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THE IMPACT OF THE TECHNOLOGICAL SINGULARITY ON THE HYPER DEVELOPMENT OF INDUSTRY 6.0: A COUNTERINTUITIVE PROCESS OF DOUBLE TRANSFORMATION

Abstract. *The hyper development of Industry 6.0 is enhanced by digitalization, innovation, and socialization of economic relations. The purpose of the article is to substantiate and reveal the counterintuitive course of the dual transformation of the economy and society for human development and the accelerated formation of Industry 6.0. The authors note that this industry involves the widespread merger of man, machine, and virtual twins and the passage of 5 evolutionary stages of human transformation in the course of scientific and technological progress to the formation of the Industry of the Future, namely: biological, transhuman, posthuman, metahuman singular future, and metaintelligence. Four stages of artificial intelligence development are presented: early, general, superintelligence and strong intelligence. At the stage of strong artificial intelligence, humanity will deal with digital human clones, digital human doubles and digital copies of human consciousness. An attempt is made to scientifically explain the fact that in the 20s of the 21st century, humanity is undergoing a stage of biodigital social reprogramming at an accelerated pace, which changes the "chemistry" of the human brain, affects the functioning of neural networks of the brain, "flashes" and "reprograms" human thoughts into the desired format, following the example of production and industrial devices. The authors express the opinion that, given the existing technological singularity, humanity and each individual may lose themselves as a "physical person", "thinking person", "thinking person", without even realizing this fact. The scientific novelty of the article lies in the fact that the authors note that the technological singularity has a powerful impact on the accelerated formation of Industry 6.0 and the Metaverse due to the development of high, "supersensory technologies", "disruptive innovations" and the emergence of super-intelligent robot agents, robot assistants. The practical significance of the results obtained is that the analysis of the evolutionary chain of transformation of the "physical classical man" to the "digital post-man with artificial intelligence" makes it possible to realize that neurotechnology, anticipatory artificial intelligence and intelligent systems are the technological driving forces of Industry 6.0. As a result, scientists note that the technological singularity is the expected moment in the future when a strong super artificial intelligence will make the fact of surpassing machine intelligence over human intelligence, technological development will be characterized by exponentiality, double transformation and changes will be ultra-fast vertical, not linear.*

Key words: artificial intelligence, Metaverse, digital technologies, metahumanistic singular future, Industry 6.0, posthuman, biodigital social construction.

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ВПЛИВ ТЕХНОЛОГІЧНОЇ СИНГУЛЯРНОСТІ НА ГІПЕРРОЗВИТОК ІНДУСТРІЇ 6.0: КОНТРІНТУЇТИВНИЙ ХІД ПОДВІЙНОЇ ТРАНСФОРМАЦІЇ

