

NAVIGATING THE GLOBAL ALGORITHM ECONOMY: IMPLICATIONS FOR BOSNIA AND HERZEGOVINA'S GEOPOLITICAL LANDSCAPE

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ABSTRACT

This study explores the implications of the global algorithm economy on Bosnia and Herzegovina's (BiH) geopolitical landscape, focusing on the strategic competition between the United States (US) and the People's Republic of China (PRC) in artificial intelligence (AI) development. As AI technologies rapidly evolve, they reshape economic value and global power dynamics. The US and the PRC, as leaders in AI innovation, are at the forefront of this transformation, influencing international relations and positioning smaller nations like BiH in complex geopolitical scenarios. This research investigates the ripple effects of the global AI rivalry on BiH's data sovereignty, political discourse, and public policy through a mixed-methods approach, including an analysis of the AI machine learning value chain and semi-structured interviews with key informants. The findings highlight significant challenges for BiH in leveraging AI for national growth but underscore opportunities for improvement through strategic investments and coherent data management strategies. The study concludes with recommendations for BiH to proactively address these challenges, emphasising the importance of understanding regional dynamics and aligning with global AI standards.

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Introduction

The rapid advancement of artificial intelligence (AI) technologies has become a defining characteristic of the 21st century, profoundly influencing global economic and geopolitical dynamics. As nations strive to assert dominance in the AI domain, the competition between major global powers, particularly the US and the PRC, has intensified, influencing a wide array of sectors from technology to economic policy. This race is not only reshaping economic landscapes but also redefining geopolitical alliances and strategies. Against this backdrop, smaller nations such as BiH are finding themselves at a critical juncture where they must navigate the complex interplay between global AI powerhouses to safeguard their interests and enhance their geopolitical standing.

The concept of the “algorithm economy” refers to an economic paradigm where algorithms, particularly those driven by AI and machine learning, play a pivotal role in driving economic value and growth (Trabelsi 2023; Gonzales 2023; Qin et al. 2023). In this new economic model, data is the key. Hence, the ability to collect, process, and analyse vast amounts of data has become a key determinant of national power and influence. Countries that lead in AI development are not only poised to reap significant economic benefits but also to exert considerable geopolitical influence (Bonsu and Song 2020; Pavel et al. 2023). The US and PRC are at the forefront of this transformation, each leveraging their unique strengths to advance their AI capabilities and secure a competitive edge.

With its robust innovation ecosystem, substantial financial resources, and a long history of technological leadership, the US continues to be a dominant force in AI research and development. American tech giants such as Google, Microsoft, and IBM are pioneers in AI innovation, continuously pushing the boundaries of what is possible. Furthermore, the US’s strategic investments in AI through government initiatives and defence projects underscore its commitment to maintaining technological supremacy (Buchanan 2020). On the other hand, China has rapidly emerged as a formidable contender in the global AI race. With extensive government support and a vast population that generates enormous amounts of data, China has made remarkable strides in AI development (Gueham 2017). The Chinese government’s strategic vision, as articulated in its “New Generation Artificial Intelligence Development Plan,” aims to position China as the world leader in AI by 2030 (Gueham 2017). Chinese tech giants like Baidu, Alibaba, and Tencent are at the forefront of this effort, developing cutting-edge AI technologies and applications.

The competition between the US and the PRC in AI is not merely a technological rivalry but also a strategic contest with far-reaching implications for global politics. This rivalry influences international trade policies, security

alliances, and diplomatic relations, thereby shaping the geopolitical landscape. For countries like BiH, situated at the intersection of these global forces, navigation through this complex terrain is essential for ensuring national security and economic prosperity. A country with a strategic location in Southeast Europe, BiH has a unique geopolitical position. Historically, it has been a crossroads of different cultures, ideologies, and political influences. In the current context of AI-driven geopolitics, BiH must carefully balance its relationships with global powers while developing its own AI capabilities. The nation's engagement with both the US and the PRC presents opportunities and challenges that require informed strategies. Hence, this research aims to delve into the dynamics of the global algorithm economy and its impact on BiH's geopolitical position. By examining how the US-PRC competition in developing robust AI technologies influences the geopolitical landscape of BiH, this study seeks to uncover potential outcomes and strategies for navigating this complex terrain. Specifically, the research will explore how AI development by these global powers affects BiH's data sovereignty, political discourse, and public policy.

