

Varazdin Development and Entrepreneurship Agency and  
Lusofona University, Centro Universitario Porto, Portugal

In cooperation with:

Faculty of Law, Economics and Social Sciences Sale - Mohammed V University in Rabat, Morocco

Faculty of Management University of Warsaw, Poland

Ecole Nationale de Commerce et de Gestion de Tanger - Abdelmalek Essaadi University, Morocco

GOVCOPP - University of Aveiro, Portugal

Medimurje University of Applied Sciences in Cakovec, Croatia



UNIVERSIDADE  
LUSÓFONA



CENTRO  
UNIVERSITÁRIO  
PORTO

## Book of Proceedings

135<sup>th</sup> esd Porto 2026

# Sustainable Cities and Artificial Intelligence

Editors:

Irena Konecki, Maria do Rosario Anjos, Candida Duarte Manuel



ISBN 978-953-6125-45-6



9 789536 125456 >

June, 2026

**Varazdin Development and Entrepreneurship Agency and  
Lusofona University, Centro Universitario Porto, Portugal**

In cooperation with:

**Faculty of Law, Economics and Social Sciences Sale - Mohammed V University in Rabat, Morocco**

**Faculty of Management University of Warsaw, Poland**

**Ecole Nationale de Commerce et de Gestion de Tanger - Abdelmalek Essaadi University, Morocco**

**GOVCOPP - University of Aveiro, Portugal**

**Medimurje University of Applied Sciences in Cakovec, Croatia**

## **Book of Proceedings**

135<sup>th</sup> esd Porto 2026

# **Sustainable Cities and Artificial Intelligence**

Editors:

**Irena Konecki**, University of Zagreb, Croatia

**Maria do Rosario Anjos**, Lusofona University, Portugal

**Candida Duarte Manuel**, Lusofona University, Portugal

June, 2026

**Title ■ Sustainable Cities and Artificial Intelligence - (Book of Proceedings)**

**Editors ■** Irena Konecki, Maria do Rosario Anjos, Candida Duarte Manuel

**Scientific Committee / Programski Odbor ■** Maria do Rosario Anjos (President), Lusofona University, Portugal; Candida Duarte Manuel, Lusofona University, Portugal; Monica Santos, ISLA Gaia, Portugal; Maria Elisabete Pinto da Costa, Lusofona University, Portugal; Sandra Raquel Alves, Polytechnic Institute of Leiria, Portugal; Zoltan Baracska, Szechenyi Istvan University of Győr, Hungary; Rado Bohinc, University of Ljubljana, Slovenia; Sonia Boushaba, Mohammed V University in Rabat, Morocco; Domenico Bucella, Kozminski University, Poland; Ivan Burazin, Dr. Franjo Tudman Defence and Security University, Croatia; Mirela Cristea, University of Craiova, Romania; Nedo Danilovic, MB University, Serbia; Darko Dukic, University of Osijek, Croatia; Gordana Dukic, University of Osijek, Croatia; Davor Filipovic, University of Zagreb, Croatia; Fran Galetic, University of Zagreb, Croatia; Matjaz Gams, Jozef Stefan Institute, Slovenia; Natalia Garcia-Carbonell, University of Cadiz, Spain; Mirjana Gligoric Matic, University of Belgrade, Serbia; Luka Grbic, University of Zadar, Croatia; Alexandra Grobelna, Gdynia Maritime University, Poland; Anica Hunjet, University North, Croatia; Barbara Huszar, Szechenyi Istvan University of Győr, Hungary; Marcelo J. Meirino, Fluminense Federal University, Brazil; Gorm Jacobsen, University of Agder, Norway; Jelena Janjusevic, Heriot-Watt University, UAE; Irena Jankovic, University of Belgrade, Serbia; William J. Jones, Mahidol University International College, Thailand; Marina Klacmer Calopa, University of Zagreb, Croatia; Igor Klopota, Medimurje University of Applied Sciences in Čakovec, Croatia; Mario Konecki, University of Zagreb, Croatia; Mladen Konecki, University of Zagreb, Croatia; Irena Konecki, University of Zagreb, Croatia; Ewa Kozien, Krakow University of Economics, Poland; Marek Kozien, Cracow University of Technology, Poland; Adam Kozien, Jagiellonian University in Krakow, Poland; Goran Kozina, University North, Croatia; Dzenan Kulovic, University of Zenica, Bosnia and Herzegovina; Abey Kuruvilla, University of Wisconsin-Parkside, USA; Ana Lorga, Lusofona University, Portugal; Mustapha Machrafi, Mohammed V University in Rabat, Morocco; Ahmed Maghni, ENCGT - Ecole Nationale de Commerce et de Gestion de Tanger, Morocco; Moulay Sadik Maliki, University of Hassan II Casablanca, Morocco; Ivana Martincevic, University North, Croatia; Eli Marusic, University of Split, Croatia; Jesus Barrena Martinez, University of Cadiz, Spain; Mihaela Mikic, University of Zagreb, Croatia; Petar Misevic, University North, Croatia; Gorana Jelic Mrcelic, University of Split, Croatia; Abdelhamid Nechad, ESCA - Ecole de Management, Morocco; Gratiela Georgiana Noja, West University of Timisoara, Romania; Brian O'Hara, Metropolitan State University of Denver, USA; Arpad Ferenc Papp-Vary, Budapest University of Economics and Business, Hungary; Dusko Pavlovic, Libertas International University, Croatia; Ivan Peronja, University of Split, Croatia; Igor Pihir, University of Zagreb, Croatia; Dinko Primorac, University North, Croatia; Mirosław Przygoda, University of Warsaw, Poland; Karlis Purmalis, University of Latvia, Latvia; Maja Racic, University of Split, Croatia; Nicholas Recker, Metropolitan State University of Denver, USA; Dusan Regodic, MB University, Serbia; David Resende, University of Aveiro, Portugal; Douglas Rhein, Mahidol University International College, Thailand; Humberto Ribeiro, University of Aveiro, Portugal; Robert Rybníček, University of Graz, Austria; Ante Samodol, Libertas International University, Croatia; Dasa Panjakovic Senjic, University of Applied Sciences with public rights BALTAZAR ZAPRESIC, Croatia; Vesna Sesar, University North, Croatia; Martina Sopta, University of Zagreb, Croatia; Joanna Stawska, University of Lodz, Poland; Tomasz Studzieniecki, Gdynia Maritime University, Poland; Toni Susak, University of Split, Croatia; Sime Vucetic, University of Zadar, Croatia; Luka Vukic, University of Split, Croatia; Andrey Zahariev, The D.A. Tsenov Academy of Economics, Bulgaria; Snezana Zivkovic, University of Nis, Serbia.

**Review Committee / Recenzentski Odbor ■** Marina Klacmer Calopa (President); Ana Aleksic; Sandra Raquel Alves; Ayuba Aminu; Mihovil Andjelinovic; Josip Arneric; Lidija Bagaric; Tomislav Bakovic; Sanja Blazevic; Leonid Bobrov; Ruzica Brečić; Anita Ceh Casni; Rozana Veselica Celic; Iryna Chernysh; Mirela Cristea; Oguz Demir; Stjepan Dvorski; Robert Fabac; Ivica Filipovic; Sinisa Franjic; Fran Galetic; Mirjana Gligoric; Tomislav Globan; Anita Goltnik Urmait; Tomislav Herceg; Irena Jankovic; Emina Jerkovic; Dafna Kariv; Oliver Kesar; Hilal Yildirim Keser; Martina Dragija Kostic; Tatjana Kovac; Vladimir Kovsca; Eduardo Leite; Angelo Maia Cister; Katarina Marosevic; Vaidotas Matutis; Marjana Merkac Skok; Daniel Francois Meyer; Natanya Meyer; Josip Mikulic; Ivana Miklosevic; Ljubica Milanovic Glavan; Guenter Mueller; Ivana Nacinovic Braje; Zlatko Nedelko; Gratiela Georgiana Noja; Zsuzsanna Novak; Alka Obadic; Claudia Ogorean; Igor Pihir; Najla Podrug; Vojko Potocan; Dinko Primorac; Zeljka Primorac; Sanda Renko; David Resende; Humberto Ribeiro; Vlasta Roska; Souhaila Said; Armando Javier Sanchez Diaz; Tomislav Sekur; Lorena Skufflic; Mirko Smoljic; Petar Soric; Mario Spremic; Matjaz Stor; Tomasz Studzieniecki; Lejla Tijanic; Daniel Tomic; Boris Tusek; Rebeka Daniela Vlahov; Thomas Will; Zoran Wittine; Grzegorz Zimon; Snezana Zivkovic; Berislav Zmuk.

**Organizing Committee / Organizacijski Odbor ■** Maria do Rosario Anjos (President); Candida Duarte Manuel; Monica Santos; Maria Elisabete Pinto da Costa; Sandra Raquel Alves; Djani Bunja; Marina Klacmer Calopa; Rozana Veselica Celic; Domagoj Cingula; Neven Gladovic; Spomenko Kesina; Erlino Koscak; Mustapha Machrafi; Eli Marusic; Ivana Miklosevic; Abdelhamid Nechad; Tomasz Ochowski; Mirosław Przygoda; Maja Racic; Humberto Ribeiro; Sonia Santos; Dasa Panjakovic Senjic; Michael Stefulj; Tomasz Studzieniecki; Rebeka Danijela Vlahov; Sime Vucetic.

**Publishing Editor ■** Domagoj Cingula

**Publisher ■ Design ■** Varazdin Development and Entrepreneurship Agency / Lusofona University, Centro Universitario Porto, Portugal / Faculty of Management University of Warsaw, Poland / GOVCOPP - University of Aveiro, Portugal / Faculty of Law, Economics and Social Sciences Sale - Mohammed V University in Rabat, Morocco / Ecole Nationale de Commerce et de Gestion de Tanger - Abdelmalek Essaadi University, Morocco / Medimurje University of Applied Sciences in Čakovec, Croatia.

**Printing ■** Online Edition

**ISBN 978-953-6125-45-6**

The Book is open access and double-blind peer reviewed.

Our Books are available for download in a PDF format from the Economic and Social Development Conference website: <http://www.esd-conference.com>

© 2026 Published by: Varazdin Development and Entrepreneurship Agency / Lusofona University, Centro Universitario Porto, Portugal / Faculty of Management University of Warsaw, Poland / GOVCOPP - University of Aveiro, Portugal / Faculty of Law, Economics and Social Sciences Sale - Mohammed V University in Rabat, Morocco / Ecole Nationale de Commerce et de Gestion de Tanger - Abdelmalek Essaadi University, Morocco / Medimurje University of Applied Sciences in Čakovec, Croatia.

All rights reserved. Authors are responsible for the linguistic and technical accuracy of their contributions. Authors keep their copyrights for further publishing.

## **CONTENTS**

### **DIGITAL SOVEREIGNTY AND THE IUS GENTIUM IN POWER POLITICS: A NEOREALIST PERSPECTIVE ON THE INTERNATIONAL REGULATION OF ARTIFICIAL INTELLIGENCE IN THE FACE OF US-CHINA COMPETITION**

Joao Tavares, Antonio Tavares..... 1

### **SMART CITIES, URBAN SECURITY AND PRIVACY-ENHANCING TECHNOLOGY SYSTEMS: A CROSS-CUTTING DIALOGUE**

Maria do Rosario Anjos, Camilo Stangherlim Ferraresi, Sonia Novais Santos ..... 13

### **TRANSITION TOWARDS E-MOBILITY: ANALYSIS OF THE BATTERY ELECTRIC VEHICLE MARKET IN SLOVENIA**

Tilen Babnik, Matej Svigelj..... 25

### **LEGAL REGULATION OF DIGITAL CONTENT AND DIGITAL SERVICES SUPPLY CONTRACTS IN THE CROATIAN DIGITAL MARKET: CHALLENGES OF PRACTICAL APPLICATION**

Maja Proso, Mateja Beus..... 32

### **THE IMPORTANCE OF IMPLEMENTING DIGITAL TRANSFORMATION IN SPORTS MANAGEMENT**

Deni Borozan, Liv Sumak ..... 40

### **AUDITED FINANCIAL STATEMENTS AND OPERATIONS OF SPECIALTY HOSPITALS**

Dubravka Mahacek, Karlo Mahacek, Filip Mahacek ..... 50

### **CANADA'S FUTURE IN THE CONTEXT OF RELATIONS WITH THE EUROPEAN UNION**

Zuzanna Przygoda, Mirosław Przygoda..... 60

### **EDUCATION AND KNOWLEDGE MANAGEMENT: TRANSFORMING TEACHING PRACTICE INTO INSTITUTIONAL LEARNING CAPACITY**

Khalid Lahlou, Moulay Sadik Maliki, Omar EL Ghazi ..... 85

### **GLOBAL TRADE POSITION OF THE EUROPEAN UNION IN THE NEW GLOBAL ORDER: A DATA-DRIVEN ANALYSIS**

Damir Sebo, Marija Sain, Iva Buljubasic..... 93

### **THE IMPACT OF GLOBALIZATION ON DIFFERENT AREAS OF LAW – THE SERBIAN CASE**

Aleksandar S. Djordjevic..... 102

**MACRO-DEMOGRAPHIC CHANGE AND SUSTAINABLE DEVELOPMENT IN A TRANSFORMING ECONOMY: A COMPREHENSIVE REVIEW OF THE LITERATURE**

Vesna Buterin..... 107

**BEYOND THE BALANCE SHEET: UNCOVERING ESG CONCEPTS IN CONSTRUCTION COMPANIES THROUGH ANALYSIS AND EVALUATION OF NON-FINANCIAL REPORTS**

Lana Lovrencic Butkovic ..... 120

**ENVIRONMENTAL SUSTAINABILITY COMMUNICATION OF CROATIAN NAUTICAL MARINAS: EVIDENCE FROM OFFICIAL WEBSITES**

Dejan Miljenovic, Ida Bajc..... 129

**CORPORATE PHILANTHROPY AS AN INSTRUMENT WITHIN CSR: A CASE STUDY FROM CROATIA**

Maja Harsanji..... 138

**CRAFT PRODUCERS' AUTHENTICITY AND THE RISKS OF INFLUENCER MARKETING**

Ivana First Komen..... 148

**SUSTAINABILITY AND ACCESS TO HEALTHCARE: MEDICINES PRICES REGULATION AS AN ASPECT OF SDG 11**

Maria do Rosario Anjos, Imaculada da Costa Feio..... 158

**THE IMPACT OF TECHNOLOGIES ON CONSTITUTIONAL HUMAN RIGHTS – THE SERBIAN CASE**

Aleksandar S. Djordjevic..... 167

**PUBLIC EXPENDITURES AS INDICATORS OF NATIONAL PRIORITIES: THE CASE OF CROATIA**

Lorena Vokic Kvesic, Gabrijela Smoljanovic..... 173

**THE ROLE OF FOREIGN WORKERS IN CROATIA'S LABOR MARKET AND TAX SYSTEM**

Lorena Vokic Kvesic, Manuela Rijic..... 182

**THE IMPACT OF THE UKRAINE ENERGY CRISIS ON GERMANY'S ELECTRICITY MARKET**

Rok Klun, Matej Svigelj..... 192

# DIGITAL SOVEREIGNTY AND THE IUS GENTIUM IN POWER POLITICS: A NEOREALIST PERSPECTIVE ON THE INTERNATIONAL REGULATION OF ARTIFICIAL INTELLIGENCE IN THE FACE OF US-CHINA COMPETITION

**Joao Tavares**

*joao.tavares@ulusofona.pt*

*<https://orcid.org/0000-0002-3764-8797>*

*Assistant at Faculty of Law and Political Science at Lusófona University – Oporto University Center and Associate Researcher at CEAD Francisco Suárez*

**Antonio Tavares**

*antonio.tavares@ulusofona.pt*

*<https://orcid.org/0000-0002-3536-7035>*

*Auxiliar Professor at Faculty of Law and Political Science at Lusófona University – Oporto University Center and Integrated Researcher at CEAD Francisco Suárez*

## **ABSTRACT**

*Our research aims to analyse digital sovereignty and the Ius Gentium in the context of power politics, focusing on the competition between the US and China for the international regulation of Artificial Intelligence. Using an interdisciplinary approach that combines History of Law and International Relations Theories, our study employs a realist perspective to explore how power dynamics shape international legal norms for regulating Artificial Intelligence. We will focus on the role of digital sovereignty as a systemic extension of state power and the challenges of establishing a contemporary Ius Gentium in a scenario of geopolitical rivalry between great powers. Our article argues that the regulation of Artificial Intelligence reflects national interests and strategies of domination, with the US and China seeking technological and normative hegemony in the international system, while international law struggles to reconcile cooperation and competition. We conclude that legal history offers lessons on the formation of international legal norms, but the fragmentation of the current configuration of the international system hinders the creation of a universal regulatory framework for Artificial Intelligence.*

**Keywords:** *Digital Sovereignty, Ius Gentium, Artificial Intelligence, Realism, Theories of International Relations, History of Law*

## **1. INTRODUCTION**

In the anarchic international system, characterized by the absence of a central coercive authority capable of imposing order and resolving conflicts in a binding manner, nation-states act primarily as rational units that seek to maximize their security and relative power. This is the central premise of the structural neorealist perspective, developed by Kenneth Waltz and refined by John Mearsheimer, according to which the structure of the system, defined by anarchy and the distribution of capacities, conditions the behavior of state actors, regardless of domestic or ideological intentions. On the threshold of the third millennium, the rise of Artificial Intelligence (AI) as a dual-use technology, with profound military, economic, social, and governance implications, has elevated it to a central domain of great-power competition (Atlantic Council, 2026, 15<sup>th</sup> of january). Private investment in the U.S. reached about \$286 billion in 2025, more than 23 times China's amount, as the race for compute, frontier models, and global adoption intensifies in an increasingly multipolar world. U.S. models maintain leadership in performance and adoption, about 93% of global visits to LLMs in 2025 (AI Index Steering Committee, 2026; Srinivasaragavan, 2026, 14 de abril), but China is moving quickly

through efficiency, open-source, and deep economic integration, reducing the performance gap to levels close to 2-3% in some 2026 indicators (Wang & Siler-Evans, 2026). In this context, digital sovereignty emerges as a contemporary and systemic extension of classical Westphalian sovereignty. It is not just the mere protection of territorial borders, but the effective control over massive data, critical computing infrastructures like data centers, semiconductors and energy, autonomous decision algorithms and transnational information flows. Digital sovereignty thus becomes an indispensable attribute of state power in the twenty-first century: whoever dominates these elements influences not only economic and military capacity, but also the ability to shape narratives, social behaviors, and global norms (Larsen, 2022). At the same time, the classical concept of *Ius Gentium*, developed in Roman Law to regulate interactions with foreigners and systematized by Hugo Grotius (1925) in the seventeenth century as a body of common norms derived from the reason and practice of peoples represents the historical effort to forge a minimum legal order in a world of fragmented sovereignties. Grotius, faced with the ravages of the Thirty Years' War, sought universal foundations that would allow cooperation and conflict containment without suppressing state sovereignty. Today, the international regulation of AI is confronted with precisely this structural paradox, the pressing need for transnational norms to manage existential risks such as algorithmic bias, military proliferation, labor disruption, cybersecurity, and even threats to strategic stability, clashes with power politics that fragment the system and prioritize relative advantage (Ishkhanyan, 2025). The Sino-American competition illustrates this tension in a paradigmatic way. The U.S., through initiatives such as the CHIPS and Science Act, strict export controls on advanced semiconductors, and a recent approach to federal deregulation (e.g., Executive Orders of 2025-2026 that preempt state laws to accelerate innovation), seeks to maintain technological and regulatory leadership by promoting like-minded alliances and open standards aligned with its vision of innovation. China, for its part, responds with integrated self-reliance plans like Made in China 2025 (State Council of the People's Republic of China, 2015) and AI Plus (State Council of the People's Republic of China, 2024; Communist Party of China Central Committee, 2025), data security laws that strengthen state control, and multilateral proposals such as the Global AI Governance Initiative (Ministry of Foreign Affairs of the People's Republic of China, 2023) and Action Plan (Permanent Mission of the People's Republic of China to the UN, 2025), which emphasize national sovereignty, inclusion of the Global South, and shared governance, often positioning itself as an alternative to what it describes as Western unilateralism (Abbott, 2025, 6<sup>th</sup> of August). Our investigation adopts a neorealist lens to analyse how the distribution of power, with the U.S. and China as the main poles in an asymmetric bipolar configuration, shapes, constrains, and largely determines attempts at global regulation of AI. It is argued that digital sovereignty is not a mere technical or legal aspect, but a strategic tool of relative power, while the contemporary *Ius Gentium* of AI remains hostage to the dynamics of geopolitical competition, limiting the emergence of a truly universal and cohesive regulatory framework. Through an interdisciplinary approach that combines International Relations Theory with the History of Law, our article demonstrates how international legal norms, far from being neutral or purely rational, reflect the interests and capacities of the great powers in an anarchic international system.

## **2. NEOREALISM, DIGITAL SOVEREIGNTY AND IUS GENTIUM**

The Structural Realism, better known as Neorealism, as formulated by Kenneth N. Waltz (1979) in *Theory of International Politics*, constitutes the main analytical framework of International Relations Theories. While Waltz (1979) argues that the international system is anarchic, that is, devoid of a central authority capable of imposing order – and that this structure conditions the behaviour of states, which act as rational units primarily oriented towards survival and the maximization of their relative power. John J. Mearsheimer (2014, p. 21), by his turn, in his

offensive aspect, reinforces this logic by arguing that, in a world of uncertainty about the intentions of others, the great powers actively seek regional and global hegemony to ensure their security. It is presumed that the ultimate and most ideal power conditions for a state are achieved when a state reaches total hegemony. However, Mearsheimer (2014, pp. 32-33) argues that this task is impossible for two reasons: first, that great powers will always find incentive to tilt the balance of power in their favour and second, that great powers will never be satisfied with the status quo of power. In the age of Artificial Intelligence, these neorealist premises acquire new relevance. Power is not measured only by traditional military or economic capabilities, but by the ability to control emerging dual-use technologies. AI represents a power multiplier that simultaneously influences the economy, national security, normative influence, and even strategic stability. As such, the distribution of capabilities in the digital domain – computing, data, talent, infrastructure and technical standards, which becomes a central element of the structure of the international system. The U.S.-China rivalry illustrates this dynamic where both states perceive AI leadership as a sine qua non for maintaining or gaining positions of relative advantage in the 21st century (Ibrahim, 2025). In this context, digital sovereignty emerges as a systemic and contemporary extension of Westphalian sovereignty. Far from being a merely technical or legal concept, digital sovereignty refers to the ability of the State to exercise effective control over the critical elements of the digital ecosystem such data generated on its territory or by citizens, computing infrastructures like data centers, semiconductors, energy sources, autonomous decision-making algorithms, cross-border information flows, and global technical standards (Santaniello, 2026; Larsen, 2022). The International Relations theorists identify in digital sovereignty attributes such as adversariality (orientation against rivals), instrumentality (tool of power), and multiversity (different competing models: liberal-market in the US, regulatory in the EU, and state-authoritarian in China). For neorealists like Carr (2016) e Choucri (2012), the claim to digital sovereignty is not an end, but a rational instrument of survival and competition: states that lose control over digital become vulnerable to asymmetric dependencies, economic coercion, and erosion of decision-making autonomy (Santaniello, 2026; Floridi, 2020; DeNardis, 2014). Technological fragmentation ("splinternet") and chip export controls exemplify how structural anarchy reproduces itself in cyberspace (Tech Diplomacy Global Institute, 2025). The concept of *Ius Gentium* offers the historical and normative counterpoint to this realistic vision. Originating in Roman Law, where it regulated the relations between Roman citizens and foreigners (*peregrini*) based on common principles of equity and natural reason, the *Ius Gentium* was systematized by Hugo Grotius (1925) in the seventeenth century, in the context of the European religious wars. In *De Jure Belli ac Pacis*, Grotius proposes a body of norms derived from sociable human nature and reason, which allows for a minimal order between sovereign states without suppressing their independence. The *Ius Gentium* is not, according to Gozzi (2019), a positive right imposed by a higher authority, but a natural and customary right that emerges from the practice of peoples and the need for coexistence. The tension between neorealism and *Ius Gentium* is productive for analysing the international regulation of AI. While structural realism sees international law as epiphenomenal, such a reflection of the distribution of power, effective only when aligned with the interests of the great powers (Morgenthau, 1948), where the Grotian tradition suggests the possibility of common norms that mitigate the most destructive effects of anarchy. In the field of AI, this tension is manifested in the effort to create a global regulatory framework, like proposals at the United Nations (UN), shared ethical principles, in the face of the reality of competing models of governance: the North American model, more oriented towards private innovation and "like-minded" alliances; the Chinese model, focused on state control, data sovereignty, and inclusion of the Global South through initiatives such as the Global AI Governance Initiative (Ministry of Foreign Affairs of the People's Republic of China, 2023) and the Action Plan (Permanent Mission of the People's Republic of China to the UN, 2025), as note by Xiao (2025).

Thus, the theoretical framework of this article is interdisciplinary: it combines neorealism as the main explanatory lens of state motivations and behaviours with the History of Law to understand the patterns of formation and limitation of international norms. Far from being neutral or universal, norms on AI reflect power strategies: the US seeks to preserve its technological primacy through export controls and selective open standards; China promotes "inclusive" governance that reinforces the principle of state sovereignty and its normative influence with developing countries. The result is a fragmented digital *Ius Gentium*, where cooperation is possible in areas of mutual interest such model security, or catastrophic risks, but subordinated to the logic of competition for technological and normative hegemony. This theoretical framework in our research allows us to empirically analyse how power politics shape the regulation of AI, limiting the emergence of a robust and universal international legal regime.

