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ARTÍCULO DE INVESTIGACIÓN

Cambios en el desarrollo del capital humano en las condiciones de las operaciones militares a gran escala y las crecientes tendencias mundiales hacia la digitalización

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Resumen. El objetivo de la investigación consiste en explorar, cómo el capital humano en Ucrania ha cambiado debido a dos factores: la guerra y la creciente digitalización. Se analiza cómo la guerra afecta al capital humano, generando experiencias colectivas de migración, muerte y daño psicológico. También se examina cómo

la inteligencia artificial (IA) ha reemplazado a los humanos en diversas actividades productivas, lo que puede perjudicar al capital humano por distintas razones. Metodológicamente, se empleó la geopolítica crítica como marco teórico, junto a la hermenéutica y a la mayéutica. Adicionalmente, se usó la técnica de las entrevistas abiertas a dos expertos en materia de defensa y seguridad. Los resultados obtenidos permiten concluir que, para aprovechar el potencial de la era digital y fomentar el desarrollo del talento humano, los responsables de las políticas públicas deben adoptar un enfoque proactivo e integral en la gestión del capital humano. Esto incluye: a) invertir en educación y capacitación tecnológica para preparar a los trabajadores para los empleos del futuro; b) promover la inclusión digital y la alfabetización mediática; c) regular el uso de la IA para proteger los derechos individuales y la privacidad, y; d) fomentar la innovación y el emprendimiento.

Palabras clave: capital humano, guerra en Ucrania, digitalización de la sociedad, operaciones militares a gran escala, geopolítica crítica.

Changes in development human capital in conditions of the large-scale military operations and growing global trends towards digitalization

Abstract. The aim of the research is to explore, how human capital in Ukraine has changed due to two factors: war and increasing digitalization. It analyzes how war affects human capital, generating collective experiences of migration, death and psychological damage. It also examines how artificial intelligence (AI) has replaced humans in various productive activities, which can harm human capital for different reasons. Methodologically, critical geopolitics was employed as a theoretical framework, along with hermeneutics and maieutic. Additionally, the technique of open interviews with two defense and security experts was used. The results obtained allow us to conclude that, to take advantage of the potential of the digital era and foster the development of human talent, public policy makers must adopt a proactive and comprehensive approach to human capital management. This includes a) investing in education and technological training to prepare workers for the jobs of the future; b) promoting digital inclusion and media literacy; c) regulating the use of AI to protect individual rights and privacy, and d) fostering innovation and entrepreneurship.

Keywords: human capital, war in Ukraine, digitization of society, large-scale military operations, critical geopolitics.

INTRODUCTION

According to authors such as Kissinger (2016), Arbeláez-Campillo, and Villasmil (2020), the current world order is undergoing a significant structural transformation, influenced by changing geopolitical conditions. Thus, the hegemonic unipolarity of the United States of America, predominant since the collapse of the USSR, faces the rise of emerging powers that are pushing towards a multipolar international system in the 21st century.

The changes in form and content of the international architecture are manifested in the growing influence of countries such as China, India and Brazil, challenging traditional Western dominance and promoting, at every moment, a more equitable distribution of global political power and a permanent tension of the asymmetrical power relations promoted by the United States. In today's world, tensions between great powers, trade disputes, and regional conflicts further complicate this panorama of increasing entropy, generating uncertainty and the strategic need for adaptation by all international actors, as stated by The Roscongress Foundation (2024). The search for strategic alliances and the strengthening of regional cooperation have become crucial to navigating this new world order, as evidenced by initiatives such as BRICS+.

The concept of a multipolar world represents an alternative to outdated models of international relations and opens up new opportunities for global cooperation and development. It is a strategic necessity, and a moral choice aimed at a sustainable future for all nations on the planet (The Roscongress Foundation, 2024, para. 2).