Conceptual and Theoretical Background

The AI machine learning value chain is crucial in the race for AI leadership, particularly between China and the United States. This value chain consists of five key stages: data collection, data storage, data preparation, algorithm training, and application development (Stanton et al. 2019; Bughin et al. 2017). Understanding this chain is vital for countries seeking a competitive advantage in the AI era. The geographic distribution of these stages significantly influences a country's position in the global economic landscape and impacts broader geopolitical dynamics.

Data Collection in the AI Machine Learning Value Chain

Data collection is the foundation of machine learning, providing the raw material necessary for developing AI applications. Vast amounts of data are generated daily through various devices and activities, including internet searches, social media posts, phone calls, and online transactions. This raw data is essential because it is used to train machine learning algorithms, making them more accurate and effective (Kelly 2022). China is often highlighted for its significant advantage in data collection (Kelly 2022). The country has a massive and highly digitised population, which generates an enormous amount of data. Additionally, China's regulatory environment is relatively lenient regarding data protection, allowing for extensive data collection across numerous sectors, such as technology, e-commerce, and social media. The Chinese government views

data as a crucial resource and has established data trading exchanges to leverage this asset strategically (Kelly 2022). In contrast, the United States excels in technological innovation and has some of the world's leading technology companies, such as Google, Facebook, and Amazon. These companies play a significant role in collecting data globally. The US benefits from a diverse range of data sources, including tech companies, financial institutions, and research organisations, contributing to a rich and varied dataset. This diversity is a significant advantage in the data collection stage of the AI value chain (Kelly 2022; Koetse 2024).

Data Storage and Data Preparation in the AI Machine Learning Value Chain

Once data is collected, it must be securely stored and managed. Initially, companies used physical data centres, large facilities filled with servers to store data. However, there is a noticeable shift towards cloud storage. Instead of maintaining their servers, many businesses now rely on cloud service providers, which operate extensive networks of servers and virtual machines accessible over the Internet. One of the most advanced forms of data storage today is found in hyperscale data centres (HDCs). These facilities span multiple locations and house thousands of servers, handling millions of virtual machines (Ozsevim 2023). Furthermore, the expansion of data centres raises important environmental concerns (Vincent 2024; Anderson, Sweeney, and Canonica 2023). For example, the expansion of data centres, particularly hyperscale facilities, has raised critical environmental concerns due to their substantial energy demands and water usage. Globally, data centres consumed approximately 460 terawatt-hours (TWh) of electricity in 2022, representing 1.8% of the world's total electricity consumption, with projections indicating this could surpass 1,000 TWh by 2026 (Ozsevim 2023). In regions such as Ireland, data centres accounted for 18% of national electricity use in 2022, with estimates suggesting they could consume 28% by 2031 (Anderson, Sweeney, and Canonica 2023). Additionally, hyperscale facilities, such as those operated by Google, require an average of 550,000 gallons (2.1 million litres) of water daily for cooling, amounting to over 200 million gallons annually (Vincent 2024). This high resource demand is particularly concerning in water-stressed areas, where such facilities intensify local scarcity. Furthermore, many data centres rely on electricity derived from fossil fuels, contributing to elevated carbon emissions and hindering global efforts to combat climate change (Vincent 2024).

Raw data often come with inherent disorder, containing outliers and errors that require attention. Data preparation, or data pre-processing, involves cleaning and structuring this data. This process is typically carried out by highly

skilled data engineers and scientists, who use various techniques to correct errors, handle outliers, and organise data into tables or other formats suitable for analysis (Kotsiantis, Kanellopoulos, and Pintelas 2006). In addition to these specialists, less-skilled workers, known as data labellers, may be employed to categorise manually subsets of data according to specific algorithmic requirements. For instance, in training facial recognition algorithms, data labellers might classify images of faces into categories like “male” or “female” to help the algorithm learn distinguishing features and make predictions on new data (Stanton et al. 2019). The effectiveness of data preparation significantly depends on the skills of the personnel involved. Data scientists play a crucial role, tasked with collecting, cleaning, and analysing large datasets from various sources, including databases, social media, and sensors. They employ statistical and machine learning techniques to analyse data and develop models that predict future trends and outcomes. Effective communication of these results to stakeholders is also a key responsibility (Segaran and Hammerbacher 2009). The demand for data scientists is projected to grow significantly. The US Bureau of Labour Statistics forecasts the creation of approximately 11.5 million data science jobs by 2026, with a 35% growth in employment from 2022 to 2032 (US Bureau of Labor Statistics 2022). This growth highlights the increasing need for skilled data professionals. Highly skilled workers in data preparation often come from STEM (science, technology, engineering, and mathematics) backgrounds. Therefore, the number of STEM graduates is a useful proxy for estimating the availability of data scientists. In 2016, China and India were the leading producers of STEM graduates, with 4.7 million and 2.6 million. The US followed with 0.5 million graduates (Stanton et al. 2019). The Biden administration’s recent Executive Order underscores the importance of STEM education in fostering a skilled workforce for AI and other advanced technologies (Patel and Ahmad 2023).