### **3. DIGITAL SOVEREIGNTY AS AN EXTENSION OF STATE POWER**

In the neorealist framework, sovereignty is not a static or merely legal attribute, but a dynamic capacity for control that allows the state to preserve its autonomy and maximize relative power in an anarchic system (Waltz, 1979). Digital sovereignty represents its contemporary and systemic projection, the extension of state power to the virtual domain, where decisive strategic resources for security, economic prosperity and normative influence in the twenty-first century are concentrated (Pohle & Thiel, 2020). Far from constituting a merely technical or defensive category, digital sovereignty functions as an instrument of interstate competition, allowing the great powers to project influence, mitigate vulnerabilities, and impose asymmetric costs on rivals (Choucri & Clark, 2018), in which Digital sovereignty encompasses multiple interconnected dimensions. In first place, Control of Critical Infrastructure and Computing PowerCompute, where high-performance processing power is emerging as the new "oil" or "steel" of the digital age. Mastery over advanced semiconductors, data centers, chip supply chains, and renewable or nuclear energy sources determines who can train and deploy frontier AI models. The U. S. has aggressively used the export control mechanism under Bureau of Industry and Security's Entity List to restrict Chinese access to advanced GPUs like NVIDIA A100/H100 and successors, seeking to delay China's technological progress and preserve its relative advantage. In response, Beijing accelerates technological self-sufficiency programs, with massive investments in domestic semiconductors such SMIC, and Huawei HiSilicon, and the construction of data centers powered by cheap energy in the interior of the country. This race reflects the Mearsheimer's logic of offensive competition where each side seeks to deny the other capabilities that could alter the balance of power. In second place, the Data Sovereignty and Internal Regulation, where Data is the essential fuel of AI systems. China has adopted a robust data sovereignty model through the Cybersecurity Law (Cyberspace Administration of China, 2025), Data Security Law (National People's Congress, 2021) and Personal Information Protection Law, requiring the localization of data in the national territory and state control over recommendation and decision-making algorithms. This approach allows both to strengthen internal stability (social control via social credit systems and censorship) and to accumulate a vast repository of data for model training. The United States, while rhetorically advocating for free data flows, is increasingly using national security instruments like CFIUS, Executive Orders on Foreign Investment and Protection of Sensitive Data to limit Chinese access to critical technologies and databases. Digital sovereignty thus proves to be not only defensive, but offensive where data control makes it possible to shape global narratives, influence behaviour and develop military advantages such AI applied to autonomous warfare, cyber operations and intelligence. In third place, Norms, Technical Standards, and Normative Influence, where Digital sovereignty is also manifested in the ability to define or influence global technical standards like AI protocols, safety metrics, algorithmic ethics.

China has been actively promoting multilateral initiatives such as the Global AI Governance Initiative (Ministry of Foreign Affairs of the People's Republic of China, 2023) and the Global AI Governance Action Plan (Permanent Mission of the People's Republic of China to the UN, 2025), emphasizing the principles of "respect for national sovereignty," "inclusive development," and "non-interference." These proposals appeal particularly to the Global South, offering an alternative to the Western model perceived as one-sided and domineering. The U.S., for its part, favours restricted forums and like-minded alliances like Quadrilateral Security Dialogue (Quad), AUKUS, North Atlantic Treaty Organization (NATO), Trade and Technology Council with the European Union, to establish standards that favour its liberal-market vision, while seeking to marginalise Chinese influence in bodies such as the International Telecommunication Union (ITU). In fourth place, Geostrategic Dimension and Asymmetric Vulnerabilities, for middle powers and smaller states, digital sovereignty becomes an existential dilemma. Dependence on foreign infrastructures like submarine cables, cloud computing from American hyperscalers, or Huawei equipment, creates coercive vulnerabilities. The fragmentation of the global ecosystem, often referred to as splinternet or parallel AI stacks is, from a neorealist point of view, a predictable consequence of anarchy: instead of a global public good, AI becomes an instrument of digital spheres of influence. Digital sovereignty allows great powers to externalize costs, such computational pollution, proliferation risks, while internalizing benefits. In short, digital sovereignty is not a mere update of Westphalian sovereignty, but its functional adaptation to the material and technological conditions of the twenty-first century. In the context of the U.S.-China competition, it ceases to be a purely defensive objective to become an active tool of power politics. Those who dominate the digital ecosystem acquire not only economic and military advantages, but also the ability to shape the international regulatory framework itself, including the rules that will come to regulate Artificial Intelligence. This dynamic explains the difficulty in establishing a robust contemporary *Ius Gentium* because global legal norms tend to reflect the existing distribution of power, rather than transcend it.

#### **4. THE US-CHINA COMPETITION FOR INTERNATIONAL AI REGULATION**

The Sino-American rivalry for the international regulation of Artificial Intelligence constitutes a paradigmatic manifestation of power politics in the contemporary international system. From a neorealist perspective, this competition is not limited to technological superiority, but extends to the ability to define the norms, technical standards, and legal frameworks that will shape the global AI ecosystem, determining who benefits most from the future distribution of relative power. Rather than converging on a common *Ius Gentium*, Washington and Beijing's regulatory approaches reflect divergent strategies for preserving or gaining hegemony, resulting in normative fragmentation that reinforces structural anarchy in the digital domain (Chan, 2026).

##### **4.1. The United States of America Approach: Strategic Deregulation, Stack Exports, and Selective Alliances**

Under the Second Trump administration, the US adopted a strategy explicitly oriented towards "winning the AI race". America's AI Action Plan (Permanent Mission of the People's Republic of China to the UN, 2025) and subsequent executive orders prioritize removing federal regulatory barriers, preempting excessive state laws, and accelerating private innovation. Measures such as the Executive Order of December 2025 aim to eliminate state obstacles to national innovation, conditioning federal funding to alignment with national security priorities (Trump, 2025).

This approach combines internal deregulation with external activism (Christensen, Gelbman, Hopkins, & Bridges, 2025):

1. Aggressively promoting the export of the "American AI Technology Stack" (semiconductors, models, software, and standards) through a program coordinated by the Department of Commerce.
2. Maintaining and refining export controls on advanced chips and sensitive technologies to counter China's military advance, while facilitating access to like-minded allies.
3. Emphasis on technological alliances (Quad, AUKUS, Trade and Technology Council with the EU) to establish standards that favor the American liberal-market vision.

The US positions AI as an instrument of economic dominance and national security, rejecting universal multilateral models that could dilute its leadership or impose excessive restrictions on innovation. U.S. models maintain market dominance about 93% of global visits to LLMs in 2025, although the performance gap has narrowed significantly (Wang & Siler-Evans, 2026).

#### **4.2. China's Approach: State Governance, Data Sovereignty, and Selective Multilateralism**

China responds with a dual strategy: strict internal control and active external normative projection. Internally, it maintains laws on cybersecurity, data security and regulation of recommendation algorithms that strengthen state control, social stability and technological self-sufficiency like AI Plus and deep industrial integration plans. Externally, Beijing launched the Global AI Governance Initiative (Ministry of Foreign Affairs of the People's Republic of China, 2023) and the Global AI Governance Action Plan (Permanent Mission of the People's Republic of China to the UN, 2025), shortly after the American plan. This document proposes a 13-point roadmap that emphasizes (Permanent Mission of the People's Republic of China to the UN, 2025):

1. Respect for national sovereignty and non-interference;
2. Inclusive development and capacity building of the Global South;
3. AI as an international public good;
4. Cooperation in infrastructure, high-quality data, sustainability and technical standards.

China has also proposed the creation of a World Organization for Cooperation on AI to complement the work of the UN, positioning itself as an advocate for more equitable and multilateral governance, in contrast to what it describes as Western unilateralism and hegemonism. This narrative has significant appeal to developing countries, which see the Chinese approach as an alternative to dominant Western models (American National Standards Institute, 2025).

#### **4.3. Normative Fragmentation and Splinternet as consequences**

The Sino-American competition for the regulation of Artificial Intelligence generates deep and predictable structural consequences in light of the neorealist perspective. Instead of normative convergence or the formation of a robust and universal digital *Ius Gentium*, there is a marked fragmentation at both the technological and legal levels, often referred to as "splinternet" or "parallel AI stacks". This fragmentation is not an accident or a temporary failure of international coordination, but a logical consequence of international anarchy and the rational search for relative power in a technological domain considered decisive for the balance of power in the twenty-first century. The concept of splinternet refers to the division of the internet and digital ecosystems into increasingly separate spaces, governed by distinct rules, infrastructures, and technical standards.

In the field of AI, this fragmentation manifests itself in the emergence of competing technology stacks:

1. American/Western stack: Dominated by private companies (OpenAI, Google, Meta, NVIDIA), with strong integration between hardware (advanced chips), cloud computing, and proprietary or semi-open models. Emphasis on rapid innovation, cross-border data flows, and technical standards aligned with liberal values (selective transparency, individual rights).
2. Chinese Stack: Focused on state control, civil-military integration, and self-reliance. It includes companies such as Huawei, Baidu, Alibaba, and ByteDance, with models optimized for efficiency, strategic open-source, and compliance with cybersecurity and data sovereignty laws.

This duality extends to critical components: semiconductors, data centers, supply chains, AI security frameworks, and even model evaluation metrics. Middle powers like India, Brazil, Indonesia, Saudi Arabia, and South Africa face increasing pressure to choose a side, whether through Chinese investments in digital infrastructure (Belt and Road Digital Initiative), technological partnerships with the US or hedging attempts that often result in high costs and compromised digital sovereignty. Competition generates predictable dynamics under a neorealist lens:

1. Technological and regulatory fragmentation like splinternet or parallel AI stacks — intermediate countries are pressured to choose ecosystems, compromising their own digital sovereignty.
2. Minimum standards risk — cooperation limited to areas of mutual interest like catastrophic risk mitigation or model security but subordinated to the logic of relative advantage.
3. Instrumentalization of international law — both the US and China use multilateral forums (UN, ITU) selectively, when aligned with their interests, confirming the realistic view that international law is effective only when it reflects the distribution of power (García-Herrero & Martens, 2026)

Fragmentation is not limited to technology. Regulatory frameworks also diverge significantly:

- The European Union's risk-based approach (AI Act) seeks to position itself as a "third way" but has limited global reach.
- The US favors internal deregulation and restricted plurilateral regimes (like-minded countries).
- China promotes governance focused on state sovereignty and economic development, through multilateral initiatives at the UN and proposals for technical standards at the ITU.

The result is the proliferation of competing norms on algorithmic ethics, risk classification, liability for damages, military use of AI, and data protection. Instead of a unified regime, "club regimes" and minimum standards emerge that only achieve consensus in areas of common existential threat such prevention of lethal autonomous weapons outside human control or mitigation of catastrophic risks. This rivalry illustrates the limits of contemporary *Ius Gentium*. While the history of law demonstrates that international norms can emerge in contexts of intense interaction, the current asymmetric bipolar configuration and the perception that AI is a decisive technology for the balance of power in the twenty-first century strongly condition the possibility of a universal and binding regulatory regime. Instead of convergence, the consolidation of parallel regimes aligned with spheres of digital influence is observed.

This dynamic confirms the neorealist view: international law is often instrumentalized. Both Washington and Beijing selectively resort to multilateral forums like UN, G20, ITU, UNESCO, when they serve their interests but ignore them or circumvent them when they impose costs to their relative advantage. This selectivity undermines the legitimacy and effectiveness of any contemporary *Ius Gentium* attempt at AI.

## **5. LESSONS FROM THE HISTORY OF LAW FOR CONTEMPORARY IUS GENTIUM**

The History of Law offers valuable and, at the same time, realistic lessons about the processes of formation, consolidation and limitation of international legal norms. Far from being a linear record of moral or rational progress, the evolution of the *Ius Gentium* reveals a recurring pattern: the common norms among sovereign peoples emerge predominantly in contexts of intense interaction, under the pressure of existential crises or under the influence of a hegemonic power, and tend to reflect the distribution of power of the time. About the Roman Law, according to Rui Albuquerque (2023, p. 63), “it is the legal system composed of the set of norms that ordered the life of classical Roman society, during its long and multifaceted existence, where it manifested relevant legality”. In the wake of this line of thought, the *Ius Gentium* emerged as a practical and customary law intended to regulate relations between Roman citizens and foreigners (*peregrini*), incorporating principles of equity, good faith, and reciprocity derived from natural reason. It was not an abstract universal law, but a functional instrument that allowed Rome to manage a multicultural empire without completely dissolving legal differences. This pragmatic origin already anticipates the central tension, that the *Ius Gentium*, serves the coexistence and projection of power, rather than its overcoming. In the modern period, Hugh Grotius systematized the concept in *De Jure Belli ac Pacis* (1625), written during the Thirty Years' War, a conflict that devastated Europe and exposed the dangers of interstate anarchy. For Grotius sought minimum foundations of order under natural law and voluntary law of peoples that would allow limiting violence without creating a supranational authority. His contribution was fundamental to the Peace of Westphalia (1648), which enshrined state sovereignty as an organizing principle of the international system, like Cardinal Richelieu who advocate the principles of the Westphalian system, sovereignty of states, external religious non-interference and European balance of power. Although Cardinal Richelieu did not participate in the negotiations of Münster and Osnabrück, which were continued by his successor, Cardinal Mazarin, it was Cardinal Richelieu who was largely responsible for creating the political and military conditions that made it possible and advantageous for France and paved the way for the Peace of Westphalia. The historical lesson here is clear, robust international norms often emerge after major conflicts or crises that make the costs of anarchy unsustainable and reflect a trade-off between sovereignty and the need for minimal cooperation. The nineteenth and early twentieth centuries reinforce this realistic reading. The post-Napoleon European Concert and the Hague Conventions on the law of war represented attempts to regularize competition between great powers but collapsed in the face of the rise of Germany and the intensification of imperialist rivalries. The international law of the period was, to a large extent, a “law of the civilized” that legitimized colonial domination—demonstrating how norms reflect the hierarchy of power and the interests of the dominant powers. After 1945, the closest moment to a robust contemporary *Ius Gentium*, the Bretton Woods system and the United Nations emerged under clear U.S. hegemony. American material, economic, and military superiority allowed for the creation of institutions that, while universal in rhetoric, embodied the interests and values of the liberal West. GATT, the IMF, the World Bank and the UN Security Council itself illustrate how international law is more easily consolidated when aligned with the unipolar or strongly asymmetric distribution of power. Hans Morgenthau (1948) and, later, the neorealists like Waltz (1979) and Mearsheimer (2014), interpret these regimes as epiphenomena of the power structure, as Tavares (2023, p. 46) notes, effective if they serve the

interests of the great powers, and contested or ignored when they fail to do so. Applying these lessons to the field of Artificial Intelligence, evident parallels and limits can be observed. As in the Grotian period, we face a disruptive technology with the potential to radically alter the balance of power (dual military-civilian use, impact on the economy and governance). However, unlike in 1945, there is no uncontested hegemony. The current configuration is one of asymmetric bipolarity between the US and China, with middle powers (EU, India, Brazil) looking for spaces of autonomy. This fragmentation of capacities makes it extremely difficult for a universal and binding regulatory regime to emerge. The European Union's AI Act (2024/2026), with its risk-based approach, represents an attempt at a regulatory "third way", but has difficulty projecting itself globally. China's proposals at the UN and the Global AI Governance Action Plan (Permanent Mission of the People's Republic of China to the UN, 2025) emphasize sovereignty and inclusion, while the U.S. favors plurilateral and like-minded regimes. This multiplicity of initiatives does not signal convergence, but normative competition, just as the realists predicted. History teaches that, without a common catastrophic crisis or an overwhelming hegemony, the *Ius Gentium* tends to remain fragmented, customary, and hierarchical. An additional lesson from the History of Law is the importance of periods of mutual learning and prolonged interaction. The trade and wars of the seventeenth century allowed Grotius to identify common practices; Today, digital interdependence generates global supply chains, collaborative investigation, and cross-border threats, that creates incentives for minimum standards in areas such as model security or catastrophic risk classification. However, these incentives are counterbalanced by the perception that leadership in AI can determine the balance of power in the 21<sup>st</sup> century, making states reluctant to cede digital sovereignty. In conclusion, the History of Law does not offer naïve optimism, but rather a tempered realism. It demonstrates that international law can mitigate the most destructive effects of anarchy and create zones of cooperation, especially after systemic shocks or under hegemonic leadership. However, it also reveals its structural limits: norms reflect, rather than transcend, the distribution of power. In the current context of the US-China competition for AI regulation, these historical lessons suggest that a universal and robust digital *Ius Gentium* is unlikely in the short-medium term. More plausible is the consolidation of parallel, minimal or regional regimes, where digital sovereignty remains the dominant organizing principle. Acknowledging this historical reality is essential for pragmatic AI governance in the 21<sup>st</sup> century.

## 6. CONCLUSION

The international regulation of Artificial Intelligence reveals, in a paradigmatic way, the persistence of neorealist logics in the international system of the 21<sup>st</sup> century. In an anarchic environment, where the absence of central coercive authority prevails, states – particularly great powers – continue to prioritise maximising their relative power, using emerging technologies not as global public goods, but as instruments of strategic competition. Digital sovereignty thus emerges not as a peripheral or merely technical concept, but as a systemic and indispensable extension of Westphalian sovereignty, encompassing control over compute, data, critical infrastructures and normative standards. This digital sovereignty becomes the new battleground where future power hierarchies are decided. The interdisciplinary analysis developed in this article, which combines structural neorealism with contributions from the History of Law, demonstrates that contemporary *Ius Gentium* faces profound structural limitations. While Hugo Grotius, faced with the devastation of the Thirty Years' War, was able to outline common principles derived from the reason and practice of peoples to mitigate the effects of anarchy, the current context of the US-China rivalry is marked by an asymmetrical bipolarity and an existential perception of AI as a decisive technology for the balance of power of the 21<sup>st</sup> century. The competing regulatory narratives, the American approach of strategic deregulation, AI stack export, and selective like-minded alliances, versus China's strategy of state

governance, data sovereignty, and selective multilateralism oriented to the Global South, reflect not superficial ideological divergence, but deep national interests and strategies of technological and normative domination. The resulting fragmentation, "splinternet" or parallel AI ecosystems, is not an anomaly, but a predictable consequence of the structure of the system. Instead of a universal and binding regulatory framework, we are witnessing the consolidation of parallel or minimal regimes, aligned with digital spheres of influence. International cooperation remains possible in areas of common threat such as catastrophic risks, proliferation of autonomous weapons or model cybersecurity, but is invariably contingent on the calculation of relative advantage. International Law, as envisaged by the realist tradition, proves to be side effect, effective when it converges with the interests of the great powers, and fragile or irrelevant when it comes into conflict with them. For the smaller states and the middle powers, this configuration imposes an acute strategic dilemma. Digital sovereignty becomes a survival imperative: over-reliance on foreign ecosystems implies vulnerability to economic coercion, surveillance, and erosion of decision-making autonomy. In these contexts, the search for technological diversification, investment in national capacities and hedging strategies between the two poles becomes rational. From a theoretical point of view, this study reinforces the enduring relevance of neorealism to understand contemporary technological dynamics, while enriching the Grotian tradition by demonstrating how the History of Law can illuminate recurring patterns of normative formation, without falling into naïve idealism. AI does not dissolve the deep structures of international politics; on the contrary, it amplifies them. The asymmetries of computational power, data and innovation translate directly into asymmetries of normative and strategic influence. Looking ahead, it is reasonable to anticipate a fragmented and hierarchical digital *Ius Gentium*, closer to coexistence regimes than to integrated global governance. Future research could explore in greater depth intervening variables, such as the impact of advances in open-source technologies, the role of middle powers like India or Brazil (Hu & Johnson, 2017), or even the European Union as potential regulatory balancers, or the possibility of exogenous shocks such as serious AI security incidents that alter the cost-benefit calculations of cooperation. Ultimately, the regulation of Artificial Intelligence does not escape the eternal dynamics of power politics. The *Ius Gentium* of the twenty-first century will inevitably be a product of the distribution of material and technological capacities, not of pure universal reason. Acknowledging this reality does not imply resignation, but it is the necessary starting point for a more pragmatic, resilient digital governance that is aware of the limits imposed by the anarchic structure of the international system.

## LITERATURE:

1. AI Index Steering Committee. (2026). The AI Index 2026 annual report. Stanford Institute for Human-Centered Artificial Intelligence, Stanford University. <https://hai.stanford.edu/ai-index/2026-ai-index-report> [1, 2]
2. Albuquerque, R. (2023). *História do Direito Romano, Peninsular e Português*. Lisboa: Edições Universitárias Lusófonas
3. American National Standards Institute. (2025, 1 de agosto). China announces action plan for global AI governance. <https://www.ansi.org/standards-news/all-news/8-1-25-china-announces-action-plan-for-global-ai-governance>
4. Atlantic Council. (15 de janeiro de 2026). Eight ways AI will shape geopolitics in 2026. <https://www.atlanticcouncil.org/dispatches/eight-ways-ai-will-shape-geopolitics-in-2026/>
5. Carr, M. (2016). *US power and the internet in international relations: The irony of the information age*. Palgrave Macmillan.
6. Chan, K. (2026, 16 de abril). Competing AI strategies for the US and China. Brookings. <https://www.brookings.edu/articles/competing-ai-strategies-for-the-us-and-china/>
7. Choucri, N. (2012). *Cyberpolitics in International Relations*. MIT Press.

8. Choucri, N., & Clark, D. D. (2018). *International relations in the cyber age: The co-evolution dilemma*. Cambridge, Massachusetts: MIT Press. <https://hdl.handle.net/1721.1/141548>
9. Christensen, G. S., Gelbman, S. J., Hopkins, B. J., & Bridges, V. K. (2025, 14 de agosto). The White House unveils aggressive AI export strategy: What businesses need to know. K&L Gates. <https://www.klgates.com/The-White-House-Unveils-Aggressive-AI-Export-Strategy-What-Businesses-Need-to-Know-8-14-2025>
10. Communist Party of China Central Committee. (2025). *Recommendations for Formulating the 15th Five-Year Plan (2026–2030)*. Beijing: Communist Party of China.
11. Cyberspace Administration of China (CAC). (2025). *Audit Measures for Personal Information Protection*.
12. DeNardis, L. (2014). *The Global War for Internet Governance*. Yale University Press.
13. Floridi, L. (2020). The fight for digital sovereignty: What it is, and why it matters, especially for the EU. *Philosophy & Technology*, 33(3), 369–378. <https://doi.org/10.1007/s13347-020-00423-6>
14. García-Herrero, A., & Martens, B. (2026, 22 de junho). Stack battles: the US-China artificial-intelligence rivalry is moving beyond chips alone (Analysis 18/2026). Bruegel. <https://www.bruegel.org/analysis/stack-battles-us-china-artificial-intelligence-rivalry-moving-beyond-chips-alone>
15. Gozzi, G. (2019). *Ius gentium and the origins of international law*. In *Rights and civilizations: A history and philosophy of international law*, 1–106. Cambridge: Cambridge University Press. <https://doi.org/10.1017/9781108565035>
16. Grotius, H. (1925). *De jure belli ac pacis libri tres* [On the law of war and peace]. Clarendon Press.
17. Hu, M., & Johnson, K. W. (2017, 8 de outubro). Against the tide: A look at Chinese and Indian strategies to become superpowers. The Strategy Bridge. <https://thestrategybridge.org/the-bridge/2017/10/8/against-the-tide-a-look-at-china-and-indias-strategies-to-become-superpowers>
18. Ibrahim, N. T. (2025). The impact of AI on global power shifts: A case study of U.S.-China rivalry. *China Quarterly of International Strategic Studies*, 11(3), S2377740025500137, <https://doi.org/10.1142/S2377740025500137>
19. Ishkhanyan, A. (2025). The sovereignty-internationalism paradox in AI governance: digital federalism and global algorithmic control. *Discover Artificial Intelligence*, 5, 123. <https://doi.org/10.1007/s44163-025-00374-x>
20. Larsen, B. C. (2022, 8 de dezembro). The geopolitics of AI and the rise of digital sovereignty. Brookings. <https://www.brookings.edu/articles/the-geopolitics-of-ai-and-the-rise-of-digital-sovereignty/>
21. Mearsheimer, J. J. (2014). *The Tragedy of Great Power Politics*. New York & London: W.W. Norton & Company.
22. Ministry of Foreign Affairs of the People's Republic of China. (2023). *Global AI Governance Initiative*. [https://www.mfa.gov.cn/eng/zy/gb/202405/t20240531\\_11367503.html](https://www.mfa.gov.cn/eng/zy/gb/202405/t20240531_11367503.html)
23. Morgenthau, H. J. (1948). *Politics Among Nations: The Struggle for Power and Peace*. New York: Knopf.
24. National People's Congress. (2021). *Data Security Law of the People's Republic of China (中华人民共和国数据安全法)*.
25. Permanent Mission of the People's Republic of China to the UN. (2025, 26<sup>th</sup> of July). *Global AI Governance Action Plan*. [https://un.china-mission.gov.cn/eng/zgyw/202507/t20250729\\_11679232.htm](https://un.china-mission.gov.cn/eng/zgyw/202507/t20250729_11679232.htm)

26. Pohle, J., & Thiel, T. (2020). Digital sovereignty. *Internet Policy Review*, 9(4). <https://doi.org/10.14763/2020.4.1532>
27. Santaniello, M. (2026). Attributes of Digital Sovereignty: A Conceptual Framework. *Geopolitics*, 31(2), 788–809. <https://doi.org/10.1080/14650045.2025.2521548>
28. Srinivasaragavan, S. (2026, 14 de abril). Stanford: China 'effectively' closes US AI model performance gap. *Silicon Republic*. <https://www.siliconrepublic.com/machines/stanford-china-effectively-closes-us-ai-model-performance-gap>
29. State Council of the People's Republic of China. (2015). Made in China 2025 (中国制造 2025). Beijing: State Council Notice No. 28.
30. State Council of the People's Republic of China. (2024). Government Work Report (Launch of the “AI Plus” Initiative). Beijing: National People's Congress.
31. Tavares, J. (2023). Uma perspectiva realista sobre a limitação do poder de veto de um Estado-membro permanente do Conselho de Segurança das Nações Unidas. *Lusíada. Política Internacional E Segurança*, 23-24, 21-49. <https://doi.org/10.34628/q10n-ts65>
32. Tech Diplomacy Global Institute. (2025). The Geopolitics of AI: Three Models of Digital Sovereignty. <https://tdgi.org/the-geopolitics-of-ai-three-models-of-digital-sovereignty/>
33. Trump, D. J. (2025, 11 of december). Executive Order 14365: Ensuring a national policy framework for Artificial Intelligence. The White House. <https://www.whitehouse.gov/presidential-actions/2025/12/eliminating-state-law-obstruction-of-national-artificial-intelligence-policy/>
34. Waltz, K. N. (1979). *Theory of International Politics*. Reading: Addison-Wesley.
35. Wang, A. H.-E., & Siler-Evans, K. (2026). U.S.-China competition for artificial intelligence markets: Analyzing global use patterns of large language models (Research Report n.º RR-A4355-1). [https://www.rand.org/pubs/research\\_reports/RRA4355-1.html](https://www.rand.org/pubs/research_reports/RRA4355-1.html)
36. Xiao, B. (2025, 17<sup>th</sup> of November). China's Approach to AI Development and Governance. National Bureau of Asian Research. <https://www.nbr.org/publication/chinas-approach-to-ai-development-and-governance/>

# SMART CITIES, URBAN SECURITY AND PRIVACY-ENHANCING TECHNOLOGY SYSTEMS: A CROSS-CUTTING DIALOGUE

**Maria do Rosario Anjos**

*Lusófona University, Porto, Portugal  
maria.rosario.anjos@ulusofona.pt*

**Camilo Stangherlim Ferraresi**

*Lusófona University, Porto, Portugal  
camilostangherlimferraresi@gmail.com*

**Sonia Novais Santos**

*Lusófona University, Porto, Portugal  
Sonia.santos@ulusofona.pt*

## **ABSTRACT**

*The digital transformation has become a strategic priority, aiming efficiency, accessibility and interoperability of public services. Smart cities are a concept strongly based on smart digital systems. This process, however, increasingly relies on the large-scale processing and sharing of personal data, raising significant concerns regarding the protection of fundamental rights. This process offers some opportunities, in particular, the faster procedures, increased efficiency and democratization in access to public utilities. Despite this, there are also some risks of personal data protection violation. The aim of this article is to answer the important investigation question: Can law regulate technology and guarantee privacy enhancing technological systems (PET's) truly effective to protect citizens fundamental rights? Can governments ensure compliance in digital process with the rule of law and fundamental rights? The methodology adopted is based on a theoretical framework that included a revision of the state of art, legislation, reports and the contribution of some important studies about PET's development. A dialog between Law and Technology. The conclusions show how essential is the protection of citizens and their personal data and how fragile are the privacy security systems. The return to the concept of «good governance», dignifying and improving the fundamental rights (the priority of the human being) demands the conception of strong privacy systems and an ethical behaviour of the rulers. In recent formulations on the essence of good governance, the ethical dimension is often present, probably because it has been realized that the public management is not a neutral activity. general data protection regulation (GDPR) is an important tool but it is not enough. It must be guarantee with privacy enhancing technological systems (PET's). This is the real challenge of a safe digital society with impact on smart cities dimension.*

**Keywords:** *E-Government Digital; Public Administration; Privacy Enhancing Technological Systems (PET's); Regulation; Rule of Law*

## **1. INTRODUCTION**

The modernization of all sectors of public administration through the use of new technologies is an evolutionary process, of accelerated progress, with an impact on the construction of smart cities. It is happening so fast that the regulation of this process cannot be truly effective, because law cannot go so fast as technology evolution. This can be a very unfair process in the perspective of fundamental citizens' rights protection. But, the truth is that science and technological progress are unstoppable. Therefore, the challenge is to find a way to regulate fundamental aspects of this process and guarantee privacy and security of all.

