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SOCIAL DYNAMICS IN THE ERA OF ARTIFICIAL INTELLIGENCE**

Abstract

Technological innovations intrigue the public and shape contemporary social dynamics. Modern society was created on the foundations of mega-changes. It is inherently complex to interpret as it undergoes constant transformation, making its analysis significantly more challenging. Modern society is dynamic, fluid, and networked into a complex and intertwined system of different contents and elements that cooperate with each other, overlap, and/or contradict each other. It is built and arises from the cooperation of various factors. Hence, a multidisciplinary approach was applied in this research paper. The primary purpose of the paper is to point out the importance of contemporary social dynamics, which are intensively changing under the influence of developed technology, especially under the influence of the development and application of artificial intelligence. This technology is perceived as the technology of the future and the technology that is the subject of intense global debate. The paper is structured into several chapters. After the introduction, the theoretical-methodological framework follows. Then, the next part of the paper is devoted to the interpretation of artificial intelligence from a sociological-political perspective. This technology is one of the key drivers of change in modern society and has the potential to dictate the pace of development of modern society. Therefore, the next chapter is devoted to the interpretation of contemporary social dynamics and the processes that laid the foundations for the emergence of modern society.

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The article also explains the processes that fueled the mega-changes in order to provide a comprehensive explanation of the current social dynamics. The value of a scientific article is reflected in the fact that it indicates the social effects of technology that have been reflected on a global level. Also, the paper encourages further interpretation of the researched topic, especially from the perspective of the application and further development of artificial intelligence.

Keywords: social dynamics, mega-changes, Fourth Industrial Revolution, artificial intelligence, machine learning

INTRODUCTION

Modern society stands apart from all previous societies in its social dynamics. Its primary characteristics are variability and evolvability, while the increasing use of artificial intelligence imposes the recognition of this technology as the most significant driver of change in the modern era. The technology of artificial intelligence intrigues both the scientific community and the global public due to its controversial "nature," which arises from the wide range of uses and possible abuses of this technology. AI's controversial nature is reflected in countless ethical, social, and economic dilemmas. Artificial intelligence has raised numerous questions and pointed to various challenges and problems (Luknar 2024a).

People around the world are increasingly relying on digital technologies to carry out various daily activities, business and private. Technological developments impose new requirements that indicate the need for continuous monitoring and adaptation to changes in the labor market. Apropos, the emergence, and application of new technological tools emphasize the need for the development of education and skills that are in line with modern market demands.

Individuals, as well as entire societies, strive to keep up with technological developments in order to maintain or improve their position. Among other things, numerous questions arise regarding safety, ethics, and legal regulation that can respond to and accompany current challenges. Hence, the interaction between humans and machines has become one of the central topics of interest and research. The interaction between humans and machines brings a change in social dynamics, so the fact is that the former support of a friend, teacher, or professional has been

replaced today by the Internet, Google, and various artificial intelligence tools. It is often claimed that this technology has the ability to change the world we live in. No current high-tech product intrigues the world public as much as this technology does, exactly because of the controversial effects that come from its application. Social dynamics have changed significantly under the influence of modern technologies. At the same time, with the development and increasing complexity of artificial intelligence algorithms, the complexity of risks continues to grow. A balance needs to be struck so that the use of artificial intelligence technology may serve the general social good. Otherwise, technological development will pave the way for technology giants to strengthen and assert their position and power by making profits through investing and patenting innovations and controlling large databases on a global scale. In this way, the technology of artificial intelligence can support totalitarianism, or rather the creation of its new form, the so-called "capillary totalitarianism", which, with the development of superintelligence, can grow into "hyper totalitarianism" (Pejaković 2024, 83). Technology giants are harming equal distribution and raising doubts about data security and privacy. It is necessary to have international cooperation and consensus on this issue, as well as good coordination between the government and non-governmental sectors and developed citizens' awareness on this matter.