Анотація. *Гіперрозвиток Індустрії 6.0 підсилюється цифровізацією, інноватизацією та соціалізацією економічних відносин. Мета статті – обґрунтувати і розкрити контрінтуїтивний хід подвійної трансформації економіки та суспільства на розвиток людини і прискорене становлення Індустрії 6.0. Автори зазначають, що дана індустрія передбачає повсюдне злиття людини, машини і віртуальних двійників та проходження 5-ти еволюційних стадій трансформації людини в ході науково-технічного прогресу до становлення Індустрії майбутнього, а саме: біологічна, транслюдська, постлюдська, метагуманістичне сингулярне майбутнє та метаінтелект. Представлені 4 стадії розвитку штучного інтелекту: рання, всезагальна, суперінтелект та сильний інтелект. На стадії сильного штучного інтелекту людство матиме справу з цифровими клонами людини, цифровими двійниками людини та цифровими копіями свідомості людини. Зроблено спробу аргументовано науково пояснити факт того, що в 20-х роках XXI століття у прискорених темпах людство проходить етап біоцифрового соціального перепрограмування, яке змінює "хімію" людського мозку, впливає на роботу нейронних мереж мозку, "перепрошиває" і "перепрограмовує" думки людини в потрібний формат, за прикладом виробничих і промислових пристроїв. Авторами висловлена думка про те, що за умови наявної технологічної сингулярності людство та кожний окремий індивідуум можуть втратити себе як "людину-фізичну", "людину-думаючу", "людину-мислячу", навіть не усвідомлюючи цього факту. Наукова новизна статті полягає в тому, що автори зазначають: технологічна сингулярність має надпотужний вплив на прискорене становлення Індустрії 6.0 та Метавсесвіту за рахунок розвитку високих, "надчуттєвих технологій", "підривних інновацій" та появи суперрозумних роботів-агентів, роботів-помічників. Практичне значення отриманих результатів полягає в тому, що аналіз еволюційного ланцюга трансформації "людини фізичної класичної" до "цифрової постлюдини зі штучним інтелектом" дає змогу усвідомити: нейротехнології, антиципаторний штучний інтелект і розумні системи є технологічними рушійними силами Індустрії 6.0. У підсумку науковці відзначають, що технологічна сингулярність є очікуваним у майбутньому моментом, коли сильний суперштучний інтелект зробить факт перевершення машинного розуму над людським, технологічний розвиток характеризуватиметься експоненціальністю, подвійна трансформація і зміни будуть надшвидкими вертикальними, а не лінійними.*

Ключові слова: штучний інтелект, Метавсесвіт, цифрові технології, метагуманістичне сингулярне майбутнє, Індустрія 6.0, постлюдина, біоцифрове соціальне конструювання.

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Statement of the problem. The speed of technical development and technological progress in the 21st century is impressive. Agent systems of artificial intelligence significantly improve business, social quality is influenced by digital value, and the Metaverse is characterized by the absorption and "reflashing" of the human brain. It's no exaggeration to say that the Metaverse will present its "atlas of digital development" in the near future. The transition between Industries 4.0, 5.0 to 6.0 is super-fast, and the time, technical and technological boundaries between them are erased. Industry 6.0 is on the threshold of entering the economy, production and industry on the basis of eco-robotics.

Industry 6.0 envisions a ubiquitous fusion of humans, machines, and virtual twins. This Industry is "supported by cross-sectoral factors such as innovation ecosystems, human-centric competencies, and coherent policy frameworks… and may be further enhanced by empathetic artificial intelligence, regenerative industrial systems, and the like" [4, p. 29]. Scientific and technological progress and the emergence of new technologies bring new meanings to human life. Technologies such as industrial robots, artificial intelligence (AI) and machine learning are developing at an exponential rate. The evolution of AI has contributed to the innovative development of personal assistants, automated drones, made the "home smart", but it has also provoked the emergence of "the question of the long-awaited moment in the future when machines will be able to develop intelligence that will equal or surpass human intelligence, that's, the moment of technological singularity" [9].

Analysis of recent research and publications. A well-argued scientific study that deserves attention was carried out by Z. Erden. He managed to deeply analyze the evolutionary changes and consequences of AI through the prism of the concept of technological singularity. He's convinced that "the future of AI is inextricably linked to the progressive, recursive-improving nature of evolution and the mechanisms that drive technological singularity" [2, p. 16]. The study of the singularity with its simultaneous opportunities and threats to the existence of humanity was carried out by F. Bahri, Andhara, H. Fadillah, S. Mulia, and S. Siagian [1]. By studying the relationship between people and technology, scientists have laid the foundation for developing policies focused on sustainable development and prosperity in the era of the technological singularity [1, p. 107].

The focus of R. Goyal's scientific attention is focused on tracing the evolution of eco-centric robotics in Industry 6.0 and identifying the environmental impact of robotics and AI involved in Industry 6.0. R. Goyal's attention was not left out of the development of sustainable robotic systems [5, p. 43]. A. Gomaa proposed a strategic framework for implementing Industry 6.0, based on the core principles of conscious intelligence, ethical design, and global justice, based on five strategic pillars: technological convergence, ethical governance, inclusive transformation, organizational agility, and sustainable development [4, p. 29].