The digital transition of public administration offers numerous opportunities, including speeding up procedures, increasing efficiency and democratising access to public services. However, it also poses significant risks, such as the exclusion of some social groups, which are more vulnerable, without technological skills or the economic means to acquire them, and above all failures in the protection of personal data and cybersecurity problems. Considering this duality, the most important is to provide a secure access to digital public utilities. The goal is an E-Governance for all with privacy systems that protect citizens. In some EU countries, with oldest populations, and poor digital literacy is crucial to guarantee a good governance in digital transition towards equal access to services of general interest (Anjos, 2016), to ensure cybersecurity throughout the process. We can say, therefore, that the first challenge is to guarantee universal access to all citizens to the public utilities, and the second is to guarantee that this access is secure and personal data privacy is assured. Without universal access to public utilities, we cannot achieve an effective smart city for all, focused on an equitable social progress and welfare (Anjos & Mimoso, 2018). Public and private activities depend on digital progress, and the use of new technologies is crucial (Anjos, Santos & Salgado, 2022) but personal data protection failures and security problems are dangerous and can minate all the process. To put it another way, we must be aware of all the opportunities and risks to avoid the collapse of our human rights system and rule of law. Therefore, it is necessary to ensure a good and safe governance in smart cities construction process, with guarantee of personal data protection. The General Data Protection Regulation (GDPR) ensures that AI systems used in public administration respect citizens' privacy. The EU has one of the world's most comprehensive legal frameworks for data protection, primarily governed by the General Data Protection Regulation (GDPR), which came into force in May 2018. Its main goals are to give EU citizens more control over their personal data and to harmonize regulations across the EU member states. The European Artificial Intelligence Regulation also aims to reinforce the purpose of safety for all users. This research work aims to be a theoretical contribution to understand the state of art about privacy systems to protect citizens from the risks of this process. We limit our analysis to some issues related to the concept of urban security and the introduction of appropriate Privacy Enhancing Technology Systems (PET's), in the construction of safe smart cities. In this study, our focus of investigation is to understand the best methodology to follow from the conception of the law to its implementation in privacy and security field, considering the connection between technology and law and that these difficulties requires a cross-cutting and committed dialogue between the different sciences involved.

## **2. DIGITAL TRANSFORMATION AND DATA PROTECTION POLICY ON SMART CITIES**

The human rights protection in smart cities is responsibility of the Public Administration. This problem is particularly important, because all data we give to public administration services, such as health, police, tax authority, but also private services such as central banks, insurance, and others shall be keep as privacy. Most of them are part of our human rights patrimony. They must be preserved, and the rule of law cannot fail in that. The European Union's recovery plan, primarily driven by the "NextGenerationEU" initiative, places a strong emphasis on digital transformation as part of its strategy to rebuild economies and enhance resilience post-pandemic. The digital goals within the EU recovery program focus on accelerating the digital transition across member states, improving digital infrastructure, and promoting technological innovation. These efforts are key to ensuring a sustainable and competitive future for the EU. Below are the primary digital goals of the EU recovery program. First, the modernization of «public services» enhances e-government services to make them more accessible and user-friendly, encouraging digital-first approaches in areas such as healthcare, education, taxation, and social services.

Secondly the interoperability and cross-border services and the interoperability of public services across EU member states, enabling seamless interactions between different national systems. Privacy and data protection is particularly important considering some realities such as:

- a. Digital Identity: develop secure and widely accepted digital identity systems to simplify access to both public and private services across the EU.
- b. Data Portability: individuals can request that their data be transferred from one organization to another.
- c. Data Breaches: organizations must notify authorities immediately of data breaches if they pose a risk to individuals' rights and freedoms.
- d. Fines: non-compliance can lead to severe fines up to €20 million or 4% of the corporation global annual turnover.

When we consider the enormous volume of personal data processed in our cities every minute (whether for using public transport, applying for or verifying documents, digital signatures, service payments, e-commerce or the Internet of Things) the image of a 'sandbox' is at the same time illuminating and frightening (Engelmann, 2021). How can we assure citizens who use these technological and digital systems on a daily basis in their everyday lives that their personal data is, in fact, protected? The possible solution, for the time being, is to ensure that PETs are secure, advanced and subject to continuous updating and development. To this end, it is essential to secure the necessary funding for research and development expenditure from both public and private bodies, in order to guarantee the highest possible level of security. This is an unavoidable cost for ensuring technological progress in the protection of personal data within public services, as well as across all private sectors. (Meilán, 2006). This is an imperative of the concept of the «*good governance*» in smart cities.

### **2.1. Expansion of Digital Infrastructure: «E-government» in action**

Digital public administration has been improved all over UE countries. With different levels of technological tools and specificities, all countries transform their public administrations in a digital administration or «E-government, in a way that all citizens can access to important and sensitive services, essential for their lives, in a «click» on a digital platform. E-government refers to the efforts of public authorities to use information and communication technologies to improve public services and enhance the democratic participation of citizens in all matters of public interest or of particular interest with reflection on their citizenship rights that depend on government recognition. E-government aims, also, to improve administrative efficiency by reducing the costs of managing and communicating electronic information, reorganizing public agencies, and reducing administrative silos of information. More importantly, it can reduce the administrative burdens on citizens and businesses by speeding up their interactions with public authorities and making them more convenient and less costly, thereby stimulating competitiveness and economic growth. More recently, open data and collaboration with third parties have given governments new insights into problems and new services that can be implemented. In addition, the opportunities for citizens to engage with public authorities through e-government (by making proposals, commenting on and influencing policies and political programs) can increase transparency and encourage participation in democratic public life. Responsibility for implementing e-government practices lies primarily with EU Member States. Nevertheless, the EU has a role to play in promoting the development of e-government practices. To achieve these goals some important technological tools were implemented by governments to guarantee the best conditions of access and utilization of digital platforms by citizens.

We highlight the following:

- (i) Introduction of 5G and Gigabit Connectivity: roll out 5G networks and high-speed broadband across all member states, with a focus on connecting rural and underserved areas to close the digital divide.
- (ii) Digital Sovereignty: invest in critical digital infrastructure, such as cloud computing, data center's and secure communication networks, to reduce dependence on non-EU technologies and enhance Europe's digital autonomy.
- (iii) Enhancing Digital Skills and Literacy: invest in digital education and upskilling programs to prepare the workforce for a digital economy. This includes initiatives to improve basic digital skills for citizens and advanced digital competencies, such as AI, cybersecurity, and data science, for workers in all sectors.
- (iv) Supporting Digital Transition in Education: expand access to digital tools and platforms in schools, universities, and vocational training programs to ensure that all students are equipped for the digital age.
- (v) Support for Innovation and Emerging Technologies: evidenced in various funded programmes for schools, universities and companies to adapt their structures to the new digital administration model.
- (vi) Artificial Intelligence (AI) and Data: (vi) Artificial Intelligence (AI) and Data: Promote the development and use of AI in key sectors such as health, public procurement, social welfare, education, and the public sector in general, on the assumption that ethical standards and transparency are guaranteed.

In short, much progress has already been made towards a secure digital public administration, but there is still much to be done to ensure truly effective data protection in the digital age.

## **2.2 Strengthening Cybersecurity**

Security is always a very sensitive issue. In this study, this is our focus of investigation to understand the best methodology to follow from the conception of the law to its implementation. It should be remembered that the area of connection between technology and law is particularly difficult and requires a cross-cutting and committed dialogue between the different sciences involved. It is up to the lawyer to achieve the necessary understanding of the problem(s) to promote the appropriate design of the law. Since the 90's of last century various authors became to develop important research to find security systems, but the great revolution was the Blockchain and Digital Innovation (Taspscott; 2022). support the development and integration of innovative technologies like blockchain for secure and transparent digital services (in various services as bitcoins, bank and finance services, international payments, e-commerce, among others). In addition, encouraging the use of digital twins, data analytics and simulation technologies to optimise industrial processes and decision-making in public services, one of the founders of the Blockchain Research Institute, highlights the very positive impacts of blockchain on the global economy and how it represents a radical change in the internet as we know it. With the arrival of blockchain, a concept that is on the radar of companies in various sectors, the focus of the web is shifting from information to a network for generating value. This is because the technology creates an environment that tracks technical, operational and business information through a virtual and immutable ledger. Thus, Tapscott says that blockchain decrees the end of intermediaries and fake or pirated information, services, and products. According to him, the technology eliminates intermediaries by allowing individuals and companies to transact with each other in a free and efficient chain, adding that the primary function of blockchain is to allow citizens to regain control of their own digital identities. In this point we must say that a smart citie or a digital public administration project have to enforce all tools we have to guarantee security.

So, E-Government shall guarantee:

- (i) **Cyber Resilience:** increase investment in cybersecurity to protect critical infrastructure, digital services, and data from cyberattacks. This includes enhancing the EU's capability to respond to cyber threats and supporting the development of robust cybersecurity standards across member states.
- (ii) **European Cybersecurity Competence Center:** Strengthen the coordination of cybersecurity efforts within the EU by establishing a central hub for cybersecurity expertise, resources, and funding.
- (iii) **Appropriate PETs:** privacy enhancing technology systems able to keep and guarantee the personal data of all citizens using public utilities.

### **2.3. Expansion of Digital Infrastructure: «E-government» in action»**

The expansion of digital infrastructure has become a key element in the modernization of public administration through the development of e-government systems. By integrating digital technologies into public services, governments can improve efficiency, accessibility, and transparency in their interactions with citizens and businesses. E-government initiatives facilitate online access to administrative procedures, digital identification systems, electronic records, and public information, reducing bureaucracy and promoting faster decision-making processes. At the same time, the expansion of digital infrastructure requires secure networks, reliable technological resources, and robust legal frameworks to protect personal data and guarantee equal access to digital services. In this context, e-government represents not only a technological transformation, but also a tool for strengthening democratic participation, public trust, and institutional innovation in contemporary societies.

## **3. SUSTAINABILITY AND GREEN DIGITAL TRANSITION SYNERGY**

Sustainability and the green digital transition lie at the heart of the smart city. The synergy between sustainability and the green digital transition is one of the central challenges of contemporary urban governance. The concept of the smart city emerged two decades ago, associated with sustainability and the efficient management of resources. Its development was also shaped by concerns related to climate change, particularly the reduction of carbon emissions. (FERRARESI, FONSECA, IA). Today, the concept is closely linked to technology and innovation. The contemporary smart city mobilizes the full potential of advanced technologies in its structures and procedures, relying on information and communication technologies, software, algorithms, and artificial intelligence tools. This gives rise to what is often described as algorithmic governance or digital governance. It is through the application of information technologies that the smart city advances its sustainability goals. In practice, this means promoting sustainability through urban transformation initiatives such as green mobility plans; circular economy solutions; the use of clean energy; energy-efficient buildings; LED public lighting; water management policies based on reuse and recovery; waste management policies based on reduction, recycling, and reuse; and the integration of sustainability with innovation through structures such as living labs and innovation hubs.

### **3.1 Some case studies from Brazil**

In this context, it is possible to highlight examples of green mobility plans, such as the city of Curitiba, in Brazil, Paraná, which is internationally recognized for its bus rapid transit (BRT) system, now celebrating 50 years of implementation. The city was also the first in the world to implement this solution, which uses dedicated bus corridors, reducing travel time and increasing energy efficiency. Another example of sustainable mobility is the city of São Paulo, Brazil, which has an integrated public transport system including metro, buses, and suburban trains, as well as a cycling network that now exceeds 680 km.

More recently, it introduced the Blue Lanes, exclusive lanes for motorcyclists. Implemented on busy avenues, these lanes aim to improve motorcycle safety and reduce traffic accidents. By separating motorcyclists from general traffic, they help organize traffic flow and prevent conflicts with larger vehicles, contributing to safer and more efficient mobility while reducing consumption and improving circulation. Digitalization can contribute to sustainability by reducing the need for physical travel, improving energy monitoring, optimizing public services, and enabling data-driven decision-making. At the same time, the digital transition itself must be sustainable, since digital infrastructures, data centers, connected devices, and intensive data processing also generate energy consumption and environmental impacts. The city of Juiz de Fora has implemented a cross-sectoral set of public policies that integrate technology, innovation, and social justice under its Municipal Climate Neutrality Policy, with 60% of the actions already implemented since 2022. These initiatives include the full replacement of public lighting with LED lamps, the expansion of photovoltaic solar generation in municipal buildings, the modernization of public facilities through energy-efficiency and natural ventilation solutions, and a pioneering biomethane production project from organic waste, expected to begin operating in 2028 and reduce landfill disposal by 100 tons per day. The city has also universalized selective waste collection and launched the Zero Waste program, which progressively establishes mandatory waste separation in households, businesses, industries, and public buildings, while strengthening the productive inclusion of waste pickers and cooperatives, recognizing their role in the recycling chain and the circular economy. From this perspective, it is important to emphasize that the sustainable city and the green transition necessarily require the incorporation of environmental, economic, and social sustainability into planning. This entails the inclusion of “themes such as green procurement, sustainable construction, public transport networks based on renewable energy sources, and the proper disposal of solid waste and liquid effluents” (NALINI; SILVA NETO, 2017, p. 7). The definition above also highlights the control and reduction of greenhouse gases as sustainability indicators, which justifies this concern, since these emissions influence climate change. As a consequence, climate change can be identified as one of the factors behind the significant increase in the risk and occurrence of disasters. Climate change originates in the emission of greenhouse gases (CO<sub>2</sub>). These gases share one common characteristic: they allow high-frequency radiation, such as visible light, to reach the Earth’s surface, but are opaque to the low-frequency radiation emitted back from the Earth’s surface. The result is that the same amount of energy enters, but less energy escapes. This energy imbalance causes warming. The physics of this “greenhouse effect” is well understood and undisputed. (FABER; CARLARNE, 2018). Ecologically sustainable cities are also necessarily resilient. Resilience is essential for the proper response to potential disasters, since the term comes from Latin and means “to return to one’s original state,” that is, the capacity of a city to resume its natural functioning after severe disruptions caused by natural disasters. Urban resilience also necessarily implies intelligence, since a smart city is a complex place in which information sharing strengthens public participation in urban planning and enables rapid decision-making in the event of catastrophic occurrences. (SENNETT, 2018). Social inclusion and participation are also part of the meaning of environmental sustainability, insofar as they relate to social sustainability, understood as the social dimension of human qualities. In this sense, “public policies aimed at promoting equal opportunities for access to public spaces and mobility encourage essential cultural exchanges within the social fabric, fostering interaction, community coexistence, and a reduction in collective imbalance.” (SOUZA; ALBINO, 2020, p. 438). Sustainability and resilience are closely connected to participation rights and environmental decision-making. The smart city adds a substantial layer of information and communication technologies to local governance processes, but digital technologies should not be understood only as instruments of efficiency and automation.

They should also be seen as tools capable of supporting climate goals, the responsible use of resources, and more sustainable public policies. In sum, the smart city is the result of applying science and technology to local governance, making it possible to address the problems of twenty-first-century cities, such as the rational use of resources, the mitigation of environmental externalities, and the reduction of climate-change-related risks, while delivering services of undeniable added value and promoting human development and social inclusion (FONSECA, 2023).

#### **4. REGULATION AND COMPLIANCE IN THE DIGITAL PROCESS OF SMART CITIES**

The digital transition in public administration, within the new paradigm of smart cities, embraces innovation, efficiency, effectiveness and interoperability. At the speed of light, just a click away, interoperable platforms and artificial intelligence systems are being integrated into urban management, which involves the mass processing of personal data, in accordance with the General Data Protection Regulation (GDPR). However, it is essential to ensure a substantive balance between legality, proportionality and enhanced protection for the most vulnerable data subjects, foremost among whom are children and the elderly. Article 25 of the GDPR enshrines the principles of data protection by design and by default. Consequently, this requirement takes on particular significance when interoperability between urban and/or rural sectors, whilst promoting the efficiency of public administration, increases the scope of exposure to risk and puts pressure on the principle of purpose limitation (Joyce and Javidroozi, 2024).

##### **4.1. Older people and children who have been overlooked in the digital transition.**

Recital 75 of the GDPR identifies children and the elderly as particularly vulnerable data subjects. Their ability to understand the risks involved in the processing of their own data is, by its very nature, diminished, which points to an imbalance in the relationship between the data subject and the data controller. Legal scholarship extends this assessment, by analogy, to older people and other structurally vulnerable groups (Malgieri and Niklas, 2020). However, Article 8 of the GDPR establishes the age of digital consent, and is the only provision that directly regulates the processing of children's data; this highlights a significant gap, given that the points of contact between children and the digital systems of a smart city are multiplying far beyond what that provision ever envisaged. As for older people, vulnerability takes two forms: cognitive and functional. Added to this are limited digital literacy and physical dependence, which make it difficult for them to fully exercise their rights of access, rectification and objection, as set out in the GDPR. Consequently, the data protection impact assessment, as provided for in Article 35 of the GDPR, must be carried out with due consideration, caution and rigour; it must not be a mere administrative formality integrated into smart urban management systems whenever data relating to children or older people is at stake, particularly in the areas of health, assisted mobility and home-based telecare. The Court of Justice of the European Union, in its judgment in *Digital Rights Ireland and Seitlinger and Others* of 8 April 2014, declared Directive 2006/24/EC invalid on the grounds that it infringed the principle of proportionality, holding that the generalised and indiscriminate retention of data, without distinction based on the specific circumstances of the data subjects, exceeded the limits of what is necessary in the light of Articles 7 and 8 of the Charter of Fundamental Rights of the European Union (CJEU, joined cases C-293/12 and C-594/12, 8 April 2014, EU:C:2014:238). The judgment handed down applies by analogy to systems used in smart cities, where there is continuous collection of urban information, without mechanisms to differentiate between vulnerable data subjects. Similarly, the European Court of Human Rights, in its judgment in *Gaughran v. the United Kingdom* of 13 February 2020, held that the indefinite retention of biometric data without periodic review tailored to the data subject's circumstances was

disproportionate, in the light of Article 8 of the European Convention on Human Rights (application no. 45245/15). That said, it is important to emphasise that biometric identification and monitoring systems applied to children or elderly people must observe proportionate retention periods and provide effective means of objection, lest the efficiency of urban management become a factor undermining the dignity of the data subjects it is intended to protect.

#### **4.2. Preventive measures in public systems**

Directive (EU) 2022/2555, known as NIS2, requires essential entities, such as public administrations, to adopt technical and organisational measures proportionate to the risk and to report significant incidents. Article 20 establishes the direct accountability of management bodies, moving beyond the paradigm of diffuse liability that has long characterised the protection of critical digital infrastructure (Directive (EU) 2022/2555, 2022). Privacy-enhancing technologies are an additional component of this regulatory framework. At present, pseudonymisation and consent management systems are the most established tools in this field. Proof of this is the infrastructure proposed for the city of Murcia, which incorporates attribute-based credential identity, a consent manager and a GDPR-based access control system, demonstrating the real potential of these technologies when applied in an urban context (Daoudagh et al., 2021). Thus, the technology supply chain is, perhaps, the final – and most fragile – link in the preventive architecture. Its vulnerability requires that due diligence obligations be extended to all service providers involved in the operation of urban platforms, lest the very mechanisms for age and identity verification end up increasing the exposure of the sensitive data they were intended to protect (AccessOwl, 2026).

#### **4.3. Case study: The Lisbon Plan 65+ and the protection of older people's personal data in the smart city, Portugal.**

At the 2025 Portugal Smart Cities Summit, Lisbon City Council presented the Lisbon Smart City Strategy 2030, structured around six pillars, with a particular focus on society and e-governance. It announced the creation of an inclusive municipal digital literacy programme targeting older people, young people and vulnerable groups (Lisbon City Council, 2025). The programme was approved by the City Council on 24 October 2022 and has been in force since January 2023. It is aimed at residents aged 65 or over who are registered in Lisbon, with a particular emphasis on recipients of the solidarity supplement for the elderly (Lisbon City Council, 2023). The Lisbon 65+ Plan aims to promote digital inclusion amongst older people, but it handles significant volumes of sensitive personal data relating to older people. For example, registration – whether in person at a pharmacy or online via authentication using a Citizen Card – involves the collection of data such as name, date of birth, address, tax identification number, National Health Service user number and social security number. The implementation of the plan required information-sharing protocols between the City Council, the Lisbon and Vale do Tejo Regional Health Authority, the Social Security Institute, the National Association of Pharmacies, the Portuguese Association of Pharmacies, the Faculty of Dental Medicine at the University of Lisbon and Santa Casa da Misericórdia de Lisboa. The programme covers around 130,000 residents, of whom approximately 5,000 recipients of the solidarity supplement for the elderly receive an enhanced package of services, involving the additional processing of sensitive clinical data. This case illustrates the large number of organisations with access to the data of a structurally vulnerable group, combined with registration channels that require digital literacy and proficiency in electronic authentication mechanisms. This highlights the tension between administrative efficiency and data protection that Article 25 of the GDPR seeks to prevent.

The local authority acknowledges this difficulty by admitting, in its 2030 strategy, that digital literacy amongst older people needs to be improved. The coexistence, within the same local authority, of a healthcare scheme for older people that collects clinical and tax identification data, and a municipal strategy that recognises the digital literacy gap among older people, confirms the need for enhanced oversight, including the integration of assisted registration mechanisms, consent protocols tailored to the individual's specific capacity for understanding, and periodic audits of data-sharing protocols amongst the various entities involved. Regulatory compliance with the digital processes of smart cities requires moving beyond a strictly procedural interpretation of the GDPR. It is essential, first and foremost, to devise public policies that combine protection from the design stage onwards with cybersecurity. This requires differentiated protection for vulnerable groups and vigilance regarding the limits of proportionality and equity. Aristotle, in Book V of the *Nicomachean Ethics*, taught that justice is measured by the proportion between the terms involved, and that distributive justice consists in treating unequal things unequally, assigning to each according to their condition (Aristotle, BC). There is an urgent need to shed light on this logic of proportion due to difference, which the enhanced protection of children and older people demands in the digital space of smart cities and towns. After two millennia, it is important to emphasise the centrality of human dignity as a founding value of the legal system, which precedes and conditions every other fundamental right, including the right to the protection of personal data (Otero Parga, 2006). That said, digital efficiency no longer threatens, but rather serves, the dignity of families and the most vulnerable.

## **5. CONCLUSION**

The development of Privacy Enhancing Technologies (PETs) requires a strong combination of expertise, resources, and funding to ensure effective collaboration between technology and law. Interdisciplinary expertise is essential, bringing together specialists in cybersecurity, data protection, artificial intelligence, and legal studies to address the complex challenges of privacy in digital environments. Adequate resources, including advanced research infrastructures, secure data environments, and access to international networks, support innovation and practical implementation of PET solutions. Sustainable funding is equally important to promote long-term research, foster collaboration between academia and industry, and encourage the creation of regulatory frameworks that balance technological innovation with the protection of fundamental rights. The rule of law plays a central role in the development and implementation of Privacy Enhancing Technologies (PETs), ensuring that technological innovation respects fundamental rights, democratic values, and legal principles. In this process, the rule of law establishes the legal and ethical framework within which data collection, processing, and sharing must operate, promoting accountability, transparency, and fairness. It guarantees that individuals' rights to privacy and data protection are safeguarded while enabling institutions and organizations to use technology responsibly. Moreover, the rule of law supports trust in digital systems by ensuring that PET solutions comply with regulations such as data protection laws and international human rights standards. Through the interaction between law and technology, PETs become not only technical tools for privacy protection but also instruments that reinforce democratic governance and citizens confidence in the digital environment. Privacy Enhancing Technologies (PETs) can significantly improve the security and protection of personal data, but their effectiveness depends on how they are designed, implemented, and governed. Technologies such as encryption, differential privacy, federated learning, and anonymization reduce the risks of unauthorized access and misuse of data by limiting exposure of sensitive information. However, no system is entirely immune to vulnerabilities, cyberattacks, or misuse.