In this scenario, the advance of human capital in Ukraine has been strongly impacted by the large-scale military operation carried out by the Russian Federation since February 2022. In the words of Pryimak, et al. (2023), the conflict has caused massive displacements of the civilian population, leading to a considerable loss of human resources and the disruption of education and vocational training. At the same time, the destruction of infrastructure, lack of resources and collective insecurity have dramatically restricted the possibilities for personal and professional growth for Ukrainian citizens. As if this were not enough, the war has generated widespread psychological trauma, affecting the mental health and well-being of the population, which in turn negatively impacts productivity and the capacity for social innovation, as Elvevåg and DeLisi (2022) argue.

As can be inferred a priori, Russia's military aggression has adversely affected Ukraine's human capital, reducing the possibilities for its training and sustained growth. The conflict has caused a decrease in production and an emigration of skilled workers abroad, which has had a negative impact on the national economy. Consequently, soon, the rehabilitation of conflict-torn areas and regions requires skilled employees, economic funds, infrastructure and advanced technologies, as a condition for the possibility of rebuilding Ukraine, in accordance with the requirements of the digital age.

For the reasons alluded to, the authors of this research hypothesize that: in order to reduce the material and moral consequences of war, restore the economy and strengthen the country's defense capabilities, a high level of development in human capital is essential. Much more so since, according to Pryimak, et al., (2023), the knowledge and skills of employees increase labor productivity, which has a positive effect on the economy as a whole and on the country's competitiveness in international markets.

The overall objective of this research is to explore, qualitatively, how human capital in Ukraine has suffered and changed due to two factors: the war and increasing digitalization. It analyzes how war affects human capital, generating collective experiences of migration, death, and psychological damage. It also examines how artificial intelligence (AI) has replaced humans in various productive activities, which can harm human capital due to job reductions. This analysis allows for a better understanding of the challenges and opportunities faced by human capital in Ukraine in this context of conflict and the coming technological transformation of society.

It should be clarified that, for some, the concept of human capital can be controversial if it is considered that people are not simply a resource at the disposal of a nation or corporation, but

beings with human dignity, histories and transcendental lives. Therefore, from a humanistic and philosophical perspective it is important to recognize the intrinsic value of each individual and their right to fully develop, beyond their economic contribution. In this sense, the term «human talent», as explained by Vallejo (2016), may be more appropriate, since it emphasizes the skills, potential, and uniqueness of each person. In any case, in semantic terms, the notions of capital or human talent recognize that the development of human capacities must be focused on the well-being and fulfillment of people and not only on economic growth.

For the authors of this research, the classic concept of «human capital» focuses on employees as an asset that can be managed and exploited to maximize the efficiency and productivity of an organization, community, or country. And, although this notion tends to consider employees as «interchangeable pieces» in a system, prioritizing their technical skills and knowledge. You don't have to deny that employees are unique individuals with diverse skills, experiences, and aspirations. Consequently, any public policy focused on the promotion of human capital focuses, or should focus, on the development of the potential and talent of each person, fostering creativity, innovation and commitment.

This research is divided into four (04) parts: in the first, a review of the existing literature on human capital and its development in contexts of conflict and digitalization is carried out; in the second part, the fundamentals of the research methodology are exposed; in the third part, a qualitative analysis of the data collected through interviews and documents that refer to the case in Ukraine is presented, in order to generate a discussion of the results and their implications for public policies and human capital development strategies. Finally, the conclusions and recommendations for future research are presented. In teleological terms, this text has the cognitive purpose of improving the understanding of the challenges and opportunities faced by human capital in Ukraine, in addition to contributing to the creation of more effective public policies to promote sustainable development in the context of war and digitalization.

LITERATURE REVIEW

This documentary selection is based on the collection of high-impact and open access scientific articles, published in the last five years, that address the theories of human capital and its development in contexts of conflict and digitalization. The selection criteria prioritized: (a) cognitive contributions on theories of human capital in relation to conflict and digitalization; (b) the methodological approach and the perspectives of analysis employed; and (c) the limitations identified in each investigation. The objective of this brief section was to provide, for the reader's understanding, a synthesis of the most relevant findings and current perspectives in this field.