China’s “Thousand Talents” programme aims to attract skilled professionals and enhance its technological capabilities by recruiting both Chinese and non-Chinese experts (Zwetsloot 2019). This initiative reflects China’s strategy to bridge gaps in technology and innovation. However, concerns remain regarding the quality and transparency of Chinese research, particularly in areas such as intellectual property and data security (Zwetsloot 2019). In contrast, the United States benefits from a well-established research ecosystem and top-tier institutions, making it an attractive destination for international talent. More than half of Chinese undergraduates studying AI have migrated to the US, with a high percentage choosing to remain and work there after graduation (Appenzeller, Bornstein, and Casado 2023). This talent mobility highlights the competitive nature of AI development and the potential challenges posed by restrictive immigration policies and increased competition from other nations.

Algorithm Training in the AI Machine Learning Value Chain

The role of human talent is critical in algorithm training (Stanton et al. 2019). Data scientists are the experts responsible for developing, refining, and comparing various models. Their work involves selecting appropriate algorithms and fine-tuning their configurations to optimise performance. Given the complexity and variety of algorithms, data scientists must possess a high level of expertise to navigate the numerous options available and evaluate their effectiveness through rigorous testing and validation processes (Stanton et al. 2019). The significance of skilled labour in this context cannot be overstated, as these professionals are crucial for enhancing predictive accuracy and adapting models to meet evolving data and requirements. Another essential component of algorithm training is computing power (Stanton et al. 2019). The efficiency and speed with which algorithms are trained rely heavily on advanced computer hardware. Sophisticated models, particularly those that handle large datasets, require substantial computational resources. This demand is met by bespoke semiconductors, such as Graphics Processing Units (GPUs) and Field-Programmable Gate Arrays (FPGAs), which are specifically designed to handle the massive parallel processing tasks needed for machine learning (Buchanan 2020). The exponential increase in computing power has been a major driver of AI progress, allowing systems to process larger volumes of data in shorter time frames. While recent research suggests that large language models (LLMs) could be trained with more modest resources, high-performance computing remains a significant bottleneck (Stanton et al. 2019). When comparing the AI capabilities of China and the United States, several key differences emerge, particularly in the realm of algorithm training. China leads in the number of individual machine learning patents and holds a significant share of patents related to deep learning, a rapidly growing subfield of AI (Stanton et al. 2019). However, in the global patent landscape, China lags behind the United States (Stanton et al. 2019). American entities have filed nearly a quarter of a million patent applications abroad, more than double the number from China (Stanton et al. 2019). Furthermore, US patents are more frequently cited, indicating higher technical relevance and quality (Stanton et al. 2019). The semiconductor industry also highlights a critical difference between the two countries. Historically, the United States has been a global leader in semiconductor technology. However, most semiconductor manufacturing now occurs outside the US, particularly in Taiwan, South Korea, and China. Meanwhile, China has made significant progress in acquiring machine learning patents and advancing its semiconductor capabilities (Stanton et al. 2019). The Chinese government has also launched initiatives like the “Thousand Talents” programme to bolster domestic expertise and reduce reliance on foreign technology (Zwetsloot 2019).

Application Development in the AI Machine Learning Value Chain

Software development has become increasingly crucial with the rise of technology. According to Evans Data Corporation, there were 26.4 million software developers worldwide in 2022. This number is expected to grow to 28.7 million by 2024 (Evans Data Corporation 2023). Developer Nation Report (2021) further illustrates this growth, noting that there were 24.3 million software developers globally in 2021, a 20% increase from 2020. Projections suggest this figure will reach 45 million by 2030 (Developer Nation 2021). The distribution and characteristics of software developers vary widely. The Asia-Pacific region, particularly India and China, has the largest population of software developers, with significant growth expected in the coming years (Stanton et al., 2019). In contrast, Europe is experiencing slower growth due to economic challenges and the ongoing impacts of the war in Ukraine. North America and Latin America are also showing steady growth rates. The growth and distribution of software developers are critical for understanding how effectively countries can develop and deploy machine learning applications.