Super-forecasting of the risks of the "technological singularity" from AI, namely the prediction of new cyber risks from the integration of AI into cybersecurity, was carried out by researchers P. Radanliev, D. De Roure, C. Maple, and U. Ani [10]. I. Priyadarshini, P. Mohanty, and Ch. Cotton focused their attention on the need to identify factors that contribute to technological progress and may ultimately lead to a technological singularity in the future [9].

B. Goertzel's research on the opportunities brought by the technological singularity and the analysis of R. Kurzweil's book "The singularity is near" and the author's reflections on human-level AI deserve scientific attention [3]. B. Goertzel concluded that R. Kurzweil's proposed scenario for the development of AI and the passage of the technological singularity isn't the only one. According to B. Goertzel, "an alternative is the emergence of human-level AI through virtual worlds of non-human AI" [3, p. 1161]. The publication by scientists S. Tariq, A. Iftikhar, P. Chaudhary, and K. Khurshid examines in detail the concept of "integrated autonomous intelligence" as a future evolutionary stage of human intelligence and some relatively less studied aspects of the architecture and functioning of the human mind that are not amenable to emulation by AI [11].

We consider the research of the Ukrainian M. Lazarev, who predicts a danger to humans as a result of the technological singularity, to be valuable in a scientific sense. He claims that "postbiologicality can become both a new qualitatively higher source in the evolution of the human species and the collapse of human humanity. With the overcoming of human biologicality, there will be a destruction of moral guidelines, social and legal systems" [8, p. 119]. The scientist thinks that technological development must be complemented by the appropriate development of new norms that will lead society to a reasonable balance.

We were studying issues of innovative and digital development of society in virtual reality and presented the author's vision of the institutionalization of the Metaverse through the prism of the formation of the exabyte economy and the gig economy [7]. The results of the study made it possible to outline the socio-economic effects and challenges of the development of the Metaverse ecosystem, as well as the production and industrial benefits of virtual reality.

Setting the task. Based on the analysis of scientific developments, the purpose of the article is to analyze and reveal the features of the formation of AI at an early, universal stage; to reveal the features of artificial superintelligence and strong AI: hyperintelligence, megaintelligence and metaintelligence; to present an evolutionary cross-section of human transformation in the course of scientific and technological progress, which takes place on the way to the formation of Industry 6.0; to propose the author's vision of the counterintuitive course of the double transformation of the development of the economy and society through the digitalization of production and industry, the application of AI technology and structural changes in the economy to achieve sustainable development goals on the path to the emergence of Industry 6.0; to identify the threats of the impact of the technological singularity and double transformation on the hyperdevelopment of man and Industry 6.0.

Presentation of the main research material. Humanity has gone through 3 Industrial Revolutions in its development according to 6 technical and technological systems and 5 Industries with corresponding time limits. Starting approximately from 2025, the economy, industry, production and society are in the transition to the 7th technical and technological system to enhance the hyper-rapid formation of Industry 6.0 and the Metaverse [7] in the coordinate system of the 4th Industrial Revolution.

It's worth noting that among the expected values for humans, the economy, and society that Industry 6.0 carries are cognitive, emotional, and compassionate empathy, and the ethics of communication. These values are already beginning to provoke societies to a humanistic revolution (Table 1), and management is implemented within the boundaries of the planet, not a separate region or country. As Industry 6.0 emerges, production will become ultra-personalized, and the ecosystem will become emotionally intelligent through the application of quantum technologies. All of this's already being amplified by the technological singularity and the double transformation. We study the double transformation in Industry 6.0 as the changes taking place in production and industry under the influence of digitalization combined with the application of AI technologies and actions taken in the economy to achieve the Sustainable Development Goals.