The study by Neboha, Zapsha, Kuznetsova, Golikova, and Lyubov (2024) analyzes human capital as a dominant factor in the knowledge economy, highlighting the importance of corporate vocational training based on digital tools. The research conducts a SWOT analysis to determine the strengths, opportunities, weaknesses, and threats of human capital development in Ukraine, identifying their key determinants in the process. The results obtained are based on methods of analysis and synthesis, graphical analysis and SWOT analysis. One limitation worth mentioning is its specific focus on Ukraine, which may restrict the generalization of its findings to other contexts, near or far.

Another relevant article highlighted for its content and significance authored by Qureshi (2023), examines the magnitude of digital transformation for development, arguing that human capital is key to effective digital transformation that drives sustainable development. Qureshi (2023), stresses that access to ICTs, skills and knowledge are necessary conditions to prevent digitalization from exacerbating existing inequalities. It therefore advocates investing in human capital to enable the innovative use of ICTs, even in situations of conflict and calamity. Finally, the article points out that digital transformation requires a transformation of human capabilities, including human capital as its cross-cutting axis, to achieve radical improvements in people's lives and, even more, in their communities.

In this vein, comparative research entitled *Comparative analysis of human capital management strategies in the context of digitalization of the national economy* (Khoruzhy, Khoruzhy, Kubrushko, Karataeva, & Bitkova, 2023), examines human capital management tactics in the context of the digitalization of national economies. The research details various theoretical structures of the phenomenon of human capital and, at the same time, reveals the polyparadigmatic essence of the analysis of the management strategies of this form of capital. Among their most notable contributions, the authors highlight that risk trends, such as global transformations in technology, demography, social instability and climate challenges, in addition to changes in human resources, shape, sociologically speaking, social organization. Therefore, the research proposes a methodology to perform complex modular measurements of human resources and evaluate the impact of micro, meso and macro factors on the economic performance of the digital environment.

In the words of Neboha, et al. (2024), several authors examine new forms of interactions of human talent and the skills necessary to meet the requirements of Industry 4.03. In addition, the importance of harmonizing the challenges of human capital management with the digital technologies used by companies in various industrialized countries is discussed. In this context of study, the issues of human capital development in the framework of the digitalization of society stand out, offering a perspective of the conception of work in the current circumstances. These studies underscore the relevance of constantly improving the professional skills of workers, with the purpose of establishing a continuous training system based on the idea of «learning organization» (Qureshi, 2023).

In a synthesis view, the literature consulted highlights the relevance of human capital as a force for sustainable development in the digital age, particularly in conflict situations. Beyond the particularities of each research, in general, the strategic importance of investing in education, digital skills and mental health is emphasized to ensure that individuals can adjust to technological transformations and overcome the challenges generated by the war. In the current context, business professional training, the management of human talent and the generation of environments of constant learning are fundamental tools to model human capital in a conflictive world that is continuously changing towards the digitalization of social life.

METHODOLOGY

The methodological architecture of this research is based on critical geopolitics, which facilitates the analysis of power discourses and underlying ideological positions in relation to the conflict in Ukraine. According to Le Dantec (2007), critical geopolitics, on the one hand, analyzes the political and geographical dynamics that shape power relations in the world order and, on the other, deconstructs the prevailing narratives and reveals to understanding the interests that support them.

In this case, the methodological approach is aligned with a counter-hegemonic attitude, promoting Ukraine's independence and sovereignty in the face of external pressures. This methodological and epistemological perspective offers a conceptual framework for understanding how military actions and digitalization affect human capital, considering the political, economic and social dimensions of the conflict.

The hermeneutical interpretation of documents, based on the philosophy of Gadamer (2004), was used to reveal the meanings and interests that each author holds, consciously or unconsciously. In general, this tool facilitates the understanding of the particularities of the life horizon in which the authors are immersed, contextualizing their points of view and prejudices. Hermeneutics allows for a detailed interpretation of the debates about human capital in Ukraine, recognizing how the experiences of war and the phenomenon of digitalization are reflected and appreciated from different perspectives. As Brom (2003) argues, the critical view of the source's sheds light on a comprehensive and detailed understanding of the phenomenon being analyzed.