Effective security therefore requires not only advanced technological solutions, but also continuous legal oversight, ethical governance, transparency, and compliance with data protection regulations. In this context, the dialogue between technology and law is essential to ensure that PET systems remain reliable, accountable, and capable of protecting both privacy and fundamental rights in rapidly evolving digital environments. Sustainability and climate monitoring is imperative because of the high costs of technologies, especially AI. The EU has launched the «**Destination Earth**» (**DestinE**) initiative, aiming to develop digital twins of the Earth that can simulate climate and environmental changes. This will help monitor global warming, support climate action, and promote disaster resilience through real-time data and predictive modeling. Regulatory compliance with the digital processes of smart cities requires moving beyond a strictly procedural interpretation of the GDPR. It is essential, first and foremost, to devise public policies that combine protection from the design stage onwards with cybersecurity. This requires differentiated protection for vulnerable groups and vigilance regarding the limits of proportionality and equity. The key is the dialogue between technology and law to building more transparent, secure, and trustworthy digital societies.

#### LITERATURE:

1. AccessOwl. (2026). NIS2 Directive explained: EU cybersecurity guide. Retrieved 22.06.2026 from <https://www.accessowl.com/blog/what-is-nis2-directive>
2. Anjos, M. R. (2016) *Serviços de Interesse Económico Geral, Concorrência e Garantias dos Cidadãos Usuários – Um estudo à luz do Direito Comunitário*. Ed. ISMAI. – ISBN: 978-972-9048-91-3. PT
3. Anjos, M. R. & Mimoso, M. J (2018) *Por uma «Cláusula de Progresso» nos contratos de Investimento estrangeiro*. III SINDA – IBEWROJUT & FDCP – ULP. Ed. Lusófonas. Lisboa
4. Aristóteles. *Ética a Nicómaco* (4.<sup>a</sup> ed.; A. C. Caeiro, trad.). Lisboa: Quetzal Editores.
5. Câmara Municipal de Lisboa. (2025). Portugal Smart Cities Summit escolhe Lisboa como cidade convidada. Retrieved 22.06.2026 from <https://informacao.lisboa.pt/noticias/detalhe/portugal-smart-cities-summit-escolhe-lisboa-como-cidade-convidada>
6. Câmara Municipal de Lisboa. (2023). Plano de Saúde Lisboa 65+ com acesso gratuito. Retrieved 22.06.2026 from <https://informacao.lisboa.pt/noticias/detalhe/plano-de-saude-lisboa-65-com-acesso-gratuito>
7. CETSP – Companhia de Engenharia de Tráfego. (n.d.). Faixa Azul: Perguntas e Respostas. Retrieved 26.06.2026 from <https://www.cetsp.com.br/consultas/faixa-azul/perguntas-e-respostas.aspx>
8. Court of Justice of the European Union. (2014). Digital Rights Ireland Ltd and Seitlinger and Others (Joined Cases C-293/12 and C-594/12), EU:C:2014:238. Judgment of 8 April 2014. Luxembourg: CJEU. Retrieved 22.06.2026 from <https://eur-lex.europa.eu/legal-content/PT/TXT/?uri=CELEX:62012CJ0293>
9. Coutinho, A. R.; SILVA, A. C. N. e A. B. (2019) *Direito, Compliance e Tecnologia*, 1<sup>a</sup> Ed. São Paulo – SP: Saraiva, Brazil
10. Daoudagh, S., Marchetti, E., Savarino, V., Bernal Bernabé, J., García-Rodríguez, J., Torres Moreno, R., Martínez, J. A. and Skarmeta, A. F. (2021). Data protection by design in the context of smart cities: A consent and access control proposal. *Sensors*, 21(21), 7154. Retrieved 22.06.2026 from <https://pmc.ncbi.nlm.nih.gov/articles/PMC8588184/>
11. Don Taspescott (2018) in LIVE Magazine interview. Cisco. 25-edition. Brasil PDF ([www.cisco.com](http://www.cisco.com)). Available in: [chromeextension://efaidnbmninnibpcapjpcglclefindmkaj/https://www.cisco.com/c/dam/global/pt\\_br/solutions/pdfs/entrevista\\_don\\_taspescott.pdf](chromeextension://efaidnbmninnibpcapjpcglclefindmkaj/https://www.cisco.com/c/dam/global/pt_br/solutions/pdfs/entrevista_don_taspescott.pdf)

12. Engelmann, W.; Marques C. G. P. (2021) *Inteligência Artificial E As Configurações Contemporâneas Do Direito: Da Inovação Tecnocientífica À Inovação Justeclógica*. Revista de Direito Brasileira, Florianópolis. SC, v. 0, n. 11, p. 405-421, abr./2021. Available: file:///C:/Users/raque/Downloads/document-1.pdf. (access in: 1 set. 2023).
13. European Court of Human Rights. (2020). *Gaughran v. the United Kingdom* (Application No. 45245/15). Judgment of 13 February 2020. Strasbourg: Council of Europe. Retrieved 22.06.2026 from <https://hudoc.echr.coe.int/eng#%7B%22itemid%22:%5B%22001-200817%22%5D%7D>
14. European Parliament and Council. (2016). Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data (General Data Protection Regulation). Brussels: Official Journal of the European Union. Retrieved 22.06.2026 from ELI: <http://data.europa.eu/eli/reg/2016/679/oj>
15. European Parliament and Council. (2022). Directive (EU) 2022/2555 of the European Parliament and of the Council of 14 December 2022 on measures for a high common level of cybersecurity across the Union (NIS2 Directive). Brussels: Official Journal of the European Union. Retrieved 22.06.2026 ELI: <http://data.europa.eu/eli/dir/2022/2555/oj>
16. Farber, D. and Carlarne, C. P. (2018). *Climate Change Law*. Saint Paul: Foundation Press.
17. Ferraresi, C. S. (2021). *A Ressignificação do Direito à Cidade a partir dos Direitos Humanos: As Smart Cities como um espaço para garantir a qualidade de vida das pessoas com deficiência*. Blumenau: Editora Dom Modesto.
18. Ferraresi, C. S. and Fonseca, I. C. (2024). *Inteligência Artificial e Direito à Cidade: As Smart Cities como modelo de cidades do futuro ecologicamente sustentáveis*. In: Wedy, G., Hupffer, H. M. and Weyermüller, A. R. (eds.), *Direito e inteligência artificial: perspectivas para um futuro ecologicamente sustentável*. São Leopoldo: Casa Leiria, pp. 119–140.
19. Fonseca, I. C. (2023). *Smart Cities and Law, E-Governance and Rights: Because we need a global digital transition strategy for the city*. In: Fonseca, I. C. (ed.), *Smart Cities and Law, E-Governance and Rights*. Milan: Wolters Kluwer, pp. 1–28.
20. Garcez, M. (2024). *Exemplos de Sucesso em Mobilidade Sustentável: 5 Casos*. Retrieved 26.06.2026 from <https://blogambiental.com.br/mobilidade-urbana-sustentavel-exemplos-para-um-futuro-mais-verde/>
21. Joyce, A. and Javidroozi, V. (2024). *Smart city development: Data sharing vs. data protection legislations*. *Cities*, 148, 104859. Retrieved 22.06.2026 from <https://www.sciencedirect.com/science/article/pii/S0264275124000738>
22. Malgieri, G. and Niklas, J. (2020). *Vulnerable data subjects*. *Computer Law & Security Review*, 37, 105415. Retrieved 22.06.2026 from <https://www.sciencedirect.com/science/article/pii/S0267364920300200>
23. Marques, D. L., Neiva, H. P., Pires, I. M., Marinho, D. A. and Marques, M. C. (2020). *Accelerometer data from the performance of sit-to-stand test by elderly people*. *Data in Brief*, 33, 106328. Retrieved 22.06.2026 from <https://pmc.ncbi.nlm.nih.gov/articles/PMC7522482/>
24. Meilán Gil, J. L. (2006) *Progreso Tecnológico y Servicios Públicos*. Marcial Pons, Madrid
25. Nalini, J. R. and Silva Neto, W. L. B. da. (2017). *Cidades inteligentes e sustentáveis: desafios conceituais e regulatórios*. In: Cortese, T. T. P., Kniess, C. T. and Maccari, E. A. (eds.), *Cidades inteligentes e sustentáveis*. Barueri: Manole, pp. 3–20.
26. Otero Parga, M. (2006). *Dignidad y solidaridad: dos derechos fundamentales*. Ciudad de México: Porrúa
27. Prefeitura de Curitiba. (2024). *BRT completa 50 anos em Curitiba: sistema ganha velocidade e veículos elétricos*. Retrieved 26.06.2026 from <https://www.curitiba.pr.gov.br/noticias/brt-completa-50-anos-em-curitiba-sistema-ganha-velocidade-e-veiculos-eletricos/75042>

28. Rodrigues, B. (2025). Quando as cidades lideram a transição ecológica. *Le Monde Diplomatique Brasil*. Retrieved 26.06.2026 from <https://diplomatique.org.br/quando-as-cidades-lideram-a-transicao-ecologica-juiz-de-fora/>
29. Sennett, R. (2018). *Construir e habitar: ética para uma cidade aberta*. Rio de Janeiro: Record.
30. Souza, M. C. S. de and Albino, P. L. (2020). Cidades sustentáveis: desafios que ultrapassam as estruturas físicas. In: Campello, L. G. B. (ed.), *Direitos humanos e meio ambiente: os 17 objetivos de desenvolvimento sustentável da Agenda 2030*. São Paulo: IDHG, pp. 428–452.
31. Tapscott, A. (2022) *Digital Asset Revolution: How Blockchain is Decentralizing Finance and Disrupting Wall Street*. (Blockchain Research Institute Series Editor

# TRANSITION TOWARDS E-MOBILITY: ANALYSIS OF THE BATTERY ELECTRIC VEHICLE MARKET IN SLOVENIA

**Tilen Babnik**

*University of Ljubljana, School of Economics and Business, Slovenia*

**Matej Svigelj**

*University of Ljubljana, School of Economics and Business, Slovenia*

*matej.svigelj@ef.uni-lj.si*

## **ABSTRACT**

*In recent years, discussions on carbon-neutral mobility and the electrification of transport for both private and business purposes have increasingly come to the forefront in Slovenia. One of the key measures introduced by the European Union is the planned restriction on the sale of new vehicles with internal combustion engines, which means that a large proportion of the population will, in the future, have to face the choice of vehicles powered by alternative energy sources. The purpose of this paper is to analyse the market for battery electric vehicles (BEVs) in Slovenia. The results of the analysis indicate that the share of electrified vehicles is increasing. The majority of newly sold vehicles are still powered by petrol engines, followed by diesel, hybrid, battery electric, and plug-in hybrid vehicles. The sale of BEVs is supported by various non-refundable financial incentives for the purchase of vehicles and electric charging stations for both private individuals and legal entities. The concept of electric vehicle sharing is also becoming increasingly popular.*

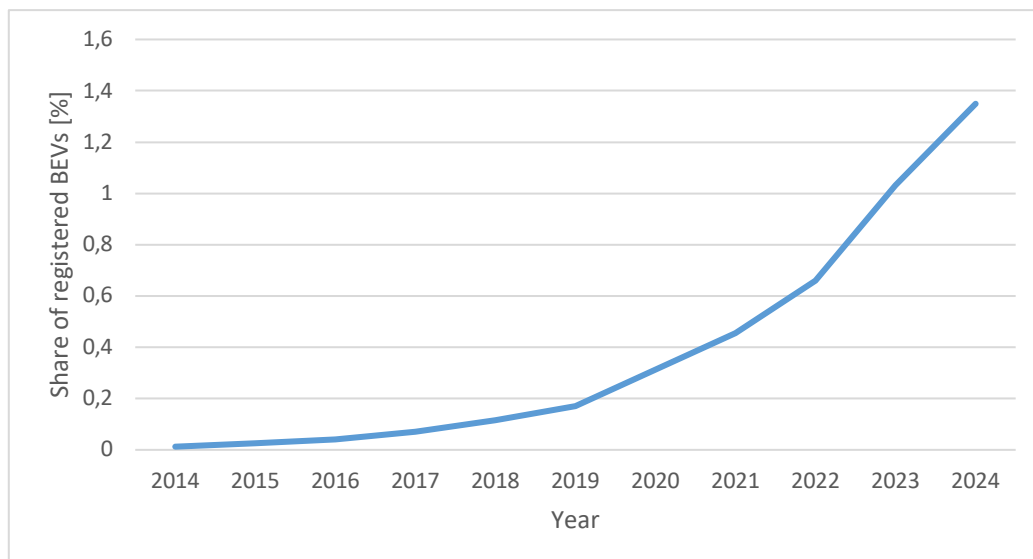
**Keywords:** battery electric vehicles, e-mobility, Slovenia

## **1. INTRODUCTION**

Over the past decade, the transition toward sustainable mobility and the electrification of transport in both the private and business sectors have become increasingly important topics in the EU and Slovenia. One of the key measures introduced by the European Union is the planned restriction on the sale of new vehicles with internal combustion engines, which means that a large proportion of the population will, in the future, have to face the choice of vehicles powered by alternative energy sources (European Parliament, 2022). While some EU member states have already achieved high shares of new electric vehicle sales, others still lag behind due to the slow development of charging infrastructure, lower purchasing power, and the lack of government incentives. Slovenia also embarked on the path toward electromobility several years ago. The aim of this paper is therefore to analyse the market for battery electric vehicles (BEVs) in Slovenia. The paper is structured as follows. Section 2 analyses the BEV market in Slovenia. Section 3 examines purchase incentives for BEVs in Slovenia, while Section 4 presents BEV car sharing in Slovenia. Finally, the main findings are summarized in the conclusion.

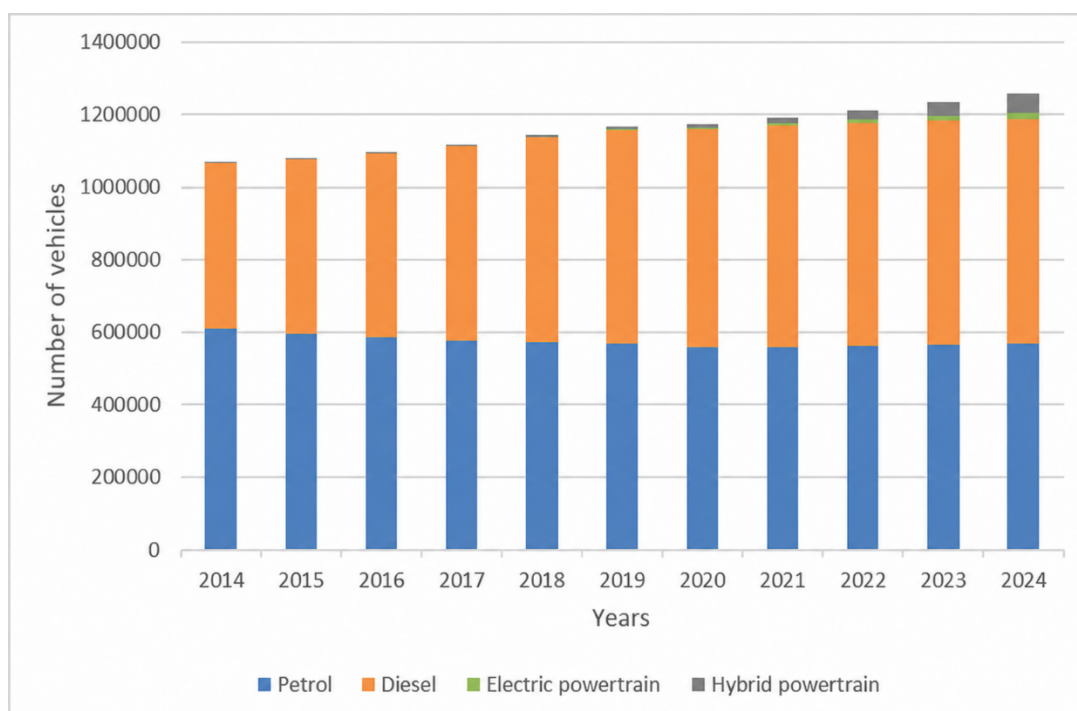
## **2. BATTERY ELECTRIC VEHICLE MARKET IN SLOVENIA**

From 2014 to the end of 2024, the share of BEVs in Slovenia increased from approximately 0.1% to around 1.5% (Figure 1). The BEV market in Slovenia has experienced a more noticeable upward trend since 2019, whereas prior to that it had grown relatively slowly for a long period. According to the Statistical Office of the Republic of Slovenia (2025), it was only in 2023 that one out of every one hundred vehicles on Slovenian roads was battery electric.



*Figure 1: Share of registered BEVs among all vehicles  
(Source: Author's own work)*

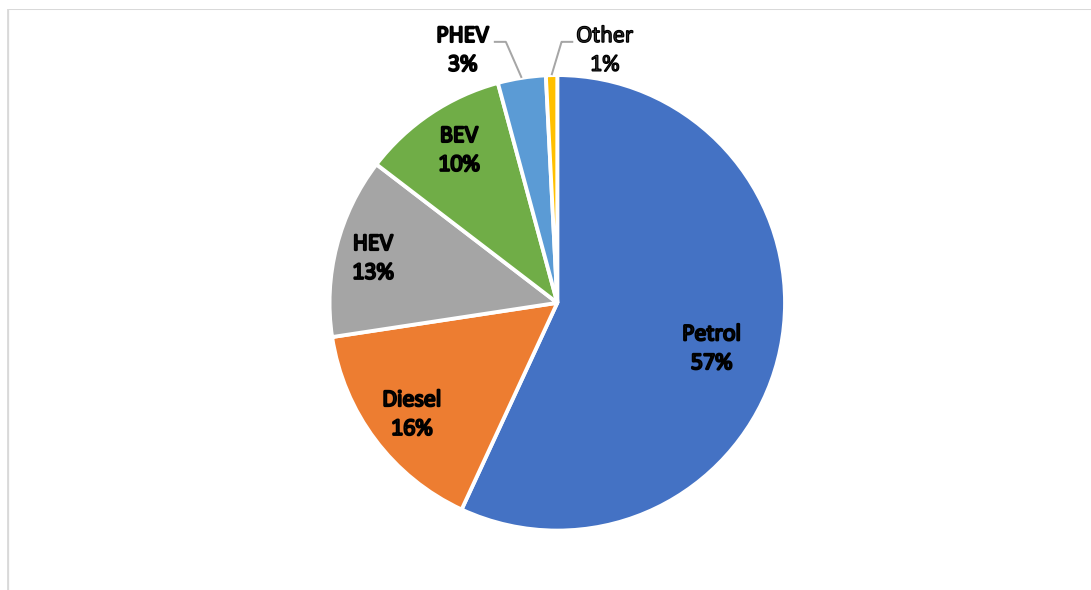
The total number of registered passenger cars in Slovenia increased from 1.05 million in 2014 to 1.25 million in 2024 (Figure 2). In 2014, approximately 610,000 petrol-powered vehicles were registered on Slovenian roads. Their number subsequently declined to around 550,000 by 2021, before rising again to approximately 570,000 in 2024.



*Figure 2: Total number of registered vehicles on Slovenian roads  
(Source: Author's own work)*

The number of diesel-powered vehicles amounted to 457,341 in 2014 and continued to grow, reaching 620,822 in 2023, before decreasing by approximately 4,000 vehicles in 2024. By contrast, the number of battery electric vehicles (BEVs) increased steadily throughout the observed period, rising from only 133 vehicles in 2014 to 16,969 in 2024. Consequently, the number of registered BEVs increased by more than 130-fold over the ten-year period.

A significant increase was also recorded in the number of hybrid vehicles, which reached approximately 54,000 vehicles on Slovenian roads by 2024. From January to October 2025, petrol-powered vehicles accounted for the largest share of newly registered vehicles in Slovenia, representing 57% of all new registrations. They were followed by diesel-powered vehicles with a 16% share, while mild hybrid vehicles accounted for 13% of new registrations. BEVs represented approximately every tenth newly registered vehicle in Slovenia during this period. Plug-in hybrid vehicles recorded the lowest sales share at 3%, whereas the category “other”, which includes vehicles powered by gas and hydrogen, accounted for 1% of all new vehicle registrations (Figure 3).

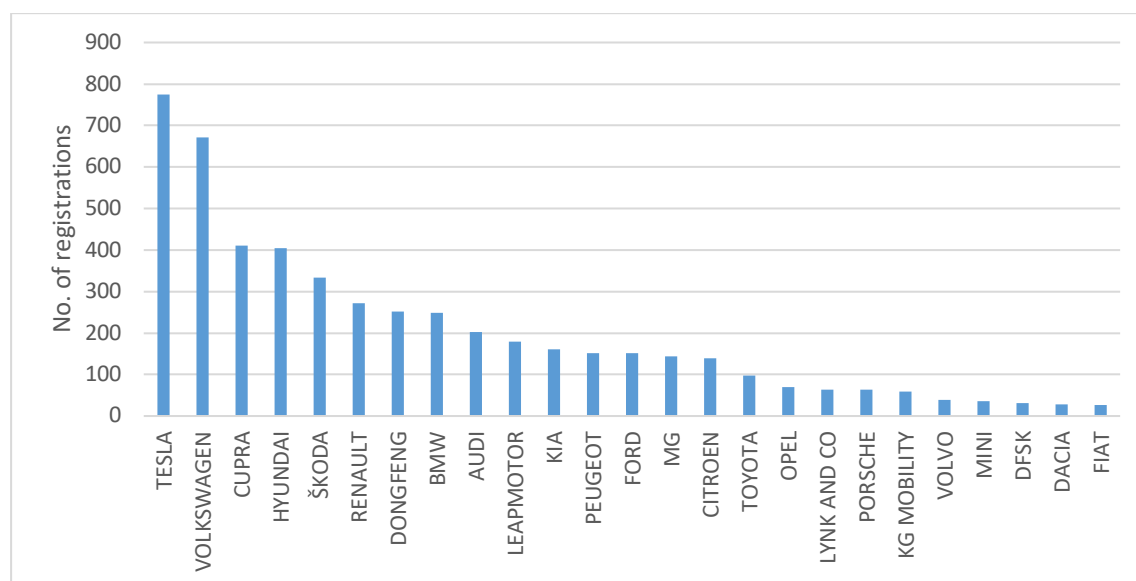


*Figure 3: Newly registered BEV registrations in Slovenia by drivetrain for the first three quarters of 2025*

*(Source: Author's own work based on ACEA (2025))*

The market share of petrol-powered vehicles declined by 0.2 percentage points compared to 2024 and by almost 3 percentage points compared to 2023. Sales of diesel-powered vehicles also continued to decline, with their market share decreasing by 0.4 percentage points compared to 2024 and by 2.4 percentage points compared to 2023. By contrast, mild hybrid vehicles increased their market share by 0.2 percentage points compared to 2024 and by 2.8 percentage points compared to 2023. The share of BEVs also continued to grow, increasing by 0.4 percentage points between 2024 and October 2025, and by 1.5 percentage points compared to 2023. Plug-in hybrid vehicles experienced a slight decline of 0.1 percentage points compared to 2024, although their market share was still 1.3 percentage points higher than in 2023 (ACEA, 2025). The BEV fleet in Slovenia is relatively diverse. Between January and October 2025, the Tesla Model Y ranked first in terms of new passenger BEV registrations, with approximately 500 newly registered vehicles. It was followed by the Volkswagen ID.4 with around 300 new registrations, while the Tesla Model 3 ranked third with approximately 280 registrations (Figure 4). Among other popular BEV models purchased by Slovenian consumers are the Cupra Born, Dongfeng Box, Škoda Elroq, Volkswagen ID.7, Hyundai Kona, Renault 5, and Cupra Tavascan. In terms of manufacturers, Tesla held the leading position in 2025, followed by Volkswagen, Cupra, Hyundai, Škoda, Renault, Dongfeng, Audi, Leapmotor, Kia, and Peugeot.

Less popular BEV brands on the Slovenian market include Ford, MG, Citroën, Toyota, Opel, Lynk & Co, Porsche, KG, Volvo, Mini, and several others (Slovenian Chamber of Commerce, 2025).



*Figure 4: New BEV registrations in Slovenia by brand for the year 2025  
(Source: Author's own work based on the Slovenian Chamber of Commerce (2025))*

### 3. PURCHASE INCENTIVES FOR BEVS IN SLOVENIA

BEV buyers in Slovenia can apply for subsidies when purchasing either new or used vehicles. Non-refundable financial incentives for private individuals have been available since 2011, when the Slovenian Environmental Public Fund (Eco Fund) published its first public call for applications. The scheme provided subsidies of EUR 5,000 for passenger vehicles, with the condition that the subsidy could not exceed 50% of the vehicle's value, while the maximum eligible vehicle price was limited to EUR 50,000 including VAT. A total budget of EUR 200,000 was allocated under this call, and the available funds were fully utilised by 2014.

In 2015, the subsidy programme continued with the Eco Fund publishing two new public calls that introduced subsidies for BEVs for both private individuals and legal entities. The subsidy amount remained unchanged at EUR 5,000, while the total available budget increased to EUR 500,000, representing a substantial increase compared to the previous scheme.

A new public call was announced in November 2016, increasing the non-refundable financial incentive for the purchase of an electric vehicle to EUR 7,500. The initial budget of the programme amounted to EUR 700,000, but it was later expanded to EUR 1.7 million due to increased demand for electric vehicles and growing interest in electromobility.

In March 2020, the subsidy amount was reduced to EUR 6,500, and in December of the same year it was further lowered to EUR 4,500 (Figure 5).