Table 1

An evolutionary cross-section into five stages/stages of human transformation in the course of scientific and technological progress to the emergence of Industry 6.0

Stages	***General characteristics and features***
Biological	Biological individuals evolve in the direction of aging during their lives in the classical form of life.
Transhuman (transhuman cyborgs)	If we are talking about digitization and the application of high technologies in people's lives, then people take on the form of transhuman cyborgs. Nanotechnology appears in the lives of transhuman cyborgs.
Posthuman	The transition to a posthuman species occurs with the help of neurotechnology and consciousness loading. The possibilities provided by PSI technology are used. For example, in the medical field we are talking about the use of implants that are made individually for the patient – Patient Specific Implant (PSI). In the ICT field, successful examples of PSI technology (Processor Signal Indicator) can be a processor power status indicator for energy efficiency. In the entertainment economy, a high-quality PSI technology that develops paranormal abilities and makes gameplay "deeper" is the use of XCOM in video games to develop characters' psychic abilities, which allows the player to control the minds of enemies and form their defenses, quickly seeking support during the game.
Metahumanistic Singular Future	The boundaries between AI and posthuman are blurred. This stage may be characterized by the creation of genetically modified children in which intelligence, height, hair and eye color will be edited at the embryonic level. The reason for such intervention may be the desire to reduce the risk of mental illness, to reduce the likelihood of inheriting diseases such as autism and deafness.
Metaintelligence	The Metaintelligence will be preceded by Metahumans, consisting of pure data and the information operations that distribute it. It will be characterized by a single consciousness that will permeate our entire world.

Source: compiled based on sources [3, pp. 1165-1167, 1169-1171; 1] and the authors' ideas and observations

The "singularity itself can be studied as a period of greatly accelerated technological progress, where significant breakthroughs occur over extremely short periods of time, collectively causing fundamental changes in the human condition on timescales relevant to human life" [2, p. 16]. The singularity has the potential to be a new beginning, allowing the integration of technology and human values, as in the concept of Society 5.0. However, issues such as gaps in access to technology, algorithmic bias, and a mismatch of goals between humans and AI could lead to a social dystopia [1, p. 107].

"Technological singularity is a philosophical concept that refers to the irreversible and profound transformation that occurs when AI capabilities comprehensively surpass human capabilities… the development of AI technologies can be characterized by the superposition of several logistic growth processes" [6]. In essence, the concept of technological singularity envisages a process in which, before its completion, many material problems and challenges affecting humanity will be solved in a short period of time, we are talking about days or weeks [2, p. 16].

We are convinced that the technological singularity has a powerful impact on the accelerated formation of Industry 6.0 and the Metaverse due to the development of high, "supersensory technologies", "disruptive innovations" and the emergence of super-intelligent robot agents, robot assistants. Given the existing technological singularity, humanity and each individual can lose themselves as a "physical person", "thinking person", "thinking person", without even realizing this fact, because there is a high probability that, "playing with super technologies", they will pass the point of no return without even realizing this dangerous fact (Table 1). The technological singularity brings accelerated changes in the economy, production, and industry, it improves humans at the embryonic level and gives life to Metahumans with meta-intelligence.

The evolutionary chain of transformation from "physical classical man" to "digital post-man with artificial intelligence" looks like this:

"Biological Human – Transhuman – Posthuman – Metahuman – Metaintelligence"

The humanistic stage is characterized by people's desire to change their gender and "add" new genes to their bodies by sewing or injecting them, thus slowing down the aging process through biotechnology.

In the second stage, the stage of transhumanism (Table 1), people will be able to add chips (new technologies of the next generation) to their bodies in the brain and other parts of the body, thereby forming new organs of the human body. According to experts, in the near future, a person will be able to be in symbiosis with new technologies. It's expected that the new generation of technologies will "live in our" organism and instantly connect us to the Internet. Thus, humanity will receive new backup copies not only of the physical human body and backup copies of smartphones, but also backup copies of the consciousnesses of different people. As a result of the active flowering of the stage of transhumanism, human consciousness will have the opportunity not to die without a trace, but to reboot itself "from the extreme living point" of consciousness.