Data Sovereignty

Moreover, in this race, the concept of data sovereignty is becoming increasingly important.³ Countries are asserting more control over the data produced within their borders, recognising its national security and economic value. The European Union, for instance, has implemented policies to ensure “digital sovereignty,” aiming to govern the extensive data collection within its member states (European Commission 2024a; European Commission 2024b; European Parliament 2020). Similarly, countries like India and Saudi Arabia are taking steps to manage and leverage their data resources more effectively (Chander and Sun 2023). The transformative nature of AI extends beyond its technological advancements, significantly impacting global economic and geopolitical landscapes. Governments worldwide are navigating the dual challenge of fostering AI innovation while addressing its associated risks. Unlike earlier systems, which relied on pre-programmed rules and human expertise, modern AI leverages significant advancements in computing power, sophisticated algorithms, and an unprecedented volume of data. This evolution has positioned AI as a major driver of economic value, contributing

³ Data sovereignty is an increasingly important issue, shaping how countries, companies, and individuals manage and protect digital information. At its core, it involves a nation’s right to control data within its borders, free from external influence. Understanding this concept is crucial for navigating the complexities of global data governance in the digital age.

approximately \$2 trillion to the global economy and potentially reaching \$16 trillion by 2030 (Rao and Verweij 2017; Bughin et al. 2018). The substantial economic impact of AI has led to heightened geopolitical competition, prompting governments to escalate investments in AI research, development, talent, and infrastructure.

In China, the government has implemented stringent measures to control data flows, such as mandating that foreign companies store data from Chinese customers within its borders. This policy aims to safeguard national security while also limiting the use of Chinese data by external entities (The Economist 2017; Lee 2017). In contrast, the US has employed a range of measures to protect its technological edge. For instance, the Committee on Foreign Investment in the United States (CFIUS) blocked Chinese investment in a major US semiconductor producer, reflecting both national security concerns and strategic interests in maintaining dominance in semiconductor production (The Economist 2017; Lee 2017). This action, while officially framed as a national security measure, also serves to preserve the competitive advantage of US semiconductor technology. The concept of data sovereignty posits that data generated, processed, and stored within a country's borders is subject to its national laws (Kirvan 2023). This principle encompasses both data residency, where data is stored but not processed, and data localisation, where data must be stored and processed within the same jurisdiction. Governments are increasingly adopting policies to assert control over data flows, reflecting broader geopolitical aspirations to safeguard national security, protect citizen privacy, and enhance economic competitiveness. Data sovereignty has become particularly prominent in Europe, where concerns over American and Chinese control over data have driven regulatory initiatives. European policymakers, for instance, are increasingly focused on strengthening their regulatory frameworks to ensure local control over data and protect against extraterritorial legal influences (Pannier 2022). The European Union's General Data Protection Regulation (GDPR), Digital Markets Act, and Digital Services Act aim to strengthen data protection and ensure local data management (Pannier 2022). Initiatives such as Numspot, a joint venture to create a trusted, locally based cloud server, exemplify Europe's efforts to bolster data sovereignty (Kirvan 2023). Despite these advancements, challenges remain, such as the extraterritorial effects of US legislation like the CLOUD Act, which allows American authorities to access data stored abroad (van der Berg 2022). This legal conflict complicates efforts to ensure data protection within European jurisdictions. China's approach to data sovereignty is articulated through its Data Security Law, which mandates that foreign companies store data from Chinese customers within China (Gueham 2017). This law also restricts the use of Chinese data for services outside the country, reflecting China's strategic interest

in controlling data flows and protecting national security (Gueham 2017; Chander and Sun 2023).

Methodology

Purpose and Objectives

This study aims to explore the complex dynamics of the global algorithm economy and its influence on BiH's geopolitical position. Specifically, the research focuses on how the competition between the PRC and the United States in developing advanced artificial intelligence (AI) technologies impacts BiH's geopolitical landscape. The study investigates the engagement of BiH with these global powers and other nations to uncover potential outcomes and strategies for navigating this intricate terrain.

Therefore, the main research questions of this paper are: *Does the US and PRC's pursuit of the development of robust AI shape BiH's geopolitical standing? What are the prospects of BiH's contribution to the race?*

Conceptual-Methodological Framework and Data Collection Methods

This research adopts a geopolitical imagination approach to examine the relationship between AI development and geopolitical dynamics. Grounded in the existing knowledge and empirical evidence, the study aims to provide insights into tangible outcomes rather than speculative scenarios. A mixed-methods approach was employed, incorporating both qualitative and quantitative techniques. During the secondary research phase, desk analysis and literature review were conducted using available reports, studies, and relevant documents. Additionally, semi-structured interviews were conducted with seven key informants from pertinent institutions and fields related to the study's subject.