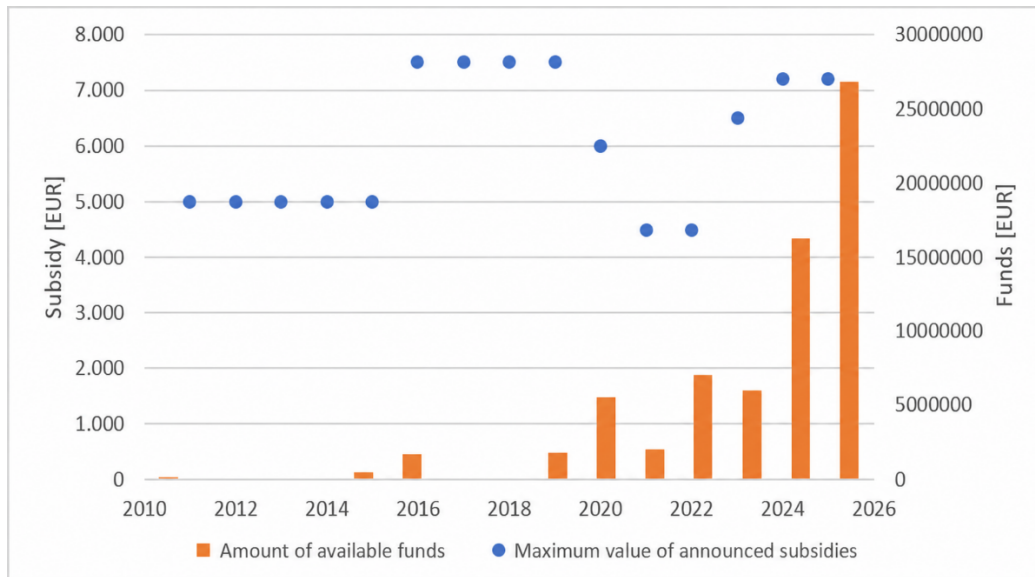


Figure 5: Maximum value of available BEV subsidies and the amount of allocated funds by year  
(Source: Source: Author's own work based on Borzen (2025))

In 2025, Borzen announced new subsidy schemes for both private individuals and legal entities covering different categories of vehicles. For private individuals, the subsidies available for category M1 vehicles, i.e. passenger vehicles with no more than eight seats in addition to the driver's seat, are as follows (Borzen, 2025):

- EUR 7,200 for the purchase of a new zero-emission electric vehicle in category M1 with a total purchase price of up to EUR 35,000 including VAT,
- EUR 6,500 for the purchase of a new zero-emission electric vehicle in category M1 with a total purchase price between EUR 35,000 and EUR 45,000 including VAT,
- EUR 4,500 for the purchase of a new zero-emission electric vehicle in category M1 with a total purchase price between EUR 45,000 and EUR 65,000 including VAT,
- EUR 3,000 for the purchase of a used zero-emission electric vehicle in category M1 or N1 with a total purchase price of up to EUR 45,000 including VAT, provided that the vehicle is not older than 36 months,
- EUR 2,000 for the purchase of a used zero-emission electric vehicle in category M1 or N1 with a total purchase price between EUR 45,000 and EUR 65,000 including VAT, provided that the vehicle is not older than 36 months.

Various incentives related to the purchase of BEVs are also available to companies, legal entities, and self-employed individuals. Businesses may apply for subsidies for both new and used vehicles, with subsidy amounts ranging from EUR 7,200 to EUR 2,000 under the same conditions as those applicable to private individuals (Borzen, 2025). In addition, companies and VAT-registered entities may deduct 22% value-added tax (VAT) when purchasing a BEV, provided that specific conditions are met. Employees who use company-owned BEVs for private purposes are exempt from paying the fringe benefit tax, whereas such taxation still applies to vehicles powered by other types of propulsion.

### **3.1 Purchase incentives for electric vehicle chargers**

In addition to subsidies for the purchase of new and used vehicles, Borzen also provides subsidies for the purchase of electric vehicle charging stations. Subsidies for private individuals purchasing charging stations for BEVs have been available since 2025, with the following levels of support (Borzen, 2025):

- 60% of eligible costs for the purchase of a charging station, up to a maximum of EUR 700,
- 50% of eligible installation costs for a charging station, up to a maximum of EUR 300.

In 2025, several providers of both slow and fast charging services operated on the market. The most prominent providers of slower alternating current (AC) charging are Gremo na elektriko and Petrol, which also operate the majority of such charging stations. These charging stations are most commonly located along streets near city centres, in parking areas of shopping centres and sports facilities, near business buildings, cultural institutions, and other public spaces where vehicles are expected to remain parked for longer periods. An average mid-sized vehicle can typically gain approximately 75 km of driving range during one hour of charging at these stations (PlugShare, 2025). One of the major advantages of AC charging stations is the relatively affordable charging price, which starts at around EUR 0.20 per kWh. In certain locations, such as the Municipality of Ljubljana, parking is free for up to three hours while the vehicle is charging. Among the most popular providers of fast charging infrastructure are Tesla, Ionity, and Petrol. Fast direct current (DC) charging stations are primarily located along motorways and major transport routes (PlugShare, 2025).

## **4. BEV CAR SHARING IN SLOVENIA**

The concept of car sharing has become increasingly popular, whereby multiple users share a vehicle according to their current mobility needs instead of individually owning a private vehicle. These vehicles are most commonly intended for short-term use, while users can access and rent them through mobile applications. All vehicles currently used within car-sharing fleets are BEVs. In 2025, the most popular companies offering such services are Avant2Go, Share'ngo, and GreenGo. The Avant2Go project was launched in 2016, when the company Avant Car became the first provider to offer short-term rental of electric vehicles. At that time, both the concept of car sharing and electric mobility were still in the early stages of development. By 2025, the network of locations had expanded significantly across Slovenia and neighbouring regions.

In addition to Ljubljana, the company operates in Kranj, Jože Pučnik Airport, Maribor, Murska Sobota, Novo mesto, Logatec, Dobrova, Polhov Gradec, and at Zagreb Airport (Avant2Go, 2025). The second most popular provider of car-sharing services is Share'ngo. In 2025, the company operates in Ljubljana and its surrounding areas, including Trzin and Dol pri Ljubljani. Similar to Avant2Go, Share'ngo exclusively uses BEVs within its fleet (Share'ngo, 2025). Car-sharing services are also offered by GreenGo, although the company is currently the least active among the three providers. GreenGo previously operated in Ljubljana, Škofja Loka, Trzin, Kranj, and Logatec, but in 2025 it remains active only in Velenje (GreenGo, 2025). One of the more distinctive forms of BEV sharing is the socially beneficial project Prostofer, whose purpose is to provide free transport services for elderly people who do not have access to their own transportation. The entire project is based on a network of volunteers who use vehicles, most commonly municipally owned BEVs, to transport elderly residents to various appointments and daily activities (Prostofer, 2025).

#### 4. CONCLUSION

This paper analysed the market for BEVs in Slovenia. The results of the analysis indicate that the share of electrified vehicles is increasing. The majority of newly sold vehicles are still powered by petrol engines, followed by diesel, hybrid, battery electric, and plug-in hybrid vehicles. The sale of BEVs is supported by various non-refundable financial incentives for the purchase of vehicles and electric charging stations for both private individuals and legal entities. The concept of electric vehicle sharing is also becoming increasingly popular.

**ACKNOWLEDGEMENT:** *This research was supported by the Slovenian Research and Innovation Agency (Research Programme P5-0117)*

#### LITERATURE:

1. ACEA (2025). New car registrations. *European Automobile Manufacturers' Association*. <https://www.acea.auto/pc-registrations/new-car-registrations-1-4-in-october-2025-year-to-date-battery-electric-16-4-market-share/>
2. AvantGo (2025). About Avant2Go car sharing. <https://avant2go.si/en/about>
3. Borzen (2025). Podpore za mobilnost. *Borzen*. <https://borzen.si/sl-si/podpore-za-mobilnost>
4. European Parliament (2022). *EU ban on the sale of new petrol and diesel cars from 2035 explained*. <https://www.europarl.europa.eu/topics/en/article/20221019STO44572/eu-ban-on-sale-of-new-petrol-and-diesel-cars-from-2035-explained>.
5. GreenGo (2025). Zelena prihodnost mobilnosti. <https://greengo.city/>
6. PlugShare (2025). EV Charging Station Map. <https://www.plugshare.com/>
7. Prostofer (2025). Brezplačni prevozi za starejše. <https://prostofer.si/>
8. Share'ngo (2025). Odkrijte Share'ngo. <https://site.sharengo.si/>
9. Slovenian Chamber of Commerce (2025). Sekcija za osebna motorna vozila. Statistika. Trgovinska zbornica Slovenije <https://www.ads-slo.org/prva>
10. Statistical Office of the Republic of Slovenia (2025). Transport. <https://www.stat.si/StatWeb/en/Field/Index/22/36>

# LEGAL REGULATION OF DIGITAL CONTENT AND DIGITAL SERVICES SUPPLY CONTRACTS IN THE CROATIAN DIGITAL MARKET: CHALLENGES OF PRACTICAL APPLICATION\*

**Maja Proso**

*Faculty of Law, University of Split, Croatia  
maja.proso@gmail.com*

**Mateja Beus**

*Faculty of Law, University of Split, Croatia  
mbeus@student.pravst.hr*

## **ABSTRACT**

*This paper examines the modernization of Croatian contract law through the implementation of Directive (EU) 2019/770 into national legal system via the Act on certain aspects of contracts for the supply of digital content and digital services with a specific emphasis on the practical challenges arising from its application. This legislation harmonized national civil law with the EU acquis and brought the Croatian legal framework into the digital age. The research focuses on the challenges of practical implementation of provisions on dual criteria for assessing conformity of digital content with the contract, as well as the trader's obligation to provide updates. Furthermore, the authors identify and analyze specific practical challenges associated with the legal regulation of the concept of users' reasonable expectations for the duration of support for rapidly evolving digital content and services. The paper also examines the specificities of the burden of proof concerning the lack of conformity under the new regulation. The authors argue that the Croatian legal framework provides a high level of consumer protection. However, they note that the vague and abstract legal terminology regarding conformity criteria could pose a significant challenge for practical implementation and judicial practice, as these criteria are essential for the practical exercise of rights and fulfillment of obligations arising from contracts for the supply of digital content and services. This vagueness allows for different interpretations in practice, which leads to legal uncertainty and a fragmented application of the law across different cases. To mitigate legal uncertainty, the authors propose the development of sector-specific guidelines to bridge the gap between static legal norms and the dynamic digital market.*

**Keywords:** *conformity of digital content, consumer protection, contracts for the supply of digital content and digital services, digital market*

## **1. INTRODUCTION**

The demand for digital content and services is constantly rising due to the omnipresence of technology in everyday life. In 2015 Digital Single Market Strategy for Europe<sup>1</sup> the European Union defined the Digital Single Market as a system that guarantees free business operations online. In such an environment, users and businesses can trade securely and seamlessly while accessing services under equal conditions and high data protection standards, without discrimination based on location. In the said Strategy it was underscored that outdated laws at both the EU and national levels have struggled to match digital growth, highlighting a critical

---

\* This paper is based on the diploma paper titled “Lack of conformity of digital content or digital services with the contract” by Mateja Beus, mag. iur., written under the mentorship of Maja Proso, PhD, Full Professor.

<sup>1</sup> European Commission, A Digital Single Market Strategy for Europe, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Brussels, 6.5.2015, COM(2015) 192 final.

need to align 'online' and 'offline' legal protections immediately. In an effort to standardize the contractual dealings between businesses and consumers in the digital sphere, the EU enacted Directive 2019/770.<sup>2</sup> This legislation specifically addresses the legal requirements for providing digital content and services to the public and aims to modernize and harmonize the EU legal framework to better reflect the digital economy across the Union and its Member States (Franceschi, Schulze, 2023, p. 4). Directive (EU) 2019/770 establishes a standardized legal framework for digital supply ensuring that consumer protections remain robust even as technology evolves and new digital business models emerge (Morais Carvalho, Farinha, 2020, pp. 259-260). Incorporation of Directive (EU) 2019/770 into Croatian national legal system was done by the Act on Certain Aspects of Sales Contracts for Goods and Contracts for the Supply of Digital Content and Digital Services.<sup>3</sup> The method of full harmonization compliance with the Directive (EU) 2019/770 was applied, which means the national legislator restricted its intervention to the areas explicitly governed by the Directive. Consequently, the Croatian legislator restricted the scope of the DCGA to the specific regulatory aspects defined by the Directive (EU) 2019/770. By avoiding any expansion of contract law beyond the Directive's explicit mandates, Croatia ensured that its domestic regime for digital content and services mirrors the EU standard.<sup>4</sup> Under Article 3(1)(a) of the DCGA, the term 'digital content' is defined as any data generated and provided in a digital format. This definition mirrors the notion of the digital content in the Directive (EU) 2019/770. The definition provided in Article 3(1)(b) of the DCGA establishes dual criteria for identifying a "digital service". Reason for this is the Directive (EU) 2019/770 objective of covering a broad spectrum of digital interactions. The first part of the definition covers services where the primary function is the manipulation or preservation of digital data. The second part extends to collaborative environments, encompassing services that facilitate social interaction, file sharing, or the collective creation of content by multiple users. Under the DCGA, a trader's contractual performance is dual-natured. It requires both the successful supply of the digital product and its strict conformity with contractual specifications. In absence of either element, the trader remains in breach of their fundamental obligations. The adoption of the DCGA, following Directive (EU) 2019/770 redefined the requirements for digital conformity with the contract. While Consumer Sales Directive (hereinafter: Directive 99/44/EC)<sup>5</sup> relied on the legal assumption that goods were in conformity if they met certain predefined criteria, the newer framework moves away from this general presumption toward specific subjective and objective requirements of conformity with the contract. This shift from a purely subjective quality standard to a dual system of subjective and objective conformity requirements represents a major evolution in digital content regulation (Sein, Spindler, 2019, pp. 367-368). In the original proposal for the Directive, the quality of digital content was judged almost entirely by what was specifically written in the contract.

<sup>2</sup> Directive (EU) 2019/770 of the European Parliament and of the Council of 20 May 2019 on certain aspects concerning contracts for the supply of digital content and digital services, 22.5.2019, OJ L 136.

<sup>3</sup> Act on Certain Aspects of Sales Contracts for Goods and Contracts for the Supply of Digital Content and Digital Services, Official Gazette, no. 110/21 (hereinafter: DCGA)

<sup>4</sup> Article 4 of Directive (EU) 2019/770 specifically addresses the level of harmonization; "Member States shall not maintain or introduce in their national law provisions diverging from those laid down in this Directive, including more or less stringent provisions to ensure a different level of consumer protection, unless otherwise provided for in this Directive" and the freedom of Member States to regulate areas outside the Directive's scope. "The text of Recital 16 addresses the freedom of Member States to regulate areas outside the Directive's scope; "This Directive should not apply to aspects of general contract law, such as rules on the formation, validity, nullity or effects of contracts, including the consequences of the termination of a contract in so far as they are not governed by this Directive... Member States should also remain free to extend the application of the rules of this Directive to contracts that are excluded from the scope of this Directive, or to otherwise regulate such contracts."

<sup>5</sup> Directive 1999/44/EC of the European Parliament and of the Council of 25 May 1999 on certain aspects of the sale of consumer goods and associated guarantees, OJ L 171, 7.7.1999.

The structure of the paper is as follows. Following the introductory remarks, the second part analyzes the concept and evolution of the principle of conformity with the contract. This is followed by a section dedicated to the specificities of conformity of digital content and services within the framework of Croatian contract law. Both subjective and objective conformity requirements are analyzed, as well as updates as a conformity requirement. The subsequent section examines the provisions of the DCGA governing the burden of proof regarding the lack of conformity of digital content or services. Finally, the concluding part synthesizes the research conducted and offers the authors' proposals for the further improvement of this legal area.

## **2. THE EVOLUTION OF THE NOTION OF CONFORMITY**

Some authors define conformity as the degree of alignment between what was promised in a contract and what was actually delivered. To determine if a digital content or service is in conformity he suggests evaluating it through four distinct lenses consisting of subjective requirements expected by the consumer under the specific contract, objective requirements typically expected from digital content or services, the correctness of integration, and third-party rights (Morais Carvalho, 2019, p.12). Authors emphasize that conformity is assessed according to a dual criterion: based on what the parties have contractually agreed and what is reasonably expected of a digital product of the same type (Klarić, Vedriš, 2025, pp. 419-420). While the notion of conformity with the contract assumes both parties negotiated the terms, this is rarely the reality for consumers. In practice, the idea of a mutually agreed-upon contract is often an illusion, as traders typically dictate the terms unilaterally (Twigg-Flesner, 2020, p.2). Nevertheless, the absence of legal conformity standards would force consumers and traders to renegotiate quality expectations for every transaction, which would be a waste of time and resources (Twigg-Flesner, 2020, p.3) Furthermore, such negotiations are often impossible because consumers typically lack technical expertise and cannot verify a product's quality until after it has been used (Hadfield, Howse, Trebilcock, 1998, p.131). The evolution of conformity rules in EU consumer law is marked by a shift from a focus on contractual freedom to a more protective framework of the digital landscape. Under the Directive 1999/44/EC a presumption of conformity existed if goods met a unified set of criteria. These requirements were compliance with the description, matching a sample or model, fitness for a specific purpose, fitness for the normal use of similar goods and standard quality and performance typical for a certain type of a product. Although objective standards existed in this period, the emphasis was on the freedom of contract. In practice, assessing conformity included an analysis of the contract terms, the subjective requirements derived from that contract and, lastly, the objective criteria. The introduction of Directive (EU) 2019/770 has changed the interplay between these requirements, as it will be explained further in the text.

## **3. CONFORMITY REQUIREMENTS UNDER DIRECTIVE (EU) 2019/770 AND THE DCGA**

Despite criticism that the introduction of the concept of lack of conformity created a dogmatic rift within the Civil Obligations Act (Nikšić, 2022, pp.45-52), the new framework devide the assessment criteria into two distinct categories. Most Member States did not explicitly include these two requirements in their national contract laws until they were required to incorporate the specific EU Directives into their legal systems (Franceschi, Schulze, 2023, p. 10). The adoption of the DCGA, following Directive (EU) 2019/770 redefined the requirements for digital conformity with the contract.

### **3.1 Subjective requirements for conformity under the DCGA**

Subjective requirements for conformity refer to the characteristics of digital content or digital services arising from the contract itself between the trader and the consumer.

The digital content or service must match the description, quantity, and quality, and possess the functionality, compatibility, interoperability, and other features as stipulated in the contract.<sup>6</sup> They must also be fit for the specific purpose for which the consumer requires them, provided that the consumer informed the trader of this purpose at the latest at the time of the conclusion of the contract, and the trader accepted it.<sup>7</sup> Furthermore, the digital content or digital service must be supplied with all accessories, instructions, including installation instructions, and customer assistance as provided for by the contract, and must be updated as specified in the contractual terms.<sup>8</sup> Regarding these stipulations, we maintain that subjective conformity requirements are inherently malleable and remain strictly governed by the principle of party autonomy. In our view, without precise technical definitions for terms like, for instance the latest version a contract is not clear enough. This lack of detail makes it difficult to predict how the agreement will be enforced or if the content truly meets the requirements. We further argue that this ambiguity complicates the determination of whether the digital content meets the contractually agreed standard. Since these requirements are based on the contract, any deviation of the supplied digital content or service from the agreed characteristics may lead to the trader's liability for lack of conformity (Josipović, 2021, p.3). Beyond this, according to Directive (EU) 2019/770, violations of personal data protection rules can also constitute a reason for the lack of conformity of digital content or digital services. This particularly refers to situations where the trader fails to comply with obligations prescribed by the General Data Protection Regulation<sup>9</sup>, such as the principle of data minimisation or the principle of data protection by design and by default. In such cases, the lack of conformity can be assessed according to subjective or objective criteria, depending on the circumstances of the specific contract. If data protection was part of the trader's contractual obligations, it constitutes a breach of subjective requirements.

### **3.2 Objective requirements requirements for conformity under the DCGA**

Article 9 of the DCGA prescribes the objective requirements used to assess the conformity of digital content or digital services with a contract. The digital content or service must match the quantity, qualities, and performance features that are customary for digital products of the same type and be fit for the purposes for which digital content or services of the same type are normally used.<sup>10</sup> When assessing conformity, public statements made by the trader or other participants in the distribution chain particularly those made in advertising or on labelling, are taken into account, as they can influence the reasonable expectations of the consumer.<sup>11</sup> Furthermore, the digital content or digital service must be supplied with all accessories and instructions that the consumer may reasonably expect to receive, and must comply with any trial versions or previews made available by the trader prior to the conclusion of the contract.<sup>12</sup> In this regard, the standard of reasonable expectation, or reasonableness, must be objectively determined by taking into account the nature and purpose of the digital content or digital service, the circumstances of the case, and the usages and practices of the contracting parties involved, just as it is necessary to objectively determine what constitutes a 'reasonable period for bringing the digital content or digital service into conformity, taking into account the nature

---

<sup>6</sup> DCGA, Article 8(a).

<sup>7</sup> DCGA, Article 8(b).

<sup>8</sup> DCGA, Article 8 and (d).

<sup>9</sup> Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) OJ L 119, 4.5.2016.

<sup>10</sup> DCGA Article 9(1) a.

<sup>11</sup> DCGA Article. 9(1). b.

<sup>12</sup> DCGA Article 9(1). c, d.

of the non-conformity.<sup>13</sup> The Act also provides for specific situations in which a lack of conformity may arise, such as the incorrect integration of the digital content or digital service into the consumer's digital environment. The trader is liable if the integration was performed by the trader or a person under the trader's responsibility, but also if the integration was performed by the consumer and the incorrect installation was due to shortcomings in the instructions provided by the trader (i.e., if they were unclear, incomplete, or erroneous). The provision of the Article 16(2) of the DCGA introduces a significant degree of legal insecurity. Its practical application may, in our opinion, result in deterring consumers from seeking legal remedies. The technical complexity of the digital content could easily prevent an average consumer to distinguish a minor glitch from a fundamental lack of conformity. Some authors also argue that drawing a clear line between, for example, a simple software bug and a legally actionable non-conformity is exceptionally difficult (Sein, Spindler, 2019, pp. 270-273.) This inherent ambiguity creates a state of legal uncertainty which, we contend, ultimately serves to destimulate consumers from exercising their right to terminate the contract.

### **3.3 Updates as a conformity requirement under the DCGA**

Croatian legal doctrine correctly emphasizes that the functionality of a digital product is inextricably linked to security and functional updates (Baretić, 2021, pp. 127-129). Under DCGA updating is considered an objective requirement, in most cases. This means that the obligation exists regardless of whether it is explicitly stated in the contract, as it is considered a standard that a consumer can reasonably expect. The DCGA distinguishes the role of updates for digital content or services as both subjective and objective conformity criteria. Thus, pursuant to the provision of Article 9, the trader is obliged to inform the consumer of available updates (including security updates) and to supply the updates necessary to ensure that the digital content or service remains in conformity. The timeframes for the update obligation as an objective element depend on whether the supply is a single act of supply or a continuous supply. In the case of continuous supply, the trader must provide updates throughout the entire duration of the contract. In the case of a single act of supply, the trader must provide updates for a period that the consumer may reasonably expect, given the type and purpose of the digital content. In legal literature, analyzing Directive 2019/770 and its implementation, authors most frequently debate the exact duration of the period within which a user can reasonably expect updates from a trader. Some authors point out that for operating systems (such as Windows or macOS), reasonable expectation lasts as long as hardware support is provided, which is often 5 to 10 years. On the other hand, for simple applications, this period may be significantly shorter. The key criterion is the economic lifespan of the product (Wendehorst, 2019, pp. 110-111). Others, however, believe that in a single act of supply, "reasonable expectation" should be closely linked to marketing promises and price (Sein, 2019, p. 1079). Updates become a subjective conformity requirement when they are directly agreed upon.

## **4. BURDEN OF PROOF REGARDING THE LACK OF CONFORMITY OF DIGITAL CONTENT OR SERVICES UNDER THE DCGA**

The issue of the burden of proof regarding the lack of conformity of digital content or service represents a central point of consumer protection, as codified in the DCGA. The whole legal framework on certain aspects of digital content and services contracts is designed to address the asymmetry of informational power between the consumer and the trader regarding the burden of proof (Schulze, Staudenmayer, 2020, pp 238-240). The presumption of lack of conformity shifts the procedural dynamics in the case of a dispute between the trader and the consumer. Article 13(1) DCGA mandates that the trader bears the burden of proof regarding whether the

---

<sup>13</sup> Directive (EU) 2019/770, Recital 46.

digital content or service was delivered to the consumer in accordance with the law. The provision of Article 13(2) DCGA stipulates that for contracts involving a single act of supply or a series of individual acts (as defined in Article 12(2)), the trader is responsible for proving conformity for any defect that becomes apparent within one year from the time of supply. This creates legal presumption that such defects existed at the moment of delivery. However, we identify a practical challenge here, regarding technical complexity inherently connected with the very nature of digital content. Namely, proving or disproving the incompatibility of a digital environment of the consumer in question often presents a complex evidentiary challenge. It is easy to envision a scenario in which trader attempt to evade liability by attributing malfunctions to the user's unstable internet connection, a factor that is difficult for a consumer to technically isolate or refute. Loos emphasizes that the trader may only request those informations that are necessary to determine whether the cause of the lack of conformity lies in the consumer's digital environment. He states that if the consumer refuses to provide reasonable technical information about their digital environment (e.g., operating system version), the burden of proof regarding the lack of conformity is automatically shifted back to the consumer (Loos, 2021, pp. 98-101). For contracts involving continuous supply, Article 13(3), in reference to Article 12(5), extends the trader's burden of proof to cover the entire duration of the contract. While this framework protects subscription services, software updates, in our view, present a challenge because they often blur the line between a product's inherent defect and the user's maintenance responsibilities. Although the DCGA obligates the trader to provide necessary updates, a conflict, in our opinion, could potentially arise in situations when there is a need to prove whether a failure occurred because the consumer neglected to install a mandatory update. Since such a failure can exempt the trader from liability, the burden often shifts to a complex dispute over the causal link between the lack of an update and the specific technical defect. The DCGA provides a safety valve for traders in Article 13(4), where the burden shifts if the trader proves the consumer's digital environment is incompatible with clearly stated technical requirements. This leads to a critical tension regarding Article 13(5) DCGA which requires the consumer to cooperate with the trader to determine the cause of the non conformity. Although Article 13(6) DCGA limits this cooperation to technically available means that are least intrusive,<sup>14</sup> we find again an issue concerning data privacy. Namely, to meet their burden of proof, traders often request diagnostic access or system forensics, which could possibly trigger some GDPR concerns and a fear of privacy infringement among consumers. This apprehension often discourages users from cooperating, which, under Article 13(7) ultimately results in the burden of proof shifting back to the consumer if the trader had informed the consumer of the technical requirements for the digital content or digital service before the conclusion of the contract. As legal doctrine caution against the risks of overly abstract terms in digital regulations (Sein, Mežnar, 2021, pp.10-12, Loos, 2019, pp. 658-660, Mišćenić, 2021, p. 156), it appears that the terminology employed in the regulation of the burden of proof concerning the lack of conformity of digital content is imprecise and lack detailed explanation. This vagueness allows for different interpretations in practice, which leads to legal uncertainty and a fragmented application of the law across different cases.