We are living at a pivotal historical moment. As Kurzweil notes (Kurzweil 1999): "We are the last. The last generation to be unaugmented. The last generation to be intellectually alone. The last generation to be limited by our bodies. We are the first. The first generation to be augmented. The first generation to be intellectually together. The first generation to be limited only by our imaginations" (3). Contemporary social dynamics will determine the course of future development. The weight of our steps and decisions is heavy, as they will shape the future of humanity.

THEORETICAL AND METHODOLOGICAL FRAMEWORK

Interpreting social dynamics is a complex and challenging task. The primary goal of this research is to explain changes and current social dynamics primarily from the perspective of the application and development of artificial intelligence. The basic research problem in investigating this complex relationship is reflected in the complexity of

technology and its multiple effects, but also in the fact that contemporary society differs from all previous ones precisely because of technological development and a high degree of dynamism. The Fourth Industrial Revolution (Philbeck and Davis 2018, 17–22), also known as "Industry 4" (Santos *et al.* 2018) and "The Second Machine Age" (Brynjolfsson and Mcafee 2014) followed after the breakthrough of technological innovations that have the ability to connect to each other in a communication network by the Internet and have the epithet of smart devices because they enable technical connectivity with people and their environment. Industry 4.0 has revolutionized the perception of reality, as it has enabled, for the first time in the history of civilization, the expansion of reality through technology. In other words, it has merged the physical and biological world with the digital into a new form known as a "cyber-physical system" (Lee 2008, 363–369; Petrillo *et al.* 2018, 4). Further technological progress could inspire further and deeper connections between humans and machines (Bonciu 2017, 7–16). Examination of the research topic requires a good knowledge of social dynamics in the past and a clear understanding of current social dynamics, based on which predictions of social movements and key challenges can be made. Hence, a new scientific methodology is needed, one that can unify science and technology in its interpretation and has the potential to "accelerate the progress of science and technology, break the boundaries of existing disciplines, and be more insightful and predictable on the influence on various spaces" (Zhuge 2011, 1014) especially in terms of understanding the consequences and impact of technological progress on the various social systems that exist across the globe.

We can interpret contemporary social dynamics using various approaches. The first approach is humanistic, where the interpretation centers on man. According to this interpretation, it is necessary to direct the use of technology, technological innovation, development, and the entire social dynamics in such a way that they serve the common social good. The second approach is the technological approach, which is focused on the potential that technology possesses. This approach encourages the use and development of technology while leaving its social effects aside. However, the process of technological development in its entirety implies much more than machines, as it enables the creation of a comprehensive system that extends across almost all industrial branches, involving people and the storage of vast and diverse knowledge required to manage and operate machines, significant material investments, standardization

to save time, and an interconnected network of communication and consumption. The third approach to interpretation gives priority to economic factors, interpreting social dynamics in the era of artificial intelligence from the standpoint of better efficiency, effectiveness, and profit generation. The fourth approach, the legal-political one, points to the lack of normative and harmonized political stances regarding the development of artificial intelligence technology. This technology has been recognized as a strategic and economic goal across the globe. However, there are concerns in the international community about the ethical guidelines regarding the development and design of artificial intelligence technology. The most developed countries in the world are competing in the implementation and possession of the most advanced artificial intelligence tools. Therefore, we can rightly say that this technology is the creator of the present (Šuvaković 2024). The views of different countries on this issue are inconsistent and range from striving for free development to efforts to establish stricter control over the development and application of this technology. The fifth approach is the cause-and-effect approach, which involves uncovering patterns and mechanisms that reveal a multidimensional concept, in this case, social dynamics resulting from the application of artificial intelligence. The most comprehensive explanation of contemporary social dynamics is provided by an all-encompassing approach that incorporates elements of all the previously mentioned perspectives.