The research was conducted in June 2024 by the authors of this paper. The idea was to gather expert opinions on geopolitics, artificial intelligence, and the economy. A total of seven interviews were conducted, with four taking place in person and three online. The questionnaire included 14 questions designed to explore the intersection of geopolitical dynamics, investment decisions, and data governance in BiH. It specifically sought insights into BiH's geopolitical standing, the influence of political stability on investment decisions, and the role of data sovereignty, residency, and localisation in attracting international investments. Furthermore, it examined how governance improvements in BiH could create a favourable environment for foreign investments, particularly in

the IT and data storage sectors. Respondents were experts in the fields of geopolitics, artificial intelligence, and economics.

The key areas of analysis for this study include the current state of BiH's nodes related to the AI machine learning value chain, existing policies, and third-party legal obligations. Additionally, the research will explore the links and potential correlations between BiH's political discourse and data sovereignty. Based on these analyses, the study will provide recommendations for potential areas of intervention to reverse negative trends.

Results

BiH is situated in a complex geopolitical scenario, corroborated by varied descriptions by respondents. Also, BiH has to deal with the marginalisation and limited bargaining ground in this AI-fuelled economy. Respondent 1 believes that BiH “does not hold a significant geopolitical role and serves as a bargaining ground for major powers, particularly between the East and West”. They emphasise BiH's marginalisation in technological terms, highlighting an economy “reliant on cheap labour”.⁴ Conversely, Respondent 2 underscores “regional differences in the perception of geopolitical relations”. They point out that “while some countries in the region gravitate towards the EU and Euro-Atlantic integrations, Serbia's ambivalence complicates the regional dynamics further”.⁵

In addition to regional dynamics and Euro-Atlantic integrations, the US is deemed to have the most significant influence by all respondents. For example, respondent 3 notes the influence of the US, “which is transmitted through Germany and the EU, making the actual influence of the US dominant”.⁶ Respondent 4 adds that “BiH's economic relations include cooperation with the US, China, and the EU”, while Respondent 5 views BiH as “part of a broader regional satellite image with strong influences from the US and neoliberal policies positioning BiH as a *colony 2.0*”.⁷ These differing views illustrate the complexity of BiH's geopolitical position, influenced by various global powers and regional dynamics. This suggests that BiH's geopolitical manoeuvring is heavily influenced by the broader regional context, requiring a better understanding of the varied regional alignments and aspirations.

⁴ Interview with the male respondent, data expert, Sarajevo, 2024.

⁵ Interview with the female respondent, data expert, Sarajevo, 2024.

⁶ Interview with the male respondent from a state institution, Sarajevo, 2024.

⁷ Interview with the female respondent from a state institution, Sarajevo, 2024, and interview with the female respondent, data expert, Sarajevo, 2024.

Investments in the country (including the AI value chain) come from various destinations, but they are not strategically pursued or managed. Regarding investment in BiH, Respondent 1 criticises the focus on “raw materials and the lack of strategic investments that would benefit BiH citizens”. They believe that “BiH lacks an investment strategy, and that the financial system is not adapted to global flows, deterring private investors”.⁸ Respondent 2 views “investments as a tool for strengthening influence”, emphasising the importance of the origin of money and transparency. They highlight that “the EU and US have been the largest investors, but China’s arrival has complicated the situation by adding a new dimension to regional geopolitical relations”.⁹ Respondent 3 confirms that “the EU is the largest investor, while China targets large state projects such as highways, rather than small businesses”.¹⁰ Respondent 5 criticises neoliberalism and the abolition of protectionist measures, considering that “foreigners use BiH as a source of cheap labour without real benefits for the local economy”.¹¹ While these responses provide insights, they are limited in scope, as they represent a small sample from a single city. To further substantiate the claim that BiH lacks a clear investment strategy, additional research is required. However, these responses indicate that a clear investment strategy would benefit BiH citizens rather than relying on external investments that satisfy the appetites of foreign markets. Additionally, the importance of transparency and the origin of money is crucial for the long-term sustainability of investments in BiH.

There is a connection between political instability and investment, but respondents’ answers to this question vary. Respondent 1 does not consider political instability a key factor for investments in BiH, citing “administrative and financial problems as greater obstacles”.¹² They see political instability more as a media projection. Respondent 2 agrees that “political instability is not crucial but emphasises the lack of the rule of law as a bigger problem”. They believe that many companies facing more turbulent areas might see BiH as a more “stable option”.¹³ On the other hand, Respondent 3 points out that “political issues can be problematic for investors, but China, focusing on infrastructure projects, does not pay much attention to political rhetoric”.¹⁴ Respondent 5 adds that “the small number of IT companies in BiH is not due to political instability

⁸ Interview with the male respondent, data expert, Sarajevo, 2024.