## 5. CONCLUSION

The implementation of Directive (EU) 2019/770 through the DCGA represent a shift in croatian contract law and consumer protection. It moved away the national contract law from outdated legal assumptions toward a modern framework for digital content conformity.

---

<sup>14</sup> Recital 60 of Directive 2019/770 clarifies the situation by stating that only in exceptional and properly justified circumstances where, despite the best use of all other means, it is not possible by any other way, consumers may be required to grant virtual access to their digital environment.

The new framework ensures that digital content and services are judged by the consumer's reasonable expectations of functionality and security. However, the conducted analysis proved the existence of several critical areas in the existing legal framework that represent the points where legal theory risks failing in practical application. While the DCGA in line with Directive (EU) 2019/770 employs precise yet static legal terminology, its inadequacy for the dynamic digital market remains a significant practical challenge. In line with prevailing doctrinal views, such provisions are often deemed too abstract and formalistic to account for technological complexity and the psychological vulnerability of the digital consumer (Luzak, 2020, p.156). Consequently, we strongly propose the development of specific guidelines as a necessary instrument for eliminating legal uncertainty and bridging the gap between static legal norms and the dynamic digital market.

## LITERATURE:

### Books and articles

1. Baretić, M., Nikšić, S., Gledec, I. (2022) *Odgovornost za neusklađenost robe i digitalnog sadržaja s ugovorom*, Zagreb, Narodne novine
2. Baretić, M. (2021) *Ugovori o isporuci digitalnog sadržaja i digitalnih usluga*, Aktualnosti hrvatskog zakonodavstva i pravne prakse: Godišnjak 28, Organizator, pp. 109-148.
3. De Franceschi, A., Schulze, R. (2023) *Harmonizing Digital Contract Law – The Impact of the EU Directives 2019/770 and 2019/771*, CH Beck, Hart, Nomos, Munich
4. Hadfield, K. G., Howse, R., Trebilcock, J. M. (1998) *Information-Based Principles for Rethinking Consumer Protection Policy*, Journal of Consumer Policy 21(2) pp. 131-169.
5. Josipović, M. (2021) *Uređenje ugovora o isporuci digitalnog sadržaja i digitalnih usluga*, Informator, br. 6712–6713, pp. 1-4.
6. Klarić, P., Vedriš, M. (2025) *Građansko pravo*, Zagreb, Narodne novine
7. Loos, B.M. (2021) *The Modernization of European Consumer Law*, Intersentia
8. Loos, B.M. (2021) *The Data-Content-Services-Directive (2019/770): A New Hope or the Empire Strikes Back?*, European Review of Private Law, pp. 471–504.
9. Luzak, J. (2020) *Digital Era, Same Old Problems: A Comparison of the Protection of Consumers' Economic Interests under the CPC Regulation and the UCPD*, Journal of European Consumer and Market Law pp. 149 – 159.
10. Mišćenić, E., Ileković L. (2024) *Novo uređenje isporuke digitalnog sadržaja i digitalnih usluga u hrvatskom potrošačkom pravu*, Harmonius Journal of Legal and Social Studies in South East Europe, pp. 193 – 235.
11. Mišćenić, E. (2021) *The New Directive on Content and Services: A New Era of EU Consumer Law?*, in Mišćenić, E., Raccach, A. (eds.), *EU Law in the Post-Pandemic Era: Challenges and Responses* (pp. 145–168) Springer
12. Morais Carvalho, J. (2019) *Sale of Goods and Supply of Digital Content and Digital Services – Overview of Directives 2019/770 and 2019/771*, Journal of European Consumer and Market Law (EuCML), 5(194) pp. 194–201.
13. Morais Carvalho, J., Farinha M. (2020) *Goods with Digital Elements, Digital Content and Digital Services in Directives 2019/770 and 2019/771*, Revista de Direito e Tecnologia, 2 pp. 257–270.
14. Schulze, R., Staudenmayer, D. (2020) *EU Digital Law: Article-by-Article Commentary* C.H. Beck / Nomos / Hart
15. Sein, K., Spindler, G. (2019) *The new Directive on Contracts for Supply of Digital Content and Digital Services – Conformity Criteria, Remedies and Modifications – Part 2*, 15 European Review of Contract Law, pp. 365–391.

16. Sein, K. (2019) *Conformity of Digital Content and Services under the New Directive (EU) 2019/770*, European Review of Private Law, pp. 1065–1088.
17. Sein, K., Mežnar, S. (2020) *Conformity of Digital Content and Services: Under the New Directive 2019/770*, Iuridica International, pp. 20–31.
18. Twigg-Flesner, C. (2020) *Conformity of goods and digital content/digital services*, in Amayuelas, A. E., Lapuente, C. S., (eds.) *El Derecho privado en el nuevo paradigma digital*, Madrid, MarcialPons
19. Wendehorst, C. (2019) *Article 8: Objective requirements for conformity*, in Staudenmayer, D., Wendehorst, C. (eds.), *The Directives on Digital Content and Sale of Goods*, (pp. 100-118) Nomos/Hart/Beck

#### **Sources of law**

1. Act on Certain Aspects of Sales Contracts for Goods and Contracts for the Supply of Digital Content and Digital Services, Official Gazette, no. 110/21.
2. Directive (EU) 2019/770 of the European Parliament and of the Council of 20 May 2019 on certain aspects concerning contracts for the supply of digital content and digital services, 22.5.2019, OJ L 136.
3. Directive 1999/44/EC of the European Parliament and of the Council of 25 May 1999 on certain aspects of the sale of consumer goods and associated guarantees, OJ L 171, 7.7.1999.
4. European Commission, A Digital Single Market Strategy for Europe, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Brussels, 6.5.2015, COM(2015) 192 final.
5. Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) OJ L 119, 4.5.2016.

# THE IMPORTANCE OF IMPLEMENTING DIGITAL TRANSFORMATION IN SPORTS MANAGEMENT

**Deni Borožan**

*University of Applied Sciences Aspira  
Domovinskog rata 65, 21000 Split, Croatia  
deni.borozan@aspira.hr*

**Liv Sumak**

*University of Applied Sciences Aspira  
Domovinskog rata 65, 21000 Split, Croatia  
liv.sumak@aspira.hr*

## ABSTRACT

Digital transformation has a strong impact on the management of sports organizations through the efficiency and professionalization of sports management. Digital tools, automation of processes and procedures, communication tools, data analytics, digital marketing certainly contribute to improving the work of sports organizations. Digital transformation with all its content and inputs directs management decisions based on data - data driven decisions, which as a result also optimizes revenue. Rapid "update" driven by information and digital application enables rapid adaptation to the market, and the use of modern technologies enables sports organizations to function better, placing them in a modern market focus accessible to interested clients, athletes and fans. In addition to the technical approach, adapting to digital transformation requires organizational adaptation and change. It is precisely the holistic approach that shows how significant the impact of digital transformation is on the management of sports organizations and administration in sports. Despite the numerous challenges in implementing digital digitization (resistance to change, high initial investment costs, GDPR data security, lack of digital skills), the long-term benefit lies in the transparency, efficiency and success of sports management.

**Keywords:** *data-driven decisions, digital transformation, efficiency, management of sports organizations, professionalization*

## 1. INTRODUCTION

Sport is one of the fastest growing industries in the world, further strengthened by its complementarity with other industries, with an estimated global value of over hundreds of billions of euros, which is actually a consequence and result of technological progress and digitalization. As a result, sport has outgrown the character of entertainment content and has turned into a complex and respectable business ecosystem. Digitalization allows sport to do business more easily and achieve goals if it is sufficiently prepared and educated to manage large amounts of data via digital platforms and tools. Sports management is faced with a new way of managing towards goals, where it must use new technological directions in order to maintain competitiveness, efficiency and relevance in a very changing market and global environment. Therefore, only those sports organizations that adapt their management to modernization and successfully implement new digital processes and technologies can expect to improve their sports and business efficiency, which will strengthen their market position and focus on long-term revenue, profit and existential success.

## **2. DEFINITION AND FUNDAMENTAL CONCEPTS OF DIGITAL TRANSFORMATION**

Digital transformation is the integration of digital technologies into the operations of companies and public services, as well as the impact of technologies on society. Technologies help optimize production, reduce emissions and waste, increase a company's competitive advantage and create new products and services.

(<https://www.europarl.europa.eu/topics/hr/article/20210414STO02010/oblikovanje-digitalne-transformacije-objasnjenje-strategije-eu-a>).

Digital transformation is not the same as informatization because it involves not only the application of new technologies but also deeper strategic, organizational and cultural changes that enable organizations to be more agile, efficient and innovative in the digital age (Westerman, Bonnet and McAfee, 2014). The fundamental concepts of digital transformation can be divided into several key dimensions: technology, strategy, culture, user experience and organizational structure. The first and most visible dimension of digital transformation is technology. The introduction of digital tools changes the way an organization works, but technology alone is not enough. Successful digital transformation requires strategic thinking and clearly defined goals. Digital transformation is both a technical and business challenge and is based on changing the way an organization creates and delivers value. Thus, technology acts as a driver, but the real change occurs in the way of thinking and leadership (Kane et al., 2015). The strategy of digital transformation implies focus on the user and market requirements, with the simultaneous ability to innovate. Organizations that introduce digital transformation often abandon traditional hierarchical decision-making models and move to more agile, decentralized approaches that enable them to react more quickly to user needs and changes in the environment. An organization's digital strategy should be aligned with the overall business strategy and include a clear vision, goals and performance indicators (KPIs) (Fitzgerald et al., 2013). In addition to the above, the culture of the organization is another important factor in digital transformation. Successful digitally transformed organizations foster a culture of openness to change, fostering innovation, taking risks, and learning from mistakes. Transformation also involves changing the role of employees from task performers to creative collaborators who contribute to the development of solutions. Leaders in digitally transformed organizations must have the ability to lead through uncertainty, inspire employees, and develop digital skills within the team (Westerman et al., 2014). In addition, user experience is one of the important areas of digital transformation. Digital technology allows organizations to personalize services, improve communication with users, and respond to their needs in real time. Artificial intelligence and data analytics enable predictive modelling of user behaviour, so that products and services are created that meet real market expectations. In this way, digital transformation becomes a tool for building long-term relationships with customers and creating competitive advantage (Verhoef et al., 2021). It should be emphasized that the structure of the organization also undergoes significant changes in the process of digital transformation. Traditional vertical structures are being replaced by more horizontal, project-oriented work models that encourage collaboration, faster information exchange, and a multidisciplinary approach to problem solving. The role of the IT department today is no longer limited to technical support, but rather this department becomes a strategic partner in business development. Digital transformation thus requires the integration of technology at the centre of the business model and decision-making (Matt, Hess et al., 2016).

### **3. DIGITAL MANAGEMENT IN SPORTS AND ITS EFFECTIVENESS**

In observing the effectiveness of management in sports through digitization, it is necessary to compare traditional with digital management. A digitally transformed approach to decision-making uses real-time data analysis, communicating agilely and interactively using mobile applications, social networks. The traditional management approach is based on intuition and experience, and communication is much slower. Databases in modern management are digitally stored in centralized systems such as the Cloud, unlike traditional management that keeps data in paper documents or files and Excel tables. Modern management of sports and athletes, their data, health record, is done through digital platforms, tools and applications, by clicking, storing, implementing and quickly using. Digital management brings administration optimization, sports performance management. Fan management through CRM systems (Customer Relationship Management) brings financial sustainability because it enables transparent and precise monitoring of the interests of clients, fans, sponsors, as well as the placement of tickets, equipment, and sponsorships. Digital applications instantly connect a sports organization with its audience, making it easy and fast to build loyalty and thus profitability. In the modern sports environment, digitalization is emerging as one of the key factors shaping the effectiveness of management in sports organizations. Technological progress has brought significant changes in the way sports systems are planned, organized, led, and controlled. Digital tools, such as data analytics, team management systems, mobile applications, and social networks, have become indispensable instruments for sports managers in their efforts to improve performance, increase revenue, and ensure market competitiveness. In this sense, the connection between digitalization and managerial efficiency in sports is reflected in several key areas: data-driven decision-making, improved communication, process optimization, improved fan relations, and the creation of new sources of revenue (Ratten, 2021). As highlighted earlier, one of the most noticeable impacts of digitalization on managerial efficiency in sports is the availability and use of large amounts of data. Sports managers today have tools that allow them to collect, analyse and interpret data on athlete performance, market trends, fan behaviour and financial flows. The application of analytics enables informed and precise decisions to be made, both in terms of sports strategies and in business decisions such as sponsorships and brand development. The digital transformation of sports organization management includes the technical implementation of new tools and a change in the way of thinking and decision-making culture in which data becomes the basis for every key decision (Chase, 2020). Effective communication is another element in which digitalization significantly contributes to managerial competencies in sports. The introduction of digital communication platforms enables sports managers to establish a direct and effective dialogue with players, coaching staff, fans, media and other stakeholders. Internal communication tools such as Slack or Microsoft Teams facilitate coordination within teams and reduce the possibility of misunderstandings, while social networks and platforms such as Twitter or Instagram enable building a stronger relationship with the audience and effectively managing the image of sports brands. Transparent and structured communication thus leads to greater organizational cohesion and operational efficiency (Siguencia et al., 2017). In addition to the above, digitalization enables the optimization of management processes in sports organizations. Automation of administrative tasks, digital archives, e-management of contracts and licenses, and online systems for reservations and ticket sales contribute to reducing costs and increasing the accuracy and speed of execution of business processes. This frees up time and resources that we can invest in strategic planning and innovation. At the same time, it is easier for sports managers to supervise operations and conduct evaluations and audits in real time, which

increases their control and speed of response to changes in the market (Ratten, 2021). Digital technology is also important in improving the fan experience and engagement. To this end, sports managers use tools such as mobile applications, virtual and augmented reality, personalized newsletters and interactive platforms to create an individualized and engaging experience for fans. This type of digital interaction strengthens fan loyalty and opens up space for collecting additional data and developing targeted marketing campaigns, so managers increase user satisfaction and create opportunities for additional sources of income, for example through e-commerce or the sale of exclusive digital content (Parganas, Anagnostopoulos and Chadwick, 2015). Likewise, digitalization enables the creation of new business models and revenues. The introduction of e-sports, non-fungible tokens (NFTs), streaming services and digital products has created a new economic dimension of sports management, so sports managers must possess increasingly digital competencies in order to recognize and exploit these trends for the benefit of the sports organization they represent. Innovation management, digital literacy and the ability to adapt to new platforms are thus becoming the most important competencies of a successful manager in sports (Chase, 2020). Digital transformation also brings a higher level of transparency and accountability in managing sports organizations. Digital systems for monitoring activities, financial reporting and resource management enable precise records of all business operations. This reduces the room for manipulation, strengthens internal control and facilitates compliance with regulatory requirements. The use of digital financial tools enables detailed budget monitoring, real-time analysis and data-based decision-making, which increases the financial efficiency and stability of the organization (Deloitte, 2025). According to all of the above, it is concluded that digital transformation in sports management is necessary for more transparent and efficient operation because it improves all processes that lead to the organization's goal. The strategic advantage of the organization is achieved by its successful implementation and application, because in a changing environment and constantly changing market, it achieves an advantage in the long-term achievement of sports and business results, financial sustainability and influence in the social environment. The application of digital transformation with all its benefits is an opportunity for sports organization and sports management to grow and develop and create a competitive advantage in the fast-growing sports industry. From all of the above, it can be seen that digitalization transforms the way sports managers make decisions and communicate and manage sports organizations and redefines managerial effectiveness in sports. A successful sports manager today is no longer just an organizer and leader, but also a strategist who uses data, technology and innovation to realize the competitive advantage of the sports organization he manages. Those sports managers who do not recognize the importance of digital transformation risk losing their reputation and market share. Therefore, it is necessary to invest in digital competencies, technology and a culture of innovation so that the sports sector can respond to the challenges of the 21st century. (Liv Šumak, 2025.)

#### **4. CHALLENGES OF IMPLEMENTATION OF DIGITAL TRANSFORMATION IN SPORTS MANAGEMENT AND HOW TO OVERCOME OBSTACLES**

The primary challenges that arise in the implementation of digital transformation in sports management are resistance to innovations and changes, high costs of introducing new technology and the lack of professional staff who have knowledge and skills in specific digital areas. Financial constraints are a major challenge for many sports organizations, as smaller or amateur ones face limited budgets that make it difficult to invest in digital infrastructure, software solutions and employee training. Although digitalization can bring long-term savings

and increase revenues, initial investments are often a barrier for many sports organizations (N3XT SPORTS, 2023). According to research, 95% of surveyed organizations cite limited organizational capacity and lack of digital talent as the main obstacles to digital transformation (iSportConnect, 2023). Research shows that around 70% of digital transformations fail, and resistance to change is one of the main reasons for failure (iSportConnect, 2023). Both security and legal risks associated with digitalization pose significant challenges for sports organizations. The increased use of digital tools and the collection of data on athletes, fans and sponsors increases the risk of cyberattacks and data protection violations. Sports organizations must ensure that they are compliant with regulations such as the General Data Protection Regulation (GDPR) in the European Union. In addition, it is crucial that they implement appropriate security measures to protect sensitive information. (iSportConnect, 2023). The presented theoretical framework leads to the conclusion that although digital transformation offers numerous opportunities for improving the management of sports organizations, its successful implementation requires careful planning, investment in human and technical resources, a change in organizational culture and compliance with legal and security standards. Recognizing and addressing these challenges plays a significant role in realizing the full potential of digitalization in the sports sector. (Liv Šumak, 2025). According to all of the above, obstacles can be overcome with clearly defined goals and a strategy in which management will incorporate the necessary education and ongoing workshops, training and coaching for employees who need to transition to a digital culture. The transition to a digital culture is achieved through gradual implementation, starting with smaller, simpler and lower-cost projects in order to avoid financial risks. In the absence of in-house staff, it is advisable to consider an "outsourcing" strategy of engaging external IT professionals. Professionalization does not necessarily mean replacing enthusiasm and commitment, but rather supplementing them with professional competencies. Therefore, it is important to systematically invest in the education of sports employees - through professional seminars, certification programs, mentoring and cooperation with higher education institutions. This not only strengthens the organizations, but also the entire sports system, making it more efficient and transparent (Suzana Šop, <https://www.poslovnih.hr/hrvatska/kako-upravljati-sportskim-sustavima-u-eri-digitalizacije-i-profesionalizacije-4487637>). In addition to the challenges already mentioned, digital transformation in sports organizations brings challenges in the area of information security and legal regulation. Sports organizations are additionally faced with the need to protect sensitive data, adapt to privacy regulations and prevent cyber-attacks. In order to overcome these difficulties, the management of sports organizations is faced with the need to engage experts from multiple fields in order to protect the sports organization. At the heart of security challenges is the need to protect the personal and sensitive data of athletes, employees, fans and partners. Sports organizations use digital tools to collect and analyse a large amount of data, including athletes' biometric data, financial information, health data and information about user behaviour. This data poses a risk for cyber-attacks. Hacking attacks on sports organizations have become increasingly common, and a well-known case is when the Russian hacking group Fancy Bear broke into the databases of the World Anti-Doping Agency (WADA) in 2016 and publicly published the medical data of athletes (National Cyber Security Centre, 2025). In addition to security, digital transformation also opens up a number of legal challenges. At a global level, the most significant regulatory framework affecting sports organizations is the General Data Protection Regulation (GDPR) of the European Union, which applies to any organization that processes personal data of EU citizens, regardless of its headquarters. Sports organizations, especially those operating internationally, must align their data processing

processes with the GDPR, which includes obtaining explicit consent for data processing, the right to data portability and timely notification in the event of a data breach (Voigt and von dem Bussche, 2024). The legal consequences of violating data protection regulations include high fines, loss of public trust and reputational damage. Organizations that fail to demonstrate compliance with applicable legislation may also face lawsuits from users whose data has been compromised. The issue of using data for marketing and commercialization purposes is particularly sensitive because in these areas there is often an overlap of interests between athletes, sponsors and media outlets, which raises the issue of privacy rights and data ownership, which is still not clearly defined in some legal systems (Voigt and von dem Bussche, 2024). One of the biggest challenges is the issue of legal liability when using new technologies such as artificial intelligence and automated performance analysis systems. If, for example, an athlete's health monitoring system issues an incorrect recommendation that leads to an injury, the question of liability arises, i.e. whether the software manufacturer, the sports organization, the medical team or the athlete themselves are to blame. The current legal environment does not yet provide unambiguous answers to these questions, which creates legal uncertainty (Li and Guo, 2024). In addition to all of the above, sports organizations are increasingly using digital platforms to broadcast content, sell tickets, communicate with fans and manage communities. Thus, they become similar to media and technology companies, which means that they are subject to additional rules on copyright, e-commerce and consumer protection. The integration of legal advisors into strategic digital projects is becoming necessary to avoid risks and ensure legal compliance in every aspect of digital transformation (Li and Guo, 2024). Digital transformation, in addition to its undoubted advantages, requires a thoughtful and professional approach to security and legal approach and protection. By cooperating with external experts in all areas, management in sports organizations should work on an adequate organizational culture, raise awareness of the risks of digitalization, be educated about digital technology and constantly align their own responsibilities with legal guidelines. Successful management through digital transformation must lead a sports organization through a sustainable, safe and, above all, legal path towards its business and sports goal.

## **5. THE FUTURE OF DIGITAL TRANSFORMATION IN SPORTS AND ALIGNMENT WITH THE SPORTS MANAGEMENT STRATEGY**

According to Šumak (Šumak, 2025), digital transformation in sports is a dynamic process through which sports organizations create value for their members, fans and the wider community. Although numerous sports organizations already use various digital tools, the future of digital transformation in sports lies in its comprehensive application, equally in professional, amateur and recreational sports. In today's sports environment characterized by the rapid development of technology, sports are increasingly transcending the traditional boundaries of the sports field and the audience and exploring new directions of digital transformation that will shape sports organizations and athletes as individuals in the coming years. New technological possibilities such as artificial intelligence (AI), augmented and virtual reality (AR/VR) and blockchain technology bring a new perspective to amateur and recreational sports. According to Bunker and Thabtah, 2019, this is revolutionizing the individualized approach to training, especially in sports where precision is crucial, such as gymnastics, swimming, or tennis. In sports, AI can be used to analyse athletes' movements, spot patterns that indicate muscle fatigue or technical errors, and suggest corrections in real time. Digital transformation therefore acts as a support for management, as a controlling. It is used in decision-making, for better quality, more transparent, more precise management.

Virtual and augmented reality (VR/AR) are changing the way fans experience sports and how athletes train. VR allows spectators to be present in the stadium from the comfort of their own home, sitting on the court, or following the game from the player's perspective. AR, on the other hand, allows the real space to be augmented with digital elements, for example, by displaying live player statistics during a match or displaying virtual coaches analysing the game in real time (Fawn, 2024). On the other hand, blockchain technology is increasingly gaining importance in sports due to its ability to ensure transparency, data immutability and decentralized control. This technology enables the creation of digital contracts that automate the payment of bonuses to athletes, commissions to agents or fees to third parties without the need for intermediaries. In this way, the room for manipulation is reduced and trust in the system is increased, which is particularly important in sports burdened by scandals and non-transparent transfers (Fawn, 2024). In addition, blockchain can also improve the management of membership in sports clubs, especially smaller ones. The use of digital identities and smart contracts facilitates the processes of registering new plans, voting at assemblies and accessing content, which increases engagement and democracy in amateur sports environments (Fawn, 2024). Such strong and powerful digital assistants influence the development of modern sports and modern sports management.

Digital transformation is becoming one of the very important needs of sports management in the fight to maintain competitiveness and market position. Digital transformation thus enables sports organizations to better analyse data and make fact-based decisions. Sports organizations are increasingly implementing customer relationship management (CRM) systems, player performance analytics, monitoring market trends, and digital monitoring of employee performance because with the help of these tools, they increase internal efficiency, reduce operational costs, speed up communication, and manage resources more transparently (Ratten, 2021). The strategic goal of every sports management is long-term sports success, on the business plan, income growth, increasing presence and visibility on the market, as dominant an influence on society as possible. Sports management should be focused on the integration of advanced technologies with the organization's long-term business and sports goals, and digital transformation should be used to the maximum in order to harmonize and support the mission of the sports organization. Digital transformation must be led by management as a strategic decision maker. A good strategic decision results from innovation, readiness for information inputs and adaptation to new technological directions and trends with constant controlling assessment of return on investment, i.e. financial sustainability.

## **6. CONCLUSION**

Digital transformation in sports management is a necessary tool for the survival, competitiveness, financial sustainability, sports results and success of a modern sports organization. From faster and more precise communication, greater transparency, better control over finances and with a database that becomes the basis for sports and management processes. Thus, the impact of digital transformation increases the efficiency of sports management because it enables the strategic inclusion of a new organizational culture in which roles and performances are coordinated more innovatively and more agilely, where knowledge, innovation, information and skills have a different, more noticeable and very important place. Technology alone does not guarantee the success of management and sports organizations.

The efficiency of sports management under the influence of digital transformation is reflected in the integration of modern technological solutions that change the way of decision-making, transforming sports organizations from intuitive to systems driven by exact data (data-driven management). The result is operational efficiency, financial sustainability, sports competitiveness. Effective sports management uses digital transformation as a means of a long-term process in which trends are monitored and recognized, decisions are made on the basis of an exact and broad database, timely and quick information from the market, with which all interest groups are communicated clearly, quickly, agilely in a transparent and highly engaged manner.