TECHNOLOGY OF ARTIFICIAL INTELLIGENCE

Artificial intelligence technology involves "any theory, method, and technique that helps machines (especially computers) to analyze, simulate, exploit, and explore human thinking process and behavior" (Yang 2019, 1). The foundation of artificial intelligence technology is machine learning. It is a process that allows a machine to acquire knowledge through data processing. In other words, this branch of artificial intelligence technology deals with the development of algorithms and models that enable computer systems to improve their performance and knowledge bases. Traditionally, there are three basic types of machine learning. The first is "supervised learning," which involves training a model based on labeled data, while the second type, so-called "unsupervised learning," is the model focused on discovering relationships, patterns, and structure in the data. The third model, "reinforcement learning," develops through

interaction with the environment using a reward/punishment system (Ayodele 2010, 19). Therefore, by artificial intelligence technology, we mean a wide range of diverse technological tools. This technology is not easy to interpret, and we associate it with numerous controversies. It refers to a complex concept that serves to explain the technology that supports the operation of a wide variety of systems designed to carry out numerous activities such as transportation, diagnostics, proving mathematical theorems, writing text, playing games such as backgammon, chess, video games, etc.

Artificial intelligence technology is characterized by its diverse applications. Therefore, this technology eludes clear and precise boundaries and can be interpreted from the perspectives of various disciplines and methods. This contributes to its definition from various perspectives, which consequently creates numerous controversies and doubts associated with this concept. The most neutral definition provides an interpretation of this technology from a functionalist-technological perspective, where "the term artificial intelligence refers to techniques invented by humans to provide support and reliable services to users, optimize logistics, ensure an uninterrupted service delivery chain, improve fault diagnostics, and enable prediction and prevention." (Luknar 2024b, 14). Essentially, artificial intelligence technology primarily serves to replace humans in performing a task, as well as in solving problems. The primary purpose of this technology is to mimic human reasoning, meaning to act and think like a human, using proven logic to achieve the best possible solutions and results based on available information (Ferrara, Laganà, and Merenda 2020, 21). Simply put, it is the ability of a computer to perform tasks efficiently.

Although it emerged as the product of decades of work and technology development in laboratories hidden from the public view, this technology has reached the public spotlight at a magical speed, almost suddenly and abruptly. The term artificial intelligence was first proposed by John McCarthy in 1956 at a conference organized at Dartmouth College (Moor 2006, 87). Artificial intelligence as we know it today, in its current form and performance, emerged only after decades of exponential growth in computing performance, digitalization, and increasing interest and investment in technological development. Digitalization has enabled the creation of large databases on which machine learning systems are fundamentally trained (Allen and Chan 2017, 7).

Artificial intelligence has largely become part of everyday social activities and life in the modern era. Predictions suggest that this technology will significantly shape our future (Kurzweil 1999; Klark 1999; Leonhard 2016; Luknar 2024b; Kisindžer, Šmit i Hatenloker 2022). Among authors, there is a consensus that this is a technology of the future, recognized as a power multiplier in today's society (Damnjanović 2012, 340). The breakthrough of this technology is driving competitive rivalry at all levels of social reality, internationally, regionally, and nationally. However, humanity, viewed globally, is not keeping pace with its development, primarily because legal regulations lag the development and implementation of this technology. Therefore, the opinions of authors around the world differ regarding the effects arising from the application of this technology on humanity. Moreover, humanity is striving to keep up with the development of artificial intelligence technology, which calls into question our ability to urgently address this issue and regulate its application and production according to the principle of general social utility.

DYNAMICS OF MODERN SOCIETY DRIVEN BY TECHNOLOGICAL EVOLUTION

We live in a dynamic era accompanied by numerous uncertainties. The dynamics of modern society are conditioned by mega shifts. Leonhard defines mega shifts as "exponential and simultaneous" (Leonhard 2016, 33) shifts that will systemically and irreversibly transform humanity. The contemporary world as we know it has been built on the foundations of globalization, multi-layered crises, and the Third and Fourth Industrial Revolutions (Luknar 2024c, 22–23).

The advancement of computer science, particularly the development of artificial intelligence, requires a fundamental transformation of modern society. The key driver of change in modern society, dictating its dynamics and pace of development, is technology (Leonhard 2016, 32). As Leonhard observes, advances in technology have brought our reality closer to the scenes of science fiction movies. In other words, technological development has triggered many significant changes.

The first mega-change is digitalization. The health crisis caused by COVID-19 accelerated digital transformation, particularly the shift of data into digital formats to facilitate quicker and more efficient communication and information processing for offering diverse services.