But we agree with the reservations of scientist M. Lazarev in part that "the ideas of transhumanism and going beyond the boundaries of human biology cannot be postulated outside of a moral context… we must focus attention not on the unconditional production of technologies, but on their proper use, on raising a person to a new level of self-awareness, on his awareness of himself as a free, responsible and creative member of global society" [8, p. 128].

The third stage is called posthumanistic. It's at this stage that people will be able to move their further evolution into the digital space, using psi-technology (PSI-technology) and consciousness uploads to scan the brain of each person into the digital cloud. As a result, society can gain a new level of empathy when each person's point of view is fully understood. Scientists expect that super technologies will allow groups of people, or all of humanity, to unite into a single intelligent brain and we'll have a global collective intelligent brain, where post-humans are some neurons.

The fourth stage will be a metahumanistic future (Table 1), where the creator is indistinguishable from the created. At this stage, AI is expected to be as capable as its posthuman creators, evolving into an organism the size of a planet. Thanks to cloud computing, the exchange of Big Data between the data loaded into the human consciousness and the AI systems created by it will occur seamlessly and instantly. This fact has every chance of leading to the emergence of a "new global consciousness" and some "new organism", which's already called Metaintelligence in science today (Table 1). This, currently extreme, stage assumes that humanity will have to become a cosmic species in order to merge with the rest of the intelligent Universe.

Reflecting on the hypothesis put forward by us about the impact of the explicit double transformation and technological singularity on the accelerated formation of Industry 6.0, there's a need to reveal the institutional cross-section of the stages of formation and development of AI. In Table 2, we have attempted to briefly characterize the features of the evolution of AI, which's at the basis (core) of Industry 6.0. Neurotechnologies, anticipatory AI and intelligent systems are the technological driving forces of Industry 6.0.

Industry 6.0 is characterized by conscious adaptive and cyclical systems, it integrates the latest technologies (AI, quantum computing and biocybernetic platforms) into its ecosystem and "embeds decentralized governance, ethical intelligence, generative design principles into its basic industrial strategies" [4, p. 31] and production chains. AI in the Industry 6.0 ecosystem is "an autonomous system that evolves on its own and can recognize and learn from unknown, unpredictable data patterns. AI systems can continuously evolve, learn, and improve their scope, adaptation, and self-organization after they have been developed" [10, p. 747].

Currently, Google constantly processes all available information on the Internet in real time 24/7, according to the algorithm and encoded data specified by the AI system. Through patented technologies built into iPhones and smartphones, AI "reads" all the necessary biometric data about a person's physical condition (body temperature, blood pressure, heartbeat, cyclical hormonal changes in the human body). This's done by "connecting" with the human nervous system using super technologies linked to the Internet ecosystem, mobile operators through the high-tech equipment of modern mobile devices. "Advanced technologies, ranging from computers to mobile devices, now serve to expand human cognitive abilities, providing instant access to information and performing tasks that were previously considered impossible" [1, p. 107].

Table 2

The development of artificial intelligence takes place in several stages

Stage of AI development	***Content and general characteristics***	***Examples of AI products and services***
The first stage is early	They operate and function in 5G and 6G networks. We are talking about cybernetics and bioengineering, which are available to the entire society according to their individual and collective needs	Smartphones, Internet of Things, Alexa, Siri, Chatbots, mini robots, drones, robotics
General AI	Includes digital AI, which is characterized by freedom of thought, emotions, aspirations, desires, greed, envy, anger, hatred, pride, selfishness	Robots, biodigital AI
Artificial superintelligence	A multi-level interconnected platform that's connected to an artificial superintelligence through an AI digital brain, which in turn requires the extraction of all biometric data of all people on the planet	Face and voice recognition, detection of vital human organs, skin structure, and skeleton using digital data of electromagnetic fields
Strong hyperintelligence, megaintelligence, and metaintelligence	An ordinary person is unable to distinguish who he's communicating with – a machine, a cyborg, a metahuman. Cyborg people are fully capable of imitating and copying everyday human actions and performing human tasks, socio-economic work on a par with classical, traditional people	Digital clone of a person, digital human double, digital copy of a person's consciousness

Source: compiled based on sources [10; 2] and the authors' ideas and observations

Revealing the content of Table 2, it's worth noting that if you connect a quantum digital AI brain to the 5G and 6G network, you can mobilize machines and launch robotics, robots, drones and mini-bots on these networks. This's done in order to carry out surveillance through voice and face recognition, scanning of human body organs. Currently, augmented, mixed and virtual reality are being institutionalized and architected.