⁹ Interview with the female respondent, data expert, Sarajevo, 2024.

¹⁰ Interview with the male respondent from a state institution, Sarajevo, 2024.

¹¹ Interview with the female respondent, data expert, Sarajevo, 2024.

¹² Interview with the male respondent, data expert, Sarajevo, 2024.

¹³ Interview with the female respondent, data expert, Sarajevo, 2024.

¹⁴ Interview with the male respondent from a state institution, Sarajevo, 2024.

but rather a lack of workforce and infrastructure development”.¹⁵ These responses suggest that while political instability can play a role, bigger issues for investors lie in administrative, legal, and infrastructural shortcomings.

Respondents note, regarding data management and localisation, that there is no coherent system at any level of government or any institution in BiH. Respondent 1 views data as a “strategic matter but emphasises that BiH lacks adequate infrastructure and strategy for data management”. They believe “there is a need to establish national digital infrastructure to effectively manage data sovereignty”.¹⁶ Respondent 2 highlights that “regulations like GDPR go against the idea of the internet as a free space”. They see data localisation as “a geopolitical issue” and emphasise the risks of non-transparency, especially in the context of cooperation with Chinese companies.¹⁷ Respondent 3 believes that “the issue of data sovereignty has been neglected in BiH and that globalisation has brought many challenges that BiH is not prepared to solve”.¹⁸ Respondent 5 criticises “the monopolisation of data by large corporations and underscores the need for localisation of certain types of data, such as health and cadastral data, while also highlighting the problem of non-transparency and political manipulation of data”.¹⁹ These responses indicate the need for a clear data management strategy and the establishment of adequate infrastructure that would enable efficient and transparent management of data sovereignty in BiH.

Discussion

Respondents’ views on investment in BiH reveal a consensus on the need for a strategic approach that benefits the local economy and ensures long-term sustainability. In their opinion, there is an obvious lack of strategic investments related to the AI machine learning value chain. Moreover, respondents criticise the current focus on raw materials and the absence of strategic investments that could uplift the local economy. They argue that the financial system in BiH is not aligned with global financial flows, which deters private investors. This highlights the need for a robust financial infrastructure, which will attract and support strategic investments and foster economic growth and development. Regarding the influence and transparency of investments, there is an emphasis

¹⁵ Interview with the female respondent, data expert, Sarajevo, 2024.

¹⁶ Interview with male respondent, data expert, Sarajevo, 2024.

¹⁷ Interview with female respondent, data expert, Sarajevo, 2024.

¹⁸ Interview with male respondent from the state institution, Sarajevo, 2024.

¹⁹ Interview with female respondent, data expert, Sarajevo, 2024.

that investments are often used as tools for geopolitical influence. They stress the importance of the origin of investment funds and the need for transparency. The respondent notes that while the EU and the US have historically been the largest investors in BiH, China's recent entry adds a new dimension to the geopolitical landscape. This perspective underscores the need for a transparent investment framework that can manage and balance the interests of diverse investors while safeguarding national sovereignty.

An important observation is that the EU is still the largest investor in the country. Respondents confirm that the EU remains the largest investor in BiH, with China focusing on large-scale infrastructure projects. This indicates a division of investment domains, where the EU's investments are more diverse and widespread, while China targets specific high-impact sectors. Understanding this division can help BiH develop targeted investment policies that leverage the strengths of each investor while mitigating potential risks. An interesting observation is a critique of neoliberalism and the current state of protectionist measures. Some respondents have criticised the neoliberal approach and the removal of protectionist measures, arguing that it has led to the exploitation of BiH's labour market. They advocate for a more protectionist stance that ensures foreign investments contribute to the local economy's sustainable development. This perspective calls for a reassessment of BiH's economic policies to ensure that foreign investments deliver tangible benefits to the local population.