The development of digital tools has facilitated the expansion of digital transformation into systems with a wide range of uses, such as government administration systems, education, healthcare, entrepreneurship, television, entertainment, and more.

The second mega-change relates to mobilization and technology as a mediator. The dynamics of human communication are changing dramatically, as communication, due to the process of digitalization, is increasingly taking place in digital form. The complexity of social networks and digital communication requires careful consideration and understanding of these phenomena, as technology emerges as a mediator or intermediary in digital communication. Consequently, technology, or its systemic frameworks, significantly shapes the way we can communicate, consume information, and connect with others in the digital world.

The third mega-change is screenification. The visual presentation of text and messages has the potential to lead to changes in behavior, particularly among young people. These effects are short-term and occur immediately after exposure to specific video content. It is not easy to identify the mechanisms through which mass media influence human psychology and behavior. The impact of social networks and other mass media on an individual depends on numerous factors, such as personal characteristics and experiences, the realism of the content, the degree of identification with an online profile or digital community to which the individual belongs, and more. However, continuous long-term exposure to a specific type of video content can produce a significant socio-psychological effect. For example, a study utilizing a psycho-semantic technique with a 25 indicators scale specifically designed to assess attitudes toward older adults found a significant shift in students' attitudes after they watched a movie (Kubrak 2020).

The fourth mega-change involved the rejection and cessation of the need for mediation. Technological development has simplified business processes to achieve faster and greater system efficiency, enabling the establishment of a direct connection without any mediation between the user and the provider of the product/service. This has significantly reshaped numerous industrial branches and sectors, enabling companies to overcome earlier forms of business operations through technologies such as online platforms, blockchain, and artificial intelligence. In the modern business world, companies often use artificial intelligence algorithms to provide personalized experiences to their users based on collected and analyzed data, as well as to remain competitive in the market. However,

this shift raises concerns about data privacy and security, as well as growing inequality, as the dynamics of power are shifting in favor of technologically advanced companies.

The fifth change is a mega-transformation that builds upon the previously mentioned changes. Numerous benefits of technology serve as the fuel for this transformation, driving its ever-increasing scale, while the application of technology continues to gain unstoppable momentum not only in the field of business but also in almost all societal segments. Technology was primarily designed to neutrally perform the function for which it was created. However, modern technologies undoubtedly "can play a key role in restructuring major social relationships – interpersonal, intergroup and institutional" (Kling 1991, 344). For example, technology enables the manipulation of information in the interest of its commissioners. In other words, it is inherently shaped by the worldview, biases, and intentions of its creators. The design, capacity, prices, and overall development of technology are influenced by dominant social groups and/or tech giants, those whose interests prevail. The struggle for power and competition are catalysts for the increasingly rapid development of technology. Technological tools have the potential to reinforce existing power structures and deepen inequality. Therefore, it is crucial to maintain a critical stance toward technological development and ensure that further progress aligns with ethical guidelines.

The sixth mega-change is the expansion of intellectual capabilities to machines. It involves the creation of machines that demonstrate a certain degree of intelligence, meaning they are capable of performing tasks modeled after humans. Such machines exhibit a certain level of reasoning and pattern recognition and can learn, make decisions, and process language. Artificial intelligence technology can be weak, designed to perform specific tasks, such as sorting/recognizing defects in a production line, or strong, resembling human intelligence.

The seventh mega-change followed the expansion of artificial intelligence technology functions. Automation has replaced humans, particularly in routine, physically demanding jobs. This has led to changes in the labor market, where the demand for skilled personnel specializing in data analysis, system maintenance, and the development of AI and innovations is growing. The effects are twofold. On the one hand, we have improved efficiency, reduced costs, and the stimulation of innovation and development in general. On the other hand, the gap is widening between those who possess outdated knowledge and skills and those

who have new, in-demand skills. Additionally, the gap between the rich and the poor is deepening. Economically underdeveloped regions do not possess modern technological tools. They struggle to acquire them and cannot afford them. As a result, their knowledge lags behind, while the wealthy further solidify their position of power. Negative social effects have been observed, such as reduced human interactions due to the use of virtual assistants and chatbots, the emergence of new forms of social deviance (Luknar 2025), and an increased risk of privacy violations and potential misuse of data collected for analysis.