## LITERATURE:

1. Adair, D. (2017). Sport Management with Historical Perspective. *International Journal of the History of Sport*, 34(5-6), 1-6.
2. Andreff, W., & Szymański, S. (2006). *Handbook on the economics of sport*. Cheltenham: Edward Elgar Publishing.
3. Baker, R.E., & Esherick, C. (2013). *Fundamentals of sport management*. Champaign: Human Kinetics.
4. Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital Business Strategy: Toward a Next Generation of Insights. *MIS Quarterly*, 37(2), 471–482.
5. Bunker, R. & Thabtah, F. (2019). A machine learning framework for sport prediction. *Applied Computing and Informatics*, 15(1), 27–33.
6. Byers, T., Anagnostopoulos, C., & Anderson, E. (2016). *Contemporary issues in sport management: a critical introduction*. Thousand Oaks: Sage Publications.
7. Chadwick, S., Arthur, D., & Bech, J. (2017). *International cases in the business of sport*. 2nd Edition, Abingdon: Routledge.
8. Chase C. (2020). The Data Revolution: Cloud Computing, Artificial Intelligence, and Machine Learning in the Future of Sports. U: Schmidt SL (ur). *21st Century Sports: How Technologies Will Change Sports in the Digital Age*. Berlin: Springer International Publishing.
9. Costa, C.A. (2005). The status and future of sport management: a delphi study. *Journal of Sport Management*, 9(2), 117-142.
10. Cuneen, J. (2004). Managing program excellence during our transition from potential to merit. *Journal of Sport Management*, 18(1), 1-12.
11. Davenport, T. H. (2014). *Analytics in Sports: The New Science of Winning*. International Institute for Analytics.
12. Davies M., & Ströbel, T. (2022). Global Sport Management Learning from Home: Expanding the International Sport Management Experience Through a Collaborative Class Project. *Sport Management Education Journal*, 16(2), 154-161.
13. Doherty, A., & Cuskelly, G. (2020). Organizational capacity and performance of community sport clubs. *Journal of Sport Management*. 34(3), 240-259.
14. Fawn, U. (2024). *Digital Transformation in Sports & Recreation: How Modern Technology Is Revolutionizing Performance Enhancing Experiences and Shaping the Future*. Bedlam: Bedlam Buster.
15. Fitzgerald, M., Kruschwitz, N., Bonnet, D., & Welch, M. (2013). Embracing Digital Technology: A New Strategic Imperative. *MIT Sloan Management Review*, 55(2), 1–12.
16. Frevel, N., Beiderbeck, D., Schmidt, S.L. (2022). The impact of technology on sports – A prospective study. *Technological Forecasting and Social Change*, 182, 121838.
17. García, J., & Llopis-Goig, R. (2021). Digitalization and Innovation in Sports Organizations. In: *The Routledge Handbook of Digital Sport Management*. Routledge.

18. Ginting, S.L. (2023). A Computational Bibliometric Analysis of Esport Management using VOS viewer. *International Journal of Informatics, Information System and Computer Engineering*, 4(1), 31-48.
19. Glebova, E., Gerke, A., Book, R. (2023). The Transformational Role of Technology in Sports Events. U: Basu, B., Desbordes, M., Sarkar, S. (ur) *Sports Management in an Uncertain Environment. Sports Economics, Management and Policy*. Singapore: Springer.
20. Grix, J., Brannagan, P., Michael, G., Ross, H., Ross, N. (2021). The impact of Covid-19 on sport. *International Journal of Sport Policy and Politics*, 13(1), 1-12.
21. Kwon, H.H., Trail, G., & James, J. D. (2007). The mediating role of perceived value: Team identification and purchase intention of team licensed apparel. *Journal of Sport Management*, 21(4), 540-554.
22. Leopkey, B., & Parent, M. M. (2016). The governance of Olympic legacy: process, actors and mechanisms. *Leisure Studies*, 36(3), 438–451.
23. Li, X., Guo, X. (2024). Factors affecting the protection of data rights in sports events: a configurational analysis. *Scientific Reports*, 14, 5353.
24. Matt, C., Hess, T., Benlian, A., & Wiesbock, Florian (2016). Options for Formulating a Digital Transformation Strategy, *MIS Quarterly Executive*, 15(2), Article 6.
25. Olafson, G.A. (1990). Research design in sport management: What's missing, what's needed? *Journal of Sport Management*, 4, 103-120.
26. Parganas, P., Anagnostopoulos, C. & Chadwick, S. (2015). You'll never tweet alone: Managing sports brands through social media. *Journal of Brand Management*, 22, 551–568.
27. Pedersen, P. M., & Thibault, L. (2019). *Contemporary Sport Management* (6th ed.). Human Kinetics.
28. Qi, Y., Sajadi, M., Baghaei, S., Rezaei, R., Li, W. (2024). Digital technologies in sports: Opportunities, challenges, and strategies for safeguarding athlete wellbeing and competitive integrity in the digital era. *Technology in Society*, 77, 102496.
29. Ratten, V. (2020). *Sport Innovation Management*. Routledge.
30. Ratten, V. (2021). *Sport entrepreneurship and innovation*. Abingdon: Routledge.
31. Ratten, V., & Jones, P. (2018). Sport education: Fit for a purpose. *Education and Training*, 60(5), 370-374.
32. Rosenblatt, A. (2020). The Role of Data Analytics in Modern Sports Organizations. *Journal of Sport Management and Analytics*, 2(1), 15–29.
33. Sigüencia, L. O., Herman, D., Marzano, G., & Rodak, P. (2017). The Role of Social Media in Sports Communication Management: An Analysis of Polish Top League Teams' Strategy. *Procedia Computer Science*, 104, 73–80.
34. Liv Šumak, Utjecaj digitalne transformacije na učinkovitost upravljanja sportskim organizacijama, 2025., završni rad, Velučilište Aspira, Split
35. Toresdahl, B.G., Asif, I.M. (2020). Coronavirus Disease 2019 (COVID-19): Considerations for the Competitive Athlete. *Sports Health*, 12(3):221-224.
36. Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122, 889–901.
37. Voigt, P., von dem Bussche, A. (2024). *The EU General Data Protection Regulation (GDPR)*. Berlin: Springer.
38. Westerman, G., Bonnet, D., & McAfee, A. (2014). *Leading Digital: Turning Technology into Business Transformation*. Harvard Business Review Press.
39. World Economic Forum. (2020). *Digital Transformation Initiative*.

**Internet sources:**

1. CelerData (2024). How Teams Use Sports Analytics for Competitive Edge. <https://celerdatablog.com/glossary/how-teams-use-sports-analytics-for-competitive-edge>
2. CoachMePlus (2025). CoachMePlus. <https://coachmeplus.com/>
3. Deloitte (2025). A whole new ball game: Navigating digital transformation in the sports industry. <https://www.deloitte.com/global/en/Industries/tmt/perspectives/gx-digital-transformation-and-future-changes-in-sports-industry.html>
4. Folio3 (2025). Sports Analytics – What is It & How Does It Improve Performance Metrics and KPIS? <https://data.folio3.com/blog/sports-data-analytics>
5. Greenfly (2025). Why Short-Form Digital Media Is Critical for Sports Fan Engagement. <https://www.greenfly.com/blog/why-short-form-digital-media-critical-sports-fan-engagement/>
6. Greenfly (2025a). Social Media in Sports: Driving Fan Engagement. <https://www.greenfly.com/blog/social-media-in-sports/>
7. Heja (2025). Heja.: <https://heja.io/>
8. iSPORT Connect (2024). Impact of Digital Transformation on Sporting Organizations. <https://www.isportconnect.com/impact-of-digital-transformation-on-sporting-organizations/>
9. Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2015). Strategy, Not Technology, Drives Digital Transformation. MIT Sloan Management Review and Deloitte University Press. <https://sloanreview.mit.edu/projects/strategy-drives-digital-transformation/>
10. Kitman Labs (2025). Kitman Labs. <https://www.kitmanlabs.com/>
11. LegFit (2025). LegFit. <https://legitfit.com>
12. N3XT Sports (2025). Digital Transformation: A Necessary Enabler of Success. <https://www.n3xtsports.com/digital-transformation-a-necessary-enabler-of-success/>
13. National Cyber Security Centre (2025). The Cyber Threat to Sports Organisations. Ensuring fair play online. <https://www.ncsc.gov.uk/files/Cyber-threat-to-sports-organisations.pdf>
14. Spond (2025). Spond.: <https://www.spond.com/>
15. TeamSnap (2025). TeamSnap. <https://www.teamsnap.com>
16. Teamworks (2025). Teamworks. <https://teamworks.com/>
17. <https://www.europarl.europa.eu/topics/hr/article/20210414STO02010/oblikovanje-digitalne-transformacije-objasnjenje-strategije-eu-a>
18. <https://www.poslovni.hr/hrvatska/kako-upravljati-sportskim-sustavima-u-eri-digitalizacije-i-profesionalizacije-4487637>

# AUDITED FINANCIAL STATEMENTS AND OPERATIONS OF SPECIALTY HOSPITALS

**Dubravka Mahacek**

*Faculty of Dental Medicine and Health Osijek, Croatia  
dmahacek@fdmz.hr*

**Karlo Mahacek**

*Požega County General Hospital, Croatia  
karlo.krki@gmail.com*

**Filip Mahacek**

*Thalassotherapia Opatija special hospital for medical rehabilitation of heart, lung and  
rheumatism diseases, Croatia  
filip.mahacek12@gmail.com*

## ABSTRACT

*Hospitals are public institutions that provide healthcare services. The sources of financing for the activities are revenues from the Croatian Health Insurance Institute (HZZO), from the county and state budgets, own revenues and donations. The subject of this paper is the operations of special hospitals. Health institutions, as budget users, prepare financial reports in accordance with the regulations on financial reporting in budgetary accounting. This involves the preparation of a financial plan with sources of financing. Significant funds are from the Croatian Health Insurance Institute (HZZO), and budgetary (state or local). The paper used data on the financial operations of special hospitals published in the reports on the financial audit conducted by the State Audit Office for 2022, as well as relevant scientific literature. The assumption is that the sources of revenue are insufficient and that they are mostly used to cover employee costs. The aim of the paper is to investigate the structure of revenues generated by special hospitals, as well as the structure of expenditures and the possibilities for meeting them. The size of the financial results of hospitals and the possibility of the hospital itself influencing the achievement of business results are also investigated. The available funds cover the needs, some of which relate to employee expenses. The total number of employees and costs per employee are shown. The analysis is carried out at the level of each of the special hospitals (which were included in the last financial audit for 2022), and at the level of eleven special hospitals in total.*

**Keywords:** *Health institution, Auditing, Special hospital, Income, Expenditures*

## 1. INTRODUCTION

The paper analyses the operation of health institutions, special hospitals, based on the data collected from the joint and individual audit reports for 2022 carried out by the State Audit Office. The audit procedure covered a total of eleven special hospitals, five of which received the unconditional opinion of the audit, while six received conditional opinions on financial reports. Six hospitals received an unconditional opinion on business compliance and five received a conditional opinion. Below we will investigate the legal basis for business and financial operations (structure of revenues and expenditures). The paper deals with the structure of income realized in special hospitals and expenditures that are financed from the realized income. Research on the number of employees in special hospitals was carried out. The assumption is that the structure of revenues of special hospitals is such that the revenues are limited, and that their purpose is largely to meet employee expenses. At the level of eleven special hospitals, we calculated the average cost per employee, and we compared the cost per employee in each of the observed hospitals. From the presented structure of expenditures, we have determined the share expenditures that arise from business operations of special hospitals.

## 2. BUSINESS OPERATIONS OF SPECIAL HOSPITALS

Hospital health institutions are budget beneficiaries and are required to compile financial statements in accordance with financial reporting regulations in budget accounting. When keeping business books and preparing financial statements, they are obliged to apply budget accounting in (the Budget Act, Article 4). The statutory provisions stipulate that healthcare is an activity of interest to the Republic of Croatia, which is performed as a public service at the primary, secondary and tertiary level and at the level of health care institutions (Health Care Act, Articles 28 and 29). Health institutions are obliged to compile a financial plan in accordance with the provisions of the Budget Act and the Ministry of Finance's instructions for drafting the state budget or the budget of local and regional self-government units. Primary healthcare activities are performed by health centres, palliative care institutions and health care institutions, secondary healthcare activities are performed by polyclinics, hospitals and spas, while the tertiary level is responsibility of clinical institutions (clinics, clinical hospitals and clinical hospital centres). The financial plan should be realistic. The financial plan contains revenue and receipts reported by types, expenditures and expenditures foreseen for a three-year period, classified according to budget classifications and explanations of the financial plan proposal. Health institutions do not have sufficient resources to cover expenditures, and by applying the budgetary principle of balance, they have planned less expenditures or higher incomes than expected. Due to insufficient revenue to cover current year expenditures, healthcare institutions did not plan to cover the shortage of revenues transferred from previous periods. The revenues of health institutions are insufficient to cover the expenses that arise. Hospitals have been achieving a negative financial result for a long time. Out of a total of 30 hospitals, 27 hospitals achieved a negative financial result in 2011. The negative financial result at the end of 2011 was increased by the deficit carried forward from the previous period (until the end of 2010). The business results of the aforementioned period are detailed in tables for individual hospitals (Včev A., Mahaček, D., 2014). This paper analyses the business operations of special hospitals for 2022. The data obtained can be compared with the data in the business analysis for 2016 in the part related to the incurred expenses, the structure of expenses and the number of employees (Včev A., Mahaček F., Mahaček K., 2019). The Governing Board adopts a work and development program, adopts a financial plan and a final account, analyses the financial operation of health institution at least once a month, and performs other statutory tasks. It is important to point out that healthcare system is special due to the fact that health care institutions as budget beneficiaries are not financed for specific types of expenditures, but on the basis of executed and accrued services. Using analytical procedures we made conclusions regarding business operation of special hospitals. Financial information on the business of the current year was collected, as well as information on the overall operating result at the end of 2022. They are placed in relation to financial and non-financial information (ratio between overall expenditures for employees and number of employees). "The correct use of analytical procedures requires the auditor to have knowledge of the client's business and activities. Without this, the auditor cannot develop appropriate analytical procedures or evaluate correctly the results of such tests" (Messier Jr., 1998). An analysis of business results of the current year and the overall operating results at the end of the period, as shown in Table 1, is used (in the table for "special hospital", "SH" abbreviation used). From the same Table we notice that out of eleven special hospitals, in 2022 six hospitals had a negative financial result, while five hospitals achieved a positive financial result. The Special Hospital for Medical Rehabilitation Krapina Spa Toplice and Special Hospital for orthopaedics and rehabilitation "Martin Horvat" Rovinj achieved the biggest deficiency in the absolute amount. The overall operating result is negative in seven special hospitals and amounts to HRK 192.627.035 while in four special hospitals it is positive and amounts to HRK 18.343.393 (the fixed conversion rate is 7.5345 kuna for 1.00 euro).

The biggest overall negative financial results were achieved by the Special Hospital for Medical Rehabilitation Krapina Spa Toplice and Orthopedics, Biograd na moru.

| Hospital                                                                                 | Result of business, surplus/ deficit in 2022 | Result at the end of 2022, total surplus/ deficit | Expenditures for employees | Total number of employees at the end of 2022 | Expenditure for employees / total number of employees (4/5) |
|------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------|----------------------------|----------------------------------------------|-------------------------------------------------------------|
| 1                                                                                        | 2                                            | 3                                                 | 4                          | 5                                            | 6                                                           |
| SH for Medical Rehabilitation Biokovka, Makarska                                         | 1,498,843                                    | 2,701,986                                         | 25,104,304                 | 186                                          | 134,969                                                     |
| SH for the medical rehabilitation of Stubica spa                                         | 2,096,709                                    | 1,385,116                                         | 28,688,261                 | 201                                          | 142,728                                                     |
| Thalassotherapy Opatija - SH for Medical Rehabilitation of Heart, Lung and Rheumatism    | 2,636,427                                    | 2,447,492                                         | 43,626,590                 | 273                                          | 159,804                                                     |
| Daruvarske spa, SH for medical rehabilitation                                            | 2,195,261                                    | 11,808,799                                        | 30,647,867                 | 255                                          | 120,188                                                     |
| Psychiatric hospital Ugljan                                                              | -1,304,242                                   | -23,646,266                                       | 41,635,698                 | 285                                          | 146,090                                                     |
| SH for Medical Rehabilitation Krapina Spa Toplice                                        | -16,096,940                                  | -96,664,291                                       | 116,652,850                | 797                                          | 146,365                                                     |
| SH for orthopedics, Biograd na moru                                                      | - 2,117,327                                  | - 47,162,067                                      | 40,065,121                 | 233                                          | 171,953                                                     |
| SH for medical rehabilitation Kalos, Vela Luka                                           | -8,490                                       | -5,704,463                                        | 18,339,112                 | 136                                          | 134,846                                                     |
| SH for orthopedics and rehabilitation "Martin Horvat" Rovinj                             | -3,087,897                                   | -4,055,411                                        | 19,851,546                 | 133                                          | 149,260                                                     |
| SH for prolonged treatment in Duga Resa                                                  | 2,097,305                                    | -3,914,109                                        | 27,323,555                 | 168                                          | 162,640                                                     |
| SH for the protection of children with neurodevelopmental and motor disabilities, Zagreb | -181,765                                     | -11,480,428                                       | 32,105,810                 | 203                                          | 158,157                                                     |
| Total                                                                                    | -12,272,116                                  | -174,283,642                                      | 424,040,714                | 2 870                                        | 147,749                                                     |

*Table 1: Data on the operation of special hospitals (in HRK) for 2022, the structure of expenditures and the total number of employees (State Audit Office, 2024, pp. 78, 79 and eleven individual audit reports)*

## 2.1. Realization of overall revenues and receipts and overall expenses and expenditures

Below, we show the structure of income and receipts realized. We also show the structure of expenses and expenditures. Conclusions are derived from the data.

### 2.1.1 Realization of expenses and expenditures

Below, Table 2 provides an overview of the types of special hospitals' income, shown in relative numbers (percentages). Relative numbers are calculated on the basis of the data on overall revenue from individual audit reports that are compiled for each of the special hospitals (eleven individual reports).

*Table ends on the next page*

| Hospital                                                                              | Aid from abroad and from subjects within the general budget | from property | from administrative and administrative fees, fees according to special regulations and fees | sales of products and goods and services provided, income from donations and refunds for protested guarantees | from the competent budget and from HZZO based on contractual obligations | Fines, administrative measures and other revenues | Income from the sale of non-financial assets | Income from financial assets and borrowing | Total income |
|---------------------------------------------------------------------------------------|-------------------------------------------------------------|---------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------|----------------------------------------------|--------------------------------------------|--------------|
| 1                                                                                     | 2                                                           | 3             | 4                                                                                           | 5                                                                                                             | 6                                                                        | 7                                                 | 8                                            | 9                                          | 10           |
| SH for Medical Rehabilitation Biokovka, Makarska                                      | 3.35                                                        | 0.13          | 8.13                                                                                        | 59.38                                                                                                         | 28.67                                                                    | 0.33                                              | 0.01                                         | 0.00                                       | 100          |
| SH for the medical rehabilitation of Stubica spa                                      | 3.40                                                        | 0.00          | 14.33                                                                                       | 20.28                                                                                                         | 61.91                                                                    | 0.06                                              | 0.00                                         | 0.00                                       | 100          |
| Thalassotherapy Opatija - SH for Medical Rehabilitation of Heart, Lung and Rheumatism | 1.46                                                        | 0.04          | 12.36                                                                                       | 19.53                                                                                                         | 65.22                                                                    | 1.38                                              | 0.00                                         | 0.00                                       | 100          |
| Daruvarske spa, SH for medical rehabilitation                                         | 2.35                                                        | 0.10          | 7.52                                                                                        | 49.97                                                                                                         | 36.67                                                                    | 0.30                                              | 0.04                                         | 3.06                                       | 100          |
| Psychiatric hospital Ugljan                                                           | 13.32                                                       | 0.00          | 0.56                                                                                        | 4.11                                                                                                          | 80.64                                                                    | 0.01                                              | 0.02                                         | 1.34                                       | 100          |

|                                                                                          |       |      |       |       |       |      |      |      |     |
|------------------------------------------------------------------------------------------|-------|------|-------|-------|-------|------|------|------|-----|
| SH for Medical Rehabilitation Krapinska Spa                                              | 9.37  | 0.00 | 10.59 | 15.28 | 64.34 | 0.07 | 0.01 | 0.34 | 100 |
| SH for orthopedics, Biograd na moru                                                      | 17.38 | 0.00 | 9.22  | 1.94  | 71.45 | 0.01 | 0.00 | 0.00 | 100 |
| SH for medical rehabilitation Kalos, Vela Luka                                           | 2.53  | 0.03 | 1.62  | 13.62 | 81.74 | 0.46 | 0.00 | 0.00 | 100 |
| SH for orthopedics and rehabilitation "Martin Horvat" Rovinj                             | 5.85  | 0.01 | 8.04  | 33.22 | 45.66 | 0.00 | 0.02 | 7.20 | 100 |
| SH for prolonged treatment in Duga Resa                                                  | 13.72 | 0.00 | 9.30  | 3.23  | 73.41 | 0.00 | 0.34 | 0.00 | 100 |
| SH for the protection of children with neurodevelopmental and motor disabilities, Zagreb | 3.73  | 0.00 | 0.29  | 1.43  | 94.56 | 0.00 | 0.00 | 0.00 | 100 |
| Total                                                                                    | 7.53  | 0.02 | 8.38  | 19.04 | 63.91 | 0.27 | 0.03 | 0.81 | 100 |

*Table 2: Revenues and Receipts of Special Hospitals in 2022, Relative Numbers, Authors Calculation (State Audit Office, Individual Reports Data for Each Hospital)*

From Table 2 shows that at the level of all special hospitals, the most significant income is from the Croatian Health Insurance Fund (HZZO) based on contractual obligations.

### *2.1.2 Realization of expenses and expenditures*

Below, Table 3 shows the types of expenses and expenditures of special hospitals presented in relative numbers. The data were collected from individual reports on the performed audit of each health institution. At the level of all special hospitals, the most important expenses are employee expenses.

| Hospital                                                                                 | Expenses for employees | Material expenses | Expenditures for the acquisition of non-financial assets | Financial expenses | Other expenses | Expenditures for financial assets and loan repayments | Total expenditures |
|------------------------------------------------------------------------------------------|------------------------|-------------------|----------------------------------------------------------|--------------------|----------------|-------------------------------------------------------|--------------------|
| 1                                                                                        | 2                      | 3                 | 4                                                        | 5                  | 6              | 7                                                     | 8                  |
| SH for Medical Rehabilitation Biokovka, Makarska                                         | 57.69                  | 33.13             | 9.02                                                     | 0.08               | 0.08           | 0.00                                                  | 100                |
| SH for the medical rehabilitation of Stubica spa                                         | 68.74                  | 20.51             | 4.84                                                     | 0.64               | 0.00           | 5.27                                                  | 100                |
| Thalassotherapy Opatija - SH for Medical Rehabilitation of Heart, Lung and Rheumatism    | 54.10                  | 38.68             | 5.60                                                     | 0.31               | 0.00           | 1.30                                                  | 100                |
| Daruvarske spa, SH for medical rehabilitation                                            | 63.65                  | 32.56             | 3.04                                                     | 0.68               | 0.07           | 0.00                                                  | 100                |
| Psychiatric hospital Ugljan                                                              | 68.63                  | 25.30             | 2.45                                                     | 0.00               | 0.00           | 3.09                                                  | 100                |
| SH for Medical Rehabilitation Krapinska Spa                                              | 72.02                  | 23.87             | 3.17                                                     | 0.32               | 0.00           | 0.61                                                  | 100                |
| SH for orthopedics, Biograd na moru                                                      | 63.71                  | 30.42             | 4.85                                                     | 0.98               | 0.05           | 0.00                                                  | 100                |
| SH for medical rehabilitation Kalos, Vela Luka                                           | 72.62                  | 23.78             | 3.19                                                     | 0.41               | 0.00           | 0.00                                                  | 100                |
| SH for orthopedics and rehabilitation "Martin Horvat" Rovinj                             | 58.24                  | 28.72             | 10.61                                                    | 1.21               | 0.00           | 1.22                                                  | 100                |
| SH for prolonged treatment in Duga Resa                                                  | 72.10                  | 20.47             | 6.94                                                     | 0.49               | 0.00           | 0.00                                                  | 100                |
| SH for the protection of children with neurodevelopmental and motor disabilities, Zagreb | 84.78                  | 11.59             | 3.52                                                     | 0.11               | 0.00           | 0.00                                                  | 100                |
| Total                                                                                    | 66.85                  | 26.95             | 4.72                                                     | 0.44               | 0.02           | 1.03                                                  | 100                |

*Table 3: Expenditure of Special Hospitals (in HRK) for 2022 - Relative Numbers, Author's Calculation (State Audit Office, Individual Reports Data for Each Hospital)*

### 3. GRAPHIC EXPLANATION OF BUSINESS DATA

Below in Figure 1 we can see expenses per employee for each of the observed hospitals. We note that these expenditures do not differ significantly among the observed hospitals.

Figure 1: Expenditures per employee. Source: authors, according to the data from Table 1, columns 6.

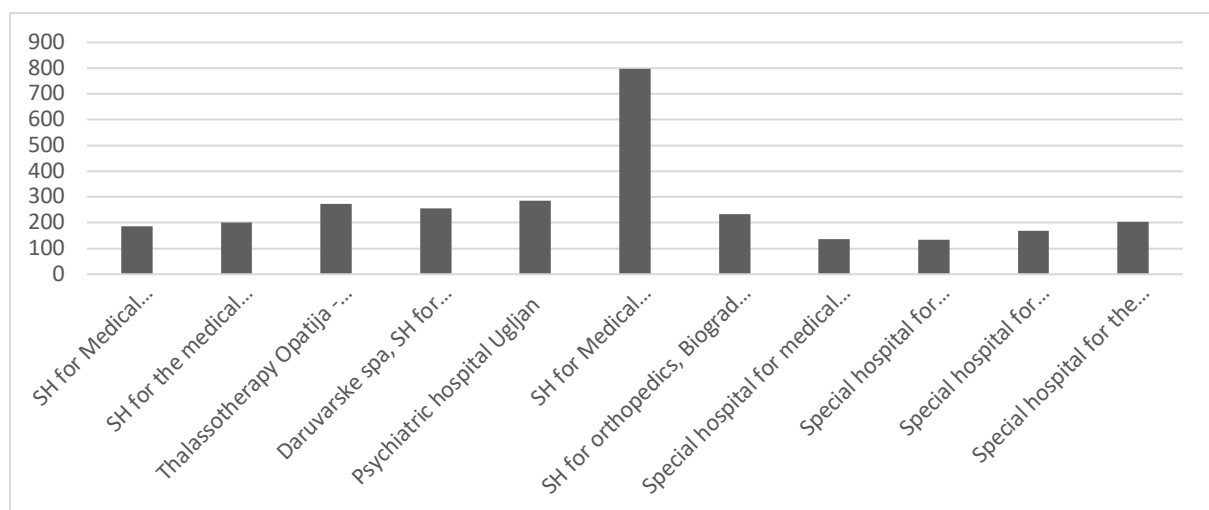


Figure 2: Total number of employees at the end of 2022, Source: authors, according to the data from Table 1, columns 5.

