can we predict future events with a high degree of probability, respond effectively to negative influences, and professionally manage this process.

Further research is needed in the psychological, social, and pedagogical aspects of IT technology development to construct a strategy for safe existence in the information space for both states and individual personalities.

#### **References**

1. Jin L., Robey D., Boudreau M.-C. Beyond Development. *Global Information Technologies*. 2008. P. 1277–1289. URL: <https://doi.org/10.4018/978-1-59904-939-7.ch094>.
2. Ugli K. M. Z. Application of information technologies in history. *American Journal Of Social Sciences And Humanity Research*. 2023. Vol. 03, no. 05. P. 79–82. URL: <https://doi.org/10.37547/ajsshr/volume03issue05-14>.
3. Leavitt H. J., Whisler T. L. Que sera l'organisation des entreprises dans les années 1980 ?. *Réseaux*. 2000. Vol. 18, no. 104. P. 15–29. URL: <https://doi.org/10.3406/reso.2000.2283>.
4. Castells M. Die Digital Divide in globaler Perspektive. *Die Internet-Galaxie*. Wiesbaden, 2001. P. 261–287. URL: [https://doi.org/10.1007/978-3-322-89613-1\\_10](https://doi.org/10.1007/978-3-322-89613-1_10).
5. Alvin T., Toffler A. Creating a new civilization: The politics of the Third Wave. Atlanta : Turner Pub., 1995. 112 p.
6. *Journal of the Society of Mechanical Engineers*. 1959. T. 62, № 490. C. 1701–1702. URL: [https://doi.org/10.1299/jsmemag.62.490\\_1701\\_3](https://doi.org/10.1299/jsmemag.62.490_1701_3).
7. Messner E., prof. World rebel. *Buenos Aires: South American Department of the Institute for the Study of Problems of War and Peace*. Prof. gene. N.N. Holovina, 1971. 168 p.
8. Marshall M. *The Gutenberg galaxy: The making of typographic man*. [Toronto] : University of Toronto Press, 1965. 293 p.
9. Krislata O. Hybrid war and its information component. *Proceedings of the Research Institute of Press Studies*. 2018. Issue 8 (26). P. 190–199.
10. Pomerantsev P. *Nothing Is True and Everything Is Possible: Adventures in Modern Russia*. Faber & Faber, Limited, 2017. 304 p.