As a complement to the documentary sources, in December 2024, two open interviews were conducted with two NATO security and defense specialists in Kiev, who decided to remain anonymous for security reasons. These interviews provided relevant data on military tactics, geopolitical trends and the repercussions of the conflict on Ukrainian society. The Socratic maieutic tool was used, as explained by González and López (2016), to encourage critical reflection by specialists, guiding them through open and intelligent questions so that they could show their knowledge and points of view in a deeper and more relevant way in the dialogue. Maieutic enabled the acquisition of key data and a better understanding of the complexity of the situation in Ukraine.

To qualitatively explore how human capital in Ukraine has changed due to the war and increasing digitalization, the interviewees were asked the following questions: How has the war affected the skills and knowledge of the Ukrainian population, and what kind of education or training is needed to rebuild the country? How has digitalization transformed the labor market in Ukraine during the conflict, and what opportunities and challenges does it present for human capital? And how can the negative effects of migration, death, and psychological damage on Ukrainian human capital be mitigated, and what public policies can be implemented to promote the resilience and well-being of the population?

In addition, the impact of artificial intelligence (AI) on employment and productive activities in Ukraine was investigated. In the research team of the authors of the article, the following basic questions were raised: In which sectors and activities has AI replaced humans in Ukraine, and what are the consequences for human capital in terms of unemployment and inequality? What kind of skills and knowledge are needed to compete in an increasingly automated labor market, and how can these skills be acquired? And what steps can be taken to ensure that AI is used ethically and responsibly in Ukraine, and that it benefits the whole of society rather than exacerbating existing inequalities?

In operational terms, the methodological stages deployed included: (1) an exhaustive review of the existing literature on human capital, conflict and digitalization; (2) the selection and hermeneutical analysis of relevant documentary sources; (3) conducting open interviews with security and defense experts; (4) qualitative analysis of data collected through interviews and documentary sources; (5) the interpretation of the results in the light of critical geopolitics; and (6) the formulation of conclusions and recommendations for future research and for the design and development of public policies.

Any qualitative research on human capital development in large-scale military operations and digitalization requires a deep ethical commitment. As Taylor (1994) argues, in his ethics of authenticity, socially responsible researchers should prioritize the informed consent of participants, especially given the sensitive nature of the topics that are exposed to public consideration. Consequently, confidentiality and anonymity should be ensured to protect participants from potential repercussions, as was done with the interviews conducted with the two experts.

In this research and, especially in the drafting phase, it was deliberately sought to minimize any potential harm to the participants, considering the psychological stress related to war experiences, the disclosure of sensitive information, and the potential security risks associated with digitization. Therefore, an attempt was made to always maintain transparency regarding the objectives, methods and intended use of the research, avoiding distortions of reality or publishing unsupported information in the sources consulted. In addition, researchers are aware of their own biases and values. Up to the time of publication of the article, the objective and subjective conditions have been created for this research to contribute, as far as possible, to the well-being of military personnel and to the ethical improvement of human capital management practices in Ukraine.

ANALYSIS AND DISCUSSION OF RESULTS

Variable impact of the war

In principle, it should be clarified that this analysis was developed through a hermeneutical and maieutic dialogic exercise, combining the answers of the interviewed subjects with the information from the documentary sources and the opinion of the authors of the study. In line with the most widely disseminated qualitative studies (Martínez, 2009; Ray, 2003), it is recognized that the knowledge produced in the social sciences is, to a large extent, a synthesis of objective and subjective elements, assuming the biases inherent to the participants in the process of knowledge production. Ultimately, this view seeks to understand the complexity of the phenomenon studied from multiple perspectives, recognizing the validity of different interpretations and experiences.

For the purposes of the research, the interviewed subjects are cited and referred to simply as Expert 1 and Expert 2, to protect their personal identity. When asked: How has the war affected the skills and knowledge of the Ukrainian population, and what kind of training or training is needed to rebuild the country? Expert 1 (1, 2024) says that the war has largely devastated the skills and knowledge of the Ukrainian population. Many have lost their jobs and education has been disrupted. To rebuild the country, massive training is needed in areas such as construction, engineering and applied technologies, within the framework of a reconstruction plan that has the support of the European Union and the international community in general. Due to the magnitude of the damage, this plan must resemble what the Marshall Plan was for Europe at the end of the Second World War in 1948.