Today, tactile suits are being developed that, depending on a person's movement, can connect to various things, objects, and elements that may not be visible, but under the influence of proximity sensors, connect to the human nervous system. Every person has an electric field and a biodigital field, and since people interact with smartphones, they connect to the digital and electric fields of the smartphone under the influence of patented high technologies. As the scientists-developers explain, these fields of the smartphone connect and combine with the same fields in a person and there's an instant exchange of information with existing social networks and all possible applications on the Internet. Such a process can be safely called biodigital social updating of a person through digital identity identifiers. All this becomes possible as a result of the influence of the technological singularity, which became possible during the constant emergence of new breakthrough innovations and mega-sensory technologies.

The emergence of digital copies of human consciousness became possible under the double transformation, which is currently viewed by ordinary people as a counterintuitive course of technological singularity. But the counterintuitive approach, despite the fact that it goes beyond the boundaries of understandable, standard, habitual and limited by intuition thinking, can still bring good and tangible results for the socio-economic development of a person and the teamwork of a group of specialists implementing business projects.

The counterintuitive approach underlies the development of Industry 6.0, as it carries some contradiction, illogicality, unexpectedness, and sometimes paradoxicality in revealing the content, elements, and goals of implementing Industry 6.0. For example, on the one hand, AI is designed to become a digital partner of a person and allow him to develop harmoniously without disrupting his ecosystem, and on the other hand, digital copies of human consciousness are created and downloaded to androids, which store the main personality traits, memories, and ways of thinking. These facts cause concern among people and society, partly due to a lack of understanding for what purpose this's being stored and by whom, when and for what purpose, because we are talking about human consciousness, feelings and sensations.

In the 20s of the 21st century, humanity is undergoing a process of biodigital social reprogramming at an accelerated pace, which changes the "chemistry" of the human brain, affects the functioning of the brain's neural networks, "flashes" and "reprograms" human thoughts into the desired format, following the example of production and industrial devices. As a result of the development of Industry 6.0, people will be able to become hybrids in their content, like a digital two-digit cyborg, because they are addicted to smartphones and high technologies that permeate their everyday lives. People take the form of a digital bioconstruction as a result of digitalization, which takes the form of a certain digital shell with a digital layer. The range of information perception by people who have undergone biodigital social "reflashing" also changes. Such people are much easier to manage and direct their actions in the right direction. Digitalization is undergoing numerous, multidimensional (virtual, augmented, mixed, enriched, enhanced, extended reality) and multilevel (new generation of technologies and equipment) modernization using quantum technology.

Conclusions and prospects for further research in this area. Summarizing the hypothesis, we put forward, it's worth noting that the technological singularity is the expected moment in the future when a strong super AI will make the fact of surpassing machine intelligence over human intelligence, technological development will be characterized by exponentiality, double transformation and changes will be vertical, not linear. Changes will become faster than people will realize and understand them. In order to keep up with progress, people themselves will agree to their integration with the machine, which may become a threat to humanity losing control over super and meta-intelligence. We believe that in the next 20 years, humanity will build a new normality of its existence on the basis of harmonizing the economic and social, constructing a new quality for the post-turbulent space.

The belief that further scientific research should be conducted in the direction of finding a digital balance between the physical dimension and the virtual world; developing mechanisms for maximum data protection while adhering to ethical standards, because revolutionary innovations without responsibility lead to destruction; constructing a new social development in the ecosystem of the Metaverse, which systematically carries out social calibration; developing tools for a kind of "human digital shield" from the destructive influence of high technologies.

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