The eighth mega-change relates to virtualization, or the "creation of a non-physical digital version" (Luknar 2024b, 43) of reality. In modern society, individuals do not only leave physical traces on their environment but also emit virtual signals through radio frequencies transmitted by their smart devices (mobile phones, watches, and other smart gadgets). The virtual environment is easy to manipulate and experiment with, as it is highly adaptable and can be modified according to user preferences. Virtual reality has proven to be effectively applicable for therapeutic purposes in treating mental illnesses. Despite its advantages, virtual reality cannot replace physical reality. Simulated environments and situations mimic events from the real world and can be particularly helpful in treating phobias and compensating for the shortage of mental health professionals. Modern technologies enable specialists to participate in remote diagnosis and therapy while also helping to quickly identify deviations from reference values, significantly reducing the time required for doctors to diagnose certain conditions. Additionally, technological development has contributed to the creation of various technological aids used for monitoring users' health. Leonhard considers virtualization a crucial driver of conflict between humans and technology, as humans adopt virtual reflections either through the uploading of their brain activity or through technological upgrades with microchips (Leonhard 2016).

The next mega-changes followed the processes of robotization and the use of artificial intelligence algorithms for predictions (the process of anticipation). Robotization in various industrial sectors, particularly in the automotive industry, medicine, agriculture, trade, and logistics, has proven to be an efficient solution that can replace humans in physically demanding and life-threatening tasks. These changes are especially noticeable in the most technologically advanced countries, while in less developed countries, the transformation largely occurs behind the scenes through the process of digitalization and automation in industry,

to a greater or lesser extent, depending on the level of economic and technological development of the country.

The dynamics of modern society are difficult to grasp. They easily escape the observer's eye as they change every moment under the influence of numerous factors. Unlike earlier societies, modern society has been marked by a new reality (Luknar 2021, 226–228) and, to the greatest extent, fear that arises as a consequence of uncertainty, fluidity, and information overload in contemporary society (Luknar 2023). The 21st century is primarily defined by evolution driven by technological development. Although today's society possesses a certain degree of elasticity, numerous factors are at play that determine the success of development (economic, institutional, technological, legal, and even cultural). Modern technologies, especially artificial intelligence, biotechnology, nanotechnology, and renewable energy, require rapid adaptation across all societal segments. Earlier processes that shaped society and its primary patterns were long-lasting and supported gradual transformation. This is not the case in the contemporary digital age, where urgent response and adaptation at the level of fundamental societal frameworks are required.

ARTIFICIAL INTELLIGENCE AS A NEXUS OF POWER

Countries are investing significant resources in the development and enhancement of their technological capabilities. Advanced technologies have brought new methods of warfare and the depersonalization of war practices due to the use of drones and robots (Korać 2019). Particularly, artificial intelligence technology is perceived as a means to gain an advantage in political and military conflicts. The increasing use of technology in political and military operations has become a more significant aspect of interstate conflicts. Governments use various technological tools to infiltrate and obtain confidential information from their adversaries. Additionally, digital information can serve as a tool for manipulation, as it has the ability to influence public opinion, shape political narratives, and ultimately affect election outcomes. Artificial intelligence technology and other digital tools are used not only to achieve economic gain but also to gain strategic advantages in diplomatic negotiations and military operations. The use of advanced technological capabilities highlights the need to address ethical and legal issues. Trust in modern technologies, including artificial intelligence, is decisively

influenced by the ability of humans to regulate modern technological tools and manage risks.