Regarding political instability and investment, the responses highlight varying views on the impact of political instability on investments in BiH, with a general agreement on the more pressing issues of administrative and infrastructural challenges. This view suggests that addressing bureaucratic inefficiencies and improving financial systems could be more effective in attracting investments than merely focusing on political stability. In addition, all respondents agree that political instability is not the main issue, pointing instead to the lack of rule of law. They argue that this poses a greater challenge to investors, who may be willing to overlook political instability if there is a predictable and fair legal framework. This underscores the importance of legal reforms and the establishment of a reliable judicial system to attract and retain investments. Furthermore, political issues may concern some investors, but China's focus on infrastructure projects makes it less sensitive to political rhetoric. This highlights the varying tolerance levels of different investors towards political instability, suggesting that BiH could tailor its investment strategies to attract those less deterred by political concerns.

Respondents also identify workforce and infrastructure development as important factors. It is observed that the scarcity of IT companies in BiH is more attributable to the lack of workforce and infrastructure development than

political instability. This indicates that improving education and training programmes, as well as developing technological infrastructure, could enhance the attractiveness of BiH as an investment destination. Regarding data, data management, and data localisation, the responses emphasise the strategic importance of data management and the need for BiH to develop robust policies and infrastructure to manage data sovereignty effectively. They emphasise the need for National Digital Infrastructure. They view data as a strategic asset and stress the need for BiH to establish a national digital infrastructure. They argue that without a coherent strategy, BiH cannot effectively manage its data sovereignty. This calls for the development of a comprehensive digital policy that includes infrastructure development, regulatory frameworks, and data management protocols. Respondents also reflected on the geopolitical implications of data localisation, noting that regulations like GDPR challenge the concept of a free and open internet. They emphasise the risks associated with non-transparent data practices, especially in collaborations with Chinese companies. This perspective underscores the need for BiH to develop clear and transparent data policies that align with international standards while protecting national interests.

Also, there is an obvious neglect of data sovereignty by officials and decision-makers. Some point out that BiH has neglected the issue of data sovereignty, facing challenges brought by globalisation. This indicates a need for BiH to prioritise data sovereignty in its national policy agenda, addressing the gaps and vulnerabilities in its current data management practices. One respondent also criticised the monopolisation of data by large corporations and the political manipulation of data. They advocate for the localisation of sensitive data, such as health and cadastral data, and stress the importance of transparency. This calls for regulatory measures to prevent data monopolies and ensure that data management practices are transparent and accountable.

Lastly, it is important to note that this research also encountered some challenges, particularly given the novelty of the topic in the minds of decision-makers. There remains a significant need for increased awareness and understanding of the importance of AI and data sovereignty among key stakeholders. Future research could greatly benefit from incorporating a broader range of perspectives, including those of policymakers, industry leaders, and civil society actors, who are crucial to advancing the conversation. Expanding the scope of inquiry to include these voices would provide a better understanding of the challenges and opportunities facing BiH in this evolving landscape.

Conclusion

In the rapidly evolving landscape of the global algorithm economy, BiH stands at an important crossroads. The intensifying competition between global superpowers, particularly the United States and China, in the realm of artificial intelligence has far-reaching implications for smaller nations. This study highlights the urgent need for the country to strategically position itself within this shifting geopolitical landscape by focusing on several key areas. First, BiH must prioritise the development of a comprehensive AI framework that not only aligns with global standards but also fosters local innovation. This framework should be supported by significant investments in digital infrastructure, ensuring the country has the necessary foundation to participate in and benefit from the global AI economy. Establishing robust data management policies and infrastructure will be essential in safeguarding national interests and building trust with both domestic and international stakeholders. Moreover, encouraging a skilled workforce through targeted education and training labour is crucial for BiH to develop its capacity in AI and related fields. By cultivating expertise in AI, the country can increase its competitiveness and attract strategic investments that drive economic growth. Second, the study emphasises the importance of transparent and ethical data practices. BiH must adopt policies that prevent data monopolies and promote the localisation of sensitive data, ensuring data management is conducted transparently and with accountability. This will mitigate the risks associated with data exploitation and political manipulation, which are particularly relevant in the current geopolitical climate. Finally, the path forward for BiH involves active participation in international collaborations and aligning with global AI standards. By engaging with international AI consortia and forming strategic partnerships with leading AI nations, BiH can access cutting-edge technologies and knowledge, thereby enhancing its geopolitical relevance. While challenges such as political instability and the lack of a coherent investment strategy remain, BiH has the potential to secure a stronger position in the global AI economy. By adopting a proactive and strategic approach, the country can bolster its geopolitical standing and lay the foundation for sustainable economic development in the era of artificial intelligence.

Recommendations

The expanded findings reflect the complex nature of BiH's geopolitical position and the various factors influencing investment and data management in the country. Addressing these challenges requires a strategic approach that balances external influences with national interests, ensuring sustainable

economic development and robust data sovereignty. By developing clear policies and infrastructure, BiH can better navigate the dynamics of the global AI economy and enhance its geopolitical standing.