Expert 1 then responds that, based on his knowledge of the terrain, it is necessary to invest in psychological rehabilitation programs to address the generalized trauma of the population of the territories that have lived the experience of war in their own flesh. In the context of Ukraine's national reconstruction, the training of the skilled workforce should be practical and oriented to the needs of the labor market, with a focus on innovation and entrepreneurship (1, 2024), rather than on the humanities or social sciences.

As for the second question: How has digitalization transformed the labor market in Ukraine during the conflict, and what opportunities and challenges does it present for human capital? Expert 1 responds that digitalization has transformed the labor market, creating new opportunities in sectors such as technology, communication, and e-commerce. However, it has also created challenges, such as the digital divide and the constant need to acquire new national skills in security and defense and sustainable development. For its part, Expert 2 adds that collective access to technology and digital training must be guaranteed for all Ukrainians, especially for the most vulnerable groups in socioeconomic terms. If the risks of the digital gap can be reduced, public policies can be promoted that promote digital inclusion and the creation of quality jobs in the technology sector (1; 2, 2024).

When the difficult question was asked: How can the negative effects of migration, death, and psychological damage on Ukrainian human capital be mitigated, and what public policies can be implemented to promote the resilience and well-being of the population? Expert 1 categorically stated that, as in any war, migration, death and psychological damage have had a devastating impact on Ukrainian human capital. To mitigate these effects, social policies that promote family reunification, psychological support and social integration are needed. However, it may take several years to achieve successful effects in this dimension (1, 2024).

For his part, Expert 2: expressed that it is very useful to strengthen mental health systems and provide, consequently, support services to victims of war. In this effort, which is a fundamental part of any national reconstruction policy, it is necessary to implement programmed for the reintegration of refugees and internally displaced persons into the labour market, guaranteeing their access to education, housing and employment, in accordance with the standards and protocols of the United Nations and the European Union, as these are the most advanced in terms of what the restoration of the social fabric and the re-promotion of the apparatus mean national production.

Variable Artificial Intelligence

The sources consulted show that AI has begun to replace humans in some sectors in Ukraine, such as manufacturing, customer service, and data analytics (Goncharuk, 2024). This reality has raised concerns about unemployment and inequality, especially for lower-skilled workers. For cybersecurity and defense specialists like Goncharuk (2024):

Russia's full-scale war in Ukraine is the first international conflict in which the opposing sides have actively developed and used artificial intelligence (AI) for military purposes. AI solutions for geospatial intelligence, operations with unmanned systems, military training, and cyber warfare have been key to success on the battlefield. (Goncharuk, 2024, para. 1)

As in any war, the needs that are imposed on the battlefield demand the implementation of a technological agenda in innovation, as a condition of possibility to achieve victory or, at least, reduce the impact of the advance on the ground of the invading forces, consequently:

After two years of intense fighting, Ukraine and Russia are competing to improve existing defense solutions with AI and to develop new AI-powered systems. The war has forced Ukraine to focus on what works best on the battlefield to blunt the enemy's advantages while also considering future warfighting needs. This has led to a clear focus on providing the best solutions for frontline troops and developing a talent pipeline for technology development (Goncharuk, 2024, para. 10).

Everything indicates that, to succeed in an increasingly automated national and international work environment, skills such as critical reasoning, inventiveness, problem solving and the ability to adapt to digital transformations are required (Arbeláez-Campillo, Villasmil Espinoza, & Rojas-Bahamón, 2021). These competencies can be obtained through formal education, vocational training and autonomous learning. However, and following the criteria of Arbeláez-Campillo, et al. (2021) in their reflections on AI and the human condition, in all imaginable scenarios these technologies must be used ethically and responsibly in Ukraine, for which clear regulations and supervisory mechanisms must be defined by the legislative branch. In the face of the increasing digitalization of society, workers' rights must be protected, transparency and accountability must be promoted, and the benefits of AI must be equitably distributed.