Due to concerns about potentially undesirable consequences and to prevent the escalation of conflicts, the countries of the European Union have adopted the Artificial Intelligence Act (Regulation 2024/1689). This Act assigns applications of AI to three risk categories: unacceptable risk, high-risk applications, and applications that are not expressly prohibited or classified as high-risk. Although this law needs to keep pace with technological developments actively, it is the first step in regulation on the European continent. The United States is also focused on the development of artificial intelligence technology and is encouraging the development and application of this technology as a primary economic and security goal (Trump White House Archives, n.d.). Additionally, the U.S. has restricted the export/import of advanced technologies to China. China is also focused on researching, developing, and commercializing artificial intelligence. Its goal is to become a global leader in the development of the next generation of this technology by 2030 (China Association for International Science and Technology Cooperation [CAISTC], 2017). In Shanghai, the Zhangjiang industrial-technological park (China Daily 2019) has been opened, dedicated to the development of this technology and the implementation of comprehensive research and testing. Russia has also presented artificial intelligence technology as a strategic goal (Президент России 2019). Serbia is the first country in the Southeast Europe region to publish and adopt the Strategy for the Development of Artificial Intelligence in 2019 (Strategija razvoja veštačke inteligencije). In 2020, the Global Partnership on AI (GPAI) was established, with its primary focus being the responsible use of artificial intelligence and data management (GPAI, n. d.). Serbia is actively involved as a member of the Alliance for AI Governance (Blic 2023) and is currently the chairing member of the Global Partnership on Artificial Intelligence (Tanjug 2024). The Artificial Intelligence Development Strategy (2025-2030) builds upon the 2019 policy framework in Serbia, with the objective of accelerating AI deployment across education, science, economy, and public services while ensuring data protection and information security laws. Serbia has also adopted ethical guidelines for responsible AI development and use. Although these guidelines are not legally binding, they highlight the need for a regulatory framework. Current efforts focus on preparing for the adoption and enforcement of the Artificial Intelligence Act.

Artificial Intelligence technology is a focal point where structures of power intersect. There is an increasing need for international collaboration and agreements to establish norms and guidelines for the application of artificial intelligence technology, especially in military operations. Therefore, it is necessary to develop an awareness of this issue, as well as the readiness of society and all its members and institutions to adopt new paradigms. Societal dynamics must be directed toward actively addressing all challenges arising from the application and development of artificial intelligence technology. Otherwise, this technology risks escaping societal control.

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ДРУШТВЕНА ДИНАМИКА У ЕРИ ВЕШТАЧКЕ ИНТЕЛИГЕНЦИЈЕ**

Резиме

Технолошке иновације интригирају јавност и обликују савремену друштвену динамику. Савремено друштво је настало на темељима мегапромена. Међутим, садашње друштво је комплексно за тумачење обзиром да није достигло своју финалну форму. Оно је динамично, флуидно, умрежено у комплексан и испреплетен систем различитих садржаја и елемената који садејствују једни са другима, преклапају се и/или противрече. Оно се гради и произилази из садејства различитих фактора. Отуда је за тумачење истраживане теме примењен мултидисциплинаран приступ. Примарна сврха рада је да укаже на значај савремене друштвене динамике која се под утицајем развијене технологије интензивно мења, нарочито под утицајем развоја и примене вештачке интелигенције. Ова технологија је перципирана као технологија будућности и технологија око које се ломе копља у међународној заједници. Рад је структуиран у неколико поглавља. Након уводне речи, следи теоријско-методолошки оквир. Затим је следећи део чланка посвећен тумачењу технологије вештачке интелигенције из социолошко-политиколошке перспективе. Ова технологија је један од кључних покретача промена у савременом друштву и има потенцијал да диктира темпо развоја савременог друштва. Стога је наредно поглавље посвећено тумачењу савремене друштвене динамике и процесима који су поставили темеље за настанак савременог друштва. У чланку су такође образложени процеси који су подстакли мегапромене, како би пружили свеобухватно образложење актуелне друштвене динамике. Вредност научног чланка се огледа у томе што указује на друштвене ефекте технологије који су се одразили на глобалном нивоу. Такође, научни

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чланак подстиче даље тумачење истраживане теме нарочито из перспективе примене и даљег развоја вештачке интелигенције.

Кључне речи: друштвена динамика, мегапромене, четврта индустријска револуција, технологија вештачке интелигенције, машинско учење