- 1. Developing a strategic AI framework is crucial for BiH.** It should focus on creating a national AI strategy that meets international standards and encourages local innovation. This framework needs to establish specific goals for each phase of the AI and machine learning process, including data collection, storage, preparation, algorithm training, and application development. To oversee AI initiatives, the government should create dedicated bodies that promote collaboration among academia, industry, and government agencies. By setting clear priorities and fostering an environment supportive of AI innovation, BiH can attract strategic investments and play a more significant role in the global AI landscape.
- 2. To support the AI value chain, BiH needs to significantly improve its digital infrastructure.** That involves constructing high-speed internet networks, data centres, and cloud computing capabilities. The government should also encourage the establishment of research and development centres focused on AI and machine learning. By investing in cutting-edge infrastructure, BiH can establish a strong foundation for AI development and attract both domestic and international tech companies to set up operations within the country.
- 3. To fully leverage AI's potential, it is crucial to invest in education and workforce development.** BiH should focus on creating training programmes that cultivate expertise in AI and machine learning. This includes updating school and university curricula to incorporate AI-related subjects and offering incentives for students to pursue careers in these fields. Additionally, the government should promote continuous professional development for existing workers through specialised training programmes and partnerships with leading tech companies. By nurturing a highly skilled workforce, BiH can enhance its competitiveness and innovation capacity in the AI sector.
- 4. The government should prioritise creating a comprehensive data sovereignty policy.** This involves developing a national digital infrastructure capable of securely storing and managing data. BiH should adopt strong data protection regulations that align with international standards, such as the GDPR, while also addressing local needs. By ensuring transparent and secure data practices, the government can protect national interests and build trust with both domestic and international stakeholders.
- 5. Ensure transparent and ethical data practices.** It is crucial to maintain data sovereignty through transparent and ethical data management. The

government should enforce policies to prevent data monopolies and encourage the storage of sensitive data, like health and cadastral information, within the country. This involves creating clear guidelines for data sharing and usage and ensuring that all data-related activities are conducted with transparency and accountability. By promoting ethical data practices, BiH can reduce the risks associated with data exploitation and political manipulation.

- 6. To enhance its geopolitical standing and take advantage of the benefits of the AI revolution, BiH should actively engage in international collaborations and align its policies with global standards.** The government should participate in international AI consortia, research networks, and standard-setting bodies to keep up with technological advancements and best practices. Furthermore, forming strategic partnerships with leading AI nations can provide BiH with access to cutting-edge technologies and opportunities for knowledge transfer. By being proactive and collaborative in the global AI arena, BiH can strengthen its geopolitical relevance and economic prospects.

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KRETANJE KROZ GLOBALNU EKONOMIJU ALGORITAMA: IMPLIKACIJE ZA GEOPOLITIČKI PEJZAŽ BOSNE I HERCEGOVINE

Apstrakt: Ova studija istražuje implikacije globalne algoritamske ekonomije na geopolitički pejzaž Bosne i Hercegovine (BiH), s fokusom na strateško nadmetanje između Sjedinjenih Američkih Država (SAD) i Narodne Republike Kine (NRK) u razvoju veštačke inteligencije (AI). Kako se tehnologije AI-a brzo razvijaju, one ne samo da preoblikuju ekonomsku vrednost, već i globalnu dinamiku odnosa moći. SAD i NRK, kao lideri u inovacijama AI-a, predvode ovu transformaciju, utičući na međunarodne odnose i postavljajući manje nacije poput Bosne i Hercegovine u složene geopolitičke scenarije. Ovo istraživanje ispituje odjeke globalnog rivalstva u AI-u na suverenitet podataka, politički diskurs i javne politike BiH kroz pristup koji kombinuje više metoda, uključujući analizu lanca vrednosti mašinskog učenja u AI-u i polustrukturirane intervjue s ključnim informantima. Nalazi ističu značajne izazove za BiH u korištenju AI-a za nacionalni razvoj, ali naglašavaju i prilike za napredak kroz strateške investicije i koherentne strategije upravljanja podacima. Studija zaključuje s preporukama za BiH da proaktivno odgovori na ove izazove, naglašavajući važnost razumijevanja regionalne dinamike i usklađivanja s globalnim AI standardima.

Ključne reči: ekonomija algoritama; veštačka inteligencija (AI); geopolitika; Bosna i Hercegovina; rivalstvo SAD-Kina.