TABLE 1. Variables with a significant impact on human capital.

Variable	Impact	Challenges	Opportunities	Remarks
Large-scale military operation	Loss of skills, disruption of education, psychological trauma, migration.	Reconstruction, rehabilitation, reintegration into the labour market, digital divide.	Mass training, innovation, entrepreneurship, digital inclusion.	To successfully face these opportunities and challenges, public policies that are up to the needs and aspirations of Ukrainian society are required.
Artificial Intelligence (AI)	Job replacement, task automation, increased productivity.	Unemployment, inequality, the need for new skills, ethics and responsibility.	New jobs, greater efficiency, development of new technologies, improvement of the quality of life.	AI doesn't have to be a problem for workers, if it's used ethically and for the benefit of social development in general.

Source: prepared by the authors (2025).

For the authors of this research, in addition to the above, strategic research capacities and the development of AI technologies must be promoted, which are adaptive to market needs and, at the same time, benefit the entire Ukrainian society, instead of exacerbating existing inequalities. For the achievement of this strategic objective, it is necessary to promote resolute collaboration between government, industry, academia and organized civil society to ensure, always, that AI is used for the common good and, even more, to build a more prosperous and just future for all Ukrainians who seek to live in peace and prosper in their own territory, without foreign taxation.

CONCLUSIONS AND RECOMMENDATIONS

The digital age, driven by artificial intelligence (AI), presents humanity with a forked path. Following the prospective criteria of Arbeláez-Campillo, et al. (2021), the first outcome, a dystopian future, envisions AI as an obstacle to the sustainable development of humanity. In this scenario, algorithmic control exacerbates inequalities, concentrates power in the hands of a few authoritarian elites, and dehumanizes work, leading to an ontological loss of autonomy and creativity. Unbridled automation could lead to mass unemployment, while algorithmic manipulation undermines social trust and the ability to make informed decisions. Ethics is eclipsed by utilitarian and pragmatic effi-

ciency, and the pursuit of short-term gain prevails over long-term human well-being, thus halting the true progress of civilization.

The second, more realistic scenario projects uneven adoption of AI globally. The impact of AI on the economy, politics, and social organization will vary significantly from country to country, depending on their goals, agendas, and regulations. Thus, some societies in the global north could leverage AI to improve economic efficiency, healthcare, and education, while others in the global south struggle with technological unemployment, social polarization, and the erosion of civil liberties. In this fragmented world, international south-south cooperation becomes necessary to address common challenges and ensure that AI benefits all of humanity, not just a few privileged groups and countries.

Thinking about the post-war Ukrainian context, human capital development faces unique challenges and opportunities. A pessimistic scenario could be a massive brain drain, a mental health crisis, and a declining economy, hampering national reconstruction. An optimistic scenario, on the other hand, envisions a revitalized and modern Ukraine, which invests heavily in education, innovation and technology, attracting human talent and becoming a regional center of technological development in Eastern Europe. The path Ukraine takes will depend on its strategic ability to tackle corruption, build strong democratic institutions, and foster a culture of entrepreneurship and constant innovation.

In this regard, to harness the potential of the digital age and foster the development of human talent, policymakers must take a proactive and comprehensive approach to human capital management. This includes: (a) investing in technology education and training to prepare workers for the jobs of the future; b) promoting digital inclusion and media literacy; c) regulate the use of AI to protect individual rights and privacy, and d) To promote innovation and entrepreneurship. Taken together, these recommendations are designed to create an environment that fosters collaboration between academia, industry and government, and promotes a culture of lifelong learning in new technologies.

Finally, this research recognizes its possible limitations. The complex and multifaceted nature of the topic, as well as the rapid evolution of technology, make it difficult to carry out a comprehensive and definitive analysis of it. Available data may be incomplete or biased, and future projections are inherently uncertain. At the same time, it is not ruled out that the philosophical perspectives adopted by the authors may negatively influence the interpretation of the results. Therefore, this research should be considered as a starting point for future explorations and debates on the subject, recognizing the epistemological need for an interdisciplinary bridge and continuous reflection that is never exhausted in a high-impact scientific article.

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