Figure 2 shows the number of employees in each of the observed hospitals. We notice that the number of employees is significantly different among the observed hospitals. Special hospitals differ according to the number of employees. The average number of employees in the eleven special hospitals that we used was 261 employees ( $2\,870/11$ ). Three special hospitals have more employees than this average, while others have less than average number of employees.

#### 4. CONCLUSION

Based on the analysis of business operations of special hospitals, we concluded that out of eleven special hospitals, six hospitals in 2022 had a negative financial result, while five hospitals achieved a positive financial result. The overall operating result is positive in four special hospitals, while it is negative in seven special hospitals.

At the level of all special hospitals, the most significant income comes from the Croatian Health Insurance Fund (HZZO) based on contractual obligations (63.91 %), with a share between 28.67 % (Biokovka, Makarska) to 94.56 % (Special hospital for the protection of children with neurodevelopmental and motor disabilities, Zagreb). Income from sales of goods and services provided has a share between 1.43 % (Special hospital for the protection of children with neurodevelopmental and motor disabilities, Zagreb) up to 59.38 % (Biokovka, Makarska), and 49.97 % (Daruvar Spa). At the level of all special hospitals, the most significant are employee expenditures, which account for between 54.10 % (Thalassotherapia Opatija) and 84.78 % (SH for the protection of children with neurodevelopmental and motor disabilities, Zagreb). Average employee expenditures at special hospital level are HRK 147.749,38, ranging from HRK 120.187,77 (Daruvar Spa) to HRK 171.953,31 (Special Hospital for orthopaedics, Biograd na moru). Material expenditures have a share from 11.59 % (Special hospital for the protection of children with neurodevelopmental and motor disabilities, Zagreb), up to 38.68 % (Thalassotherapia Opatija). Expenditures for the acquisition of nonfinancial assets have a share between 2.45 % (Psychiatric hospital Ugljan) to 10.61 % (SH for orthopaedics and rehabilitation, Rovinj). From realized revenues, special hospitals largely finance employee expenditures. Material expenditures are necessary for business operations and are significantly different according to participation in overall expenditures of individual hospitals, as well as expenditures for the acquisition of nonfinancial assets. We conclude that most hospitals operate with a negative financial result. Funding sources are limited. If you want to do business positively, you need to either increase revenues or reduce costs. It is possible to obtain more funds from the state budget or by providing services, which needs to be investigated in further work.

## LITERATURE:

1. Croatian Parliament: Health Care Act, Official Gazette 100/18, 125/19, 147/20, 119/22, 156/22, 33/23, 36/24
2. Croatian Parliament: Budget Act, Official Gazette 144/21
3. State Audit Office: Report on the work of the State Audit Office for 2023, p. 76 and 78, Retrieved on May 8, 2025 from [https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCE\\_O\\_RADU\\_DUR-A\\_ZA\\_2023/IZVJESCE%20O%20RADU%20DRZAVNOG%20UREDAA%20ZA%20REVIZIJU%20ZA%202023.pdf](https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCE_O_RADU_DUR-A_ZA_2023/IZVJESCE%20O%20RADU%20DRZAVNOG%20UREDAA%20ZA%20REVIZIJU%20ZA%202023.pdf)
4. State Audit Office, Bjelovar, Regional Office, Izvješće o obavljenoj financijskoj reviziji Daruvarske toplice Specijalna bolnica za medicinsku rehabilitaciju, March 2024 pp. 5, 11 and 13, Retrieved on July 1, 2025 from [https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA\\_%20O\\_OBAVLJENIM\\_REVIZIJAMA/FINACIJSKE\\_REVIZIJE/BOLNICKE\\_ZDRAVSTVENE\\_USTANOVE/DARUVARSKE%20TOPLICE%20SPECIJALNA%20BOLNICA%20ZA%20MEDICINSKU%20REHABILITACIJU.pdf](https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA_%20O_OBAVLJENIM_REVIZIJAMA/FINACIJSKE_REVIZIJE/BOLNICKE_ZDRAVSTVENE_USTANOVE/DARUVARSKE%20TOPLICE%20SPECIJALNA%20BOLNICA%20ZA%20MEDICINSKU%20REHABILITACIJU.pdf)
5. State Audit Office, Dubrovnik, Regional Office, Izvješće o obavljenoj financijskoj reviziji Specijalna bolnica za medicinsku rehabilitaciju Kalos, Vela Luka, December 2023 pp. 9, 13 and 16, Retrieved on July 1, 2025 from [https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA\\_%20O\\_OBAVLJENIM\\_REVIZIJAMA/FINACIJSKE\\_REVIZIJE/BOLNICKE\\_ZDRAVSTVENE\\_USTANOVE/SPECIJALNA%20BOLNICA%20ZA%20MEDICINSKU%20REHABILITACIJU%20KALOS,%20VELA%20LUKA.pdf](https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA_%20O_OBAVLJENIM_REVIZIJAMA/FINACIJSKE_REVIZIJE/BOLNICKE_ZDRAVSTVENE_USTANOVE/SPECIJALNA%20BOLNICA%20ZA%20MEDICINSKU%20REHABILITACIJU%20KALOS,%20VELA%20LUKA.pdf)

6. State Audit Office, Karlovac, Regional Office, Izvješće o obavljenoj financijskoj reviziji Specijalna bolnica za produženo liječenje Duga Resa, October 2023 pp. 4, 8 and 11, Retrieved on July 1, 2025 from [https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA\\_%20O\\_OBAVLJENIM\\_REVIZIJAMA/FINACIJSKE\\_REVIZIJE/BOLNICKE\\_ZDRAVSTVENE\\_USTANOVE/SPECIJALNA%20BOLNICA%20ZA%20PRODUZENO%20LIJECENJE%20DUGA%20RESA.pdf](https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA_%20O_OBAVLJENIM_REVIZIJAMA/FINACIJSKE_REVIZIJE/BOLNICKE_ZDRAVSTVENE_USTANOVE/SPECIJALNA%20BOLNICA%20ZA%20PRODUZENO%20LIJECENJE%20DUGA%20RESA.pdf)
7. State Audit Office, Rijeka, Regional Office, Izvješće o obavljenoj financijskoj reviziji Thalassotherapia Opatija – Specijalna bolnica za medicinsku rehabilitaciju bolesti srca, pluća i reumatizma, November 2023 pp. 5, 9 and 13, Retrieved on July 1, 2025 from [https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA\\_%20O\\_OBAVLJENIM\\_REVIZIJAMA/FINACIJSKE\\_REVIZIJE/BOLNICKE\\_ZDRAVSTVENE\\_USTANOVE/THALASSOTHERAPIA%20OPATIJA%20%E2%80%93%20SPECIJALNA%20BOLNICA.pdf](https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA_%20O_OBAVLJENIM_REVIZIJAMA/FINACIJSKE_REVIZIJE/BOLNICKE_ZDRAVSTVENE_USTANOVE/THALASSOTHERAPIA%20OPATIJA%20%E2%80%93%20SPECIJALNA%20BOLNICA.pdf)
8. State Audit Office, Split Regional Office, Revised Audit Report, Special Hospital for Medical Rehabilitation Biokovka, Makarska, Split, February 2024, pp. 7, 10 and 13, Retrieved on April 25, 2025 from [https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA\\_%20O\\_OBAVLJENIM\\_REVIZIJAMA/FINACIJSKE\\_REVIZIJE/BOLNICKE\\_ZDRAVSTVENE\\_USTANOVE/SPECIJALNA%20BOLNICA%20ZA%20MEDICINSKU%20REHABILITACIJU%20BIOKOVKA,%20MAKARSKA.pdf](https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA_%20O_OBAVLJENIM_REVIZIJAMA/FINACIJSKE_REVIZIJE/BOLNICKE_ZDRAVSTVENE_USTANOVE/SPECIJALNA%20BOLNICA%20ZA%20MEDICINSKU%20REHABILITACIJU%20BIOKOVKA,%20MAKARSKA.pdf)
9. State Audit Office, Krapina, Regional Office, Izvješće o obavljenoj financijskoj reviziji Specijalna bolnica za medicinsku rehabilitaciju Stubičke Toplice, September 2023 pp. 5, 9 and 13, Retrieved on July 1, 2025 from [https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA\\_%20O\\_OBAVLJENIM\\_REVIZIJAMA/FINACIJSKE\\_REVIZIJE/BOLNICKE\\_ZDRAVSTVENE\\_USTANOVE/SPECIJALNA%20BOLNICA%20ZA%20MEDICINSKU%20REHABILITACIJU%20STUBICKE%20TOPLICE.pdf](https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA_%20O_OBAVLJENIM_REVIZIJAMA/FINACIJSKE_REVIZIJE/BOLNICKE_ZDRAVSTVENE_USTANOVE/SPECIJALNA%20BOLNICA%20ZA%20MEDICINSKU%20REHABILITACIJU%20STUBICKE%20TOPLICE.pdf)
10. State Audit Office, Zadar, Regional Office, Izvješće o obavljenoj financijskoj reviziji Psihijatrijska bolnica Ugljan, January 2024, pp. 7, 13 and 16, Retrieved on July 1, 2025 from [https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA\\_%20O\\_OBAVLJENIM\\_REVIZIJAMA/FINACIJSKE\\_REVIZIJE/BOLNICKE\\_ZDRAVSTVENE\\_USTANOVE/PSIHIJATRIJSKA%20BOLNICA%20UGLJAN.pdf](https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA_%20O_OBAVLJENIM_REVIZIJAMA/FINACIJSKE_REVIZIJE/BOLNICKE_ZDRAVSTVENE_USTANOVE/PSIHIJATRIJSKA%20BOLNICA%20UGLJAN.pdf)
11. State Audit Office, Krapina, Regional Office, Izvješće o obavljenoj financijskoj reviziji Specijalna bolnica za medicinsku rehabilitaciju Krapinske Toplice, December 2023 pp. 8, 13 and 16, Retrieved on July 1, 2025 from [https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA\\_%20O\\_OBAVLJENIM\\_REVIZIJAMA/FINACIJSKE\\_REVIZIJE/BOLNICKE\\_ZDRAVSTVENE\\_USTANOVE/SPECIJALNA%20BOLNICA%20ZA%20MEDICINSKU%20REHABILITACIJU%20KRAPINSKE%20TOPLICE.pdf](https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA_%20O_OBAVLJENIM_REVIZIJAMA/FINACIJSKE_REVIZIJE/BOLNICKE_ZDRAVSTVENE_USTANOVE/SPECIJALNA%20BOLNICA%20ZA%20MEDICINSKU%20REHABILITACIJU%20KRAPINSKE%20TOPLICE.pdf)
12. State Audit Office, Pazin, Regional Office, Izvješće o obavljenoj financijskoj reviziji Specijalna bolnica za ortopediju i rehabilitaciju Martin Horvat Rovinj – Rovigno – Ospedale specialistico per l'ortopedia e la riabilitazione Martin Horvat Rovinj – Rovigno, January 2024 pp. 8, 11 and 15, Retrieved on July 1, 2025 from [https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA\\_%20O\\_OBAVLJENIM\\_REVIZIJAMA/FINACIJSKE\\_REVIZIJE/BOLNICKE\\_ZDRAVSTVENE\\_USTANOVE/SPECIJALNA%20BOLNICA%20ZA%20ORTOPEDIJU%20I%20REHABILITACIJU%20MARTIN%20HORVAT%20ROVINJ%20%E2%80%93%20ROVIGNO.pdf](https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA_%20O_OBAVLJENIM_REVIZIJAMA/FINACIJSKE_REVIZIJE/BOLNICKE_ZDRAVSTVENE_USTANOVE/SPECIJALNA%20BOLNICA%20ZA%20ORTOPEDIJU%20I%20REHABILITACIJU%20MARTIN%20HORVAT%20ROVINJ%20%E2%80%93%20ROVIGNO.pdf)

13. State Audit Office, Zadar, Regional Office, Izvješće o obavljenoj financijskoj reviziji Specijalna bolnica za ortopediju Biograd na Moru, November 2023 pp. 6, 11 and 15, Retrieved on July 1, 2025 from [https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA\\_%20O\\_OBAVLJENIM\\_REVIZIJAMA/FINANCIJSKE\\_REVIZIJE/BOLNICKE\\_ZDRAVSTVENE\\_USTANOVE/SPECIJALNA%20BOLNICA%20ZA%20ORTOPEDIJU%20BIOGRAD%20NA%20MORU.pdf](https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA_%20O_OBAVLJENIM_REVIZIJAMA/FINANCIJSKE_REVIZIJE/BOLNICKE_ZDRAVSTVENE_USTANOVE/SPECIJALNA%20BOLNICA%20ZA%20ORTOPEDIJU%20BIOGRAD%20NA%20MORU.pdf)
14. State Audit Office, Zagreb, Regional Office, Izvješće o obavljenoj financijskoj reviziji Specijalna bolnica za zaštitu djece s neurorazvojnim i motoričkim smetnjama, Zagreb, March 2024 pp. 8, 12 and 14, Retrieved on July 1, 2025 from [https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA\\_%20O\\_OBAVLJENIM\\_REVIZIJAMA/FINANCIJSKE\\_REVIZIJE/BOLNICKE\\_ZDRAVSTVENE\\_USTANOVE/SPECIJALNA%20BOLNICA%20ZA%20ZASTITU%20DJECE%20S%20NEURORAZVOJNIM%20I%20MOTORICKIM%20SMETNJAMA,%20ZAGREB.pdf](https://www.revizija.hr/UserDocsImages/izvjesca-novo/Revizije%20-%202023/IZVJESCA_%20O_OBAVLJENIM_REVIZIJAMA/FINANCIJSKE_REVIZIJE/BOLNICKE_ZDRAVSTVENE_USTANOVE/SPECIJALNA%20BOLNICA%20ZA%20ZASTITU%20DJECE%20S%20NEURORAZVOJNIM%20I%20MOTORICKIM%20SMETNJAMA,%20ZAGREB.pdf)
15. Včev A., Mahaček D., (2014), Financijska revizija bolničkih zdravstvenih ustanova i računovodstveni sustav, p. 132, 133, Zbornik Ekonomskog fakulteta u Zagrebu Vol. 12 No. 1, ISSN 1333-8900, e-ISSN 1845-495X
16. Včev A., Mahaček F., Mahaček K., (2019), Application of statistical analysis on data on business operations of special hospitals, p. 20, 21, 45th International Scientific Conference on Economic and Social Development – XIX International Social Congress (ISC 2019) - Moscow, 17-18 October 2019, e-ISSN 1849-7535
17. William F. Messier Jr., (1998), Revizija – Priručnik za revizore i studente, Faber & Zgombić Plus, Zagreb, p. 165

# CANADA'S FUTURE IN THE CONTEXT OF RELATIONS WITH THE EUROPEAN UNION

**Zuzanna Przygoda**

*Colorado State University, Pueblo,  
Pueblo, Colorado, USA  
zuzannakprzygoda@gmail.com*

**Mirosław Przygoda**

*Pueblo School District 60 Pueblo,  
Pueblo, Colorado, USA  
mirosławprzygoda@wp.pl*

## **ABSTRACT**

*Canada is the second-largest country on the globe in terms of land area. By population, it ranks third within the North American region, including the Caribbean. Canada is a member of two elite groups comprising the world's largest economies: the G7 and the G20. It is a member of NATO, being one of the founding nations of this defence alliance. Alongside the US and Mexico, Canada is a signatory to the USMCA trade agreement. At present, the United States is the "Land of the Maple Leaf's" largest trading partner. The European Union, as a trading bloc, ranks second, while China ranks third. In the past, relations between Canada and the US were often marked by political and even military conflicts. However, since the end of the First World War, relations have been based on mutual respect and partnership. This was fostered by a sense of shared solidarity that emerged in 1914, when citizens of both nations (initially American volunteers and Canadian soldiers) found themselves on the European front. The Second World War and the shared struggle against the Axis powers further strengthened the bonds between the two nations. Regrettably, current relations between Canada and the US resemble an open conflict on a political and trade level. Since the beginning of 2025, both countries have been in an open tariff war. This situation has had a severe impact on the state of the Canadian economy. Under these circumstances, the government in Ottawa is forced to seek solutions aimed at helping the country overcome the crisis. The European Union is extending a helping hand to Canada, proposing closer trade relations and a deepening of mutual economic integration. Will this help Canada? How far can the integration process develop, given the current conditions? It is based on an analysis of existing opinions and available materials.*

**Keywords:** *conflict, European Union, integration, Canada, the US*

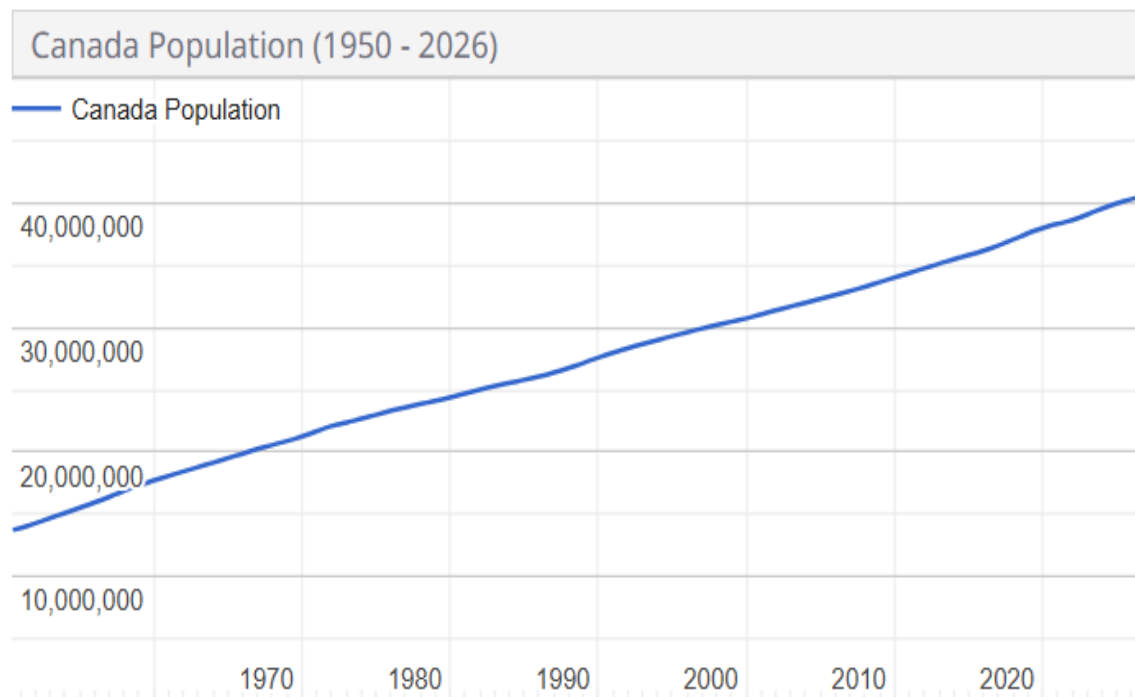
## **1. INTRODUCTION**

Canada is the second largest country in the world, behind Russian Federation. Total land area of Canada is 9 984 670km<sup>2</sup> (Worldometer, 2026). Geographically, Canada it is part of North America. Its reaches from the Atlantic Ocean to the east to the Pacific Ocean to the west and Arctic Ocean to the north. This creates the world's longest coastline. To the south and west, Canada shares a border with the United States. To the south it borders twelve US states: Idaho, Maine, Michigan, Minnesota, Montana, New Hampshire, New York, North Dakota, Ohio, Pennsylvania, Vermont and Washington. With Ohio and Pensylvania it is a water boundary on Lake Erie. To the west, it borders the thirteenth state – Alaska. The border with the USA, spanning 8 891 kilometers is the longest land border between two countries in the world. In addition to border with the United States, Canada shares a very short (only 1,280 meters) land border with Greenland (which is an autonomous territory of the Kingdom of Denmark) to the northeast on Hans Island and maritime bounadary with France's overseas collectivity of Saint Pierre and Miquelon to the southeast (RCGS, 2008).

Canada is also home to the world's northernmost settlement. Canadian Forces Station Alert on the northern tip of Ellesmere Island lies only 817 kilometers from the North Pole (World Population Review, 2026). Nearly 40% of Canada's territory and more than 75% of its coastline are located north of the Arctic Circle (Neilson Bonikowsky N., 2012). This makes Canadians feel responsible for what is happening in this part of our globe.

## 2. POPULATION

Canada 2026 population is estimated at 40,467,728 people at mid-year. It is equivalent to 0,49% of the total world population. The whole number of people living in this country gives 38th place - globally. More than 80,2% of the people is urban residents (32,464,952 in 2026). For many years the number of inhabitants in Canada shown an upward trend (Worldometer, 2026, II). The main drivers of population growth are immigration and - to lesser extent, natural growth (Zimmerman K., 2010). The Phenomenon of steady and constant population growth is the result of a consistent policy pursued for many years by successive governments in Ottawa, as well as by local authorities. The Canadian federal administration, considering that a population decline constitutes a major threat to the existence of the state, is endeavoring to counteract this phenomenon.

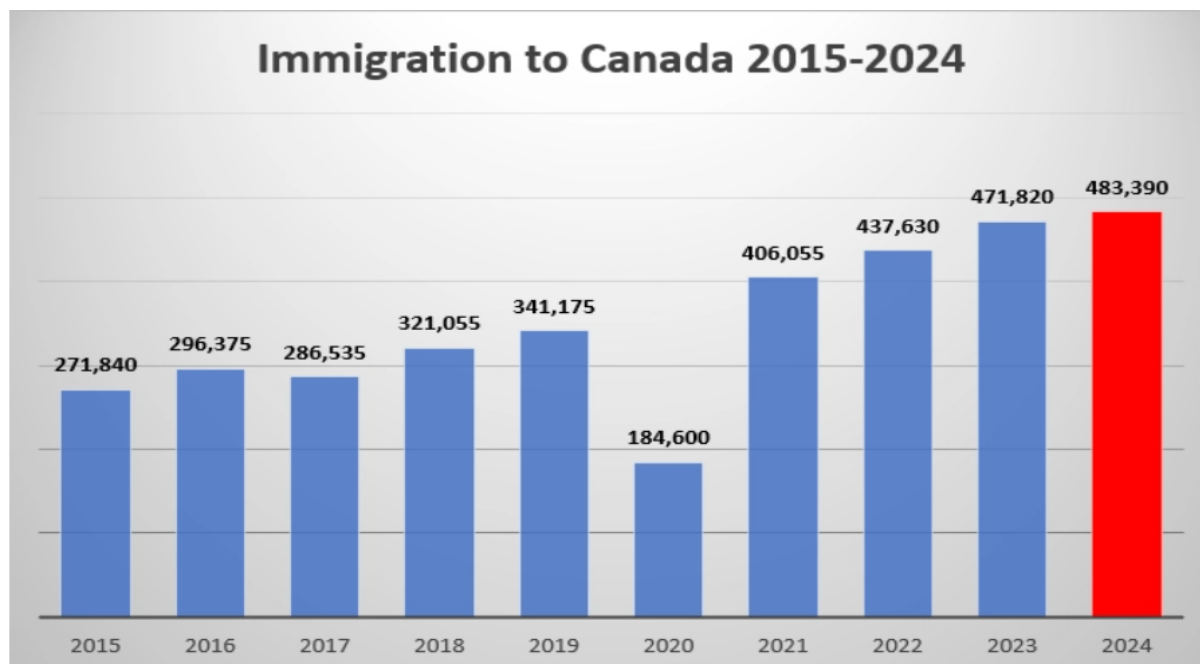


*Graph 1: Canada Population (1950 – 2026)*

*Source: Worldometer, Canada Population*

*From: <https://www.worldometers.info/world-population/canada-population/>*

Canada has one of the highest per-capita immigrations rates in the world, fuelled mainly by economic policy and family reunification. A record 483,390 immigrants were admitted in 2024. Canada leads also the world in refugee resettlement. It was more than 47,600 in 2022 (Sevunts L., 2023). A policy favoring the influx of immigrants from around the globe causes a change in the existing social structure that is not always favorable, and under crisis conditions, can lead to discontent among certain groups of citizens and specific social tensions.



*Graph 2: Immigration to Canada 2015-2024*

*Source: Immigration.ca, Live and Work in Canada, since 1994*

*From: <https://immigration.ca/will-canadas-record-2024-immigration-levels-ever-be-exceeded/>*

New immigrants are accommodated mostly in major urban areas such as Toronto, Montreal, Vancouver, Ottawa, Calgary, Edmonton and others (Singer C. R. 2025). This constitutes a significant factor in the development of cities and metropolitan areas in Canada.

| No. | Urban Area | Population Estimate (2025) | Global Rank | Population Forecast (2030) | Population Forecast (2050) |
|-----|------------|----------------------------|-------------|----------------------------|----------------------------|
| 1.  | Toronto    | 5 494 431                  | 74          | 5 722 033                  | 6 168 899                  |
| 2.  | Montreal   | 2 668 723                  | 187         | 2 705 897                  | 2 773 659                  |
| 3.  | Vancouver  | 1 707 865                  | 286         | 1 763 610                  | 1 874 133                  |
| 4.  | Calgary    | 1 197 110                  | 431         | 1 290 299                  | 1 601 251                  |
| 5.  | Edmonton   | 981 522                    | 524         | 1 042 255                  | 1 242 064                  |
| 6.  | Winnipeg   | 679 037                    | 796         | 689 745                    | 710 740                    |
| 7.  | Ottawa     | 605 121                    | 900         | 623 082                    | 715 605                    |
| 8.  | Quebec     | 490 451                    | 1134        | 499 753                    | 517 247                    |
| 9.  | Surrey     | 454 230                    | 1226        | 479 259                    | 504 763                    |
| 10. | Hamilton   | 432 788                    | 1292        | 439 570                    | 450 793                    |

*Table 1: Top 10 Largest Cities in Canada and Population Forecast to 2050*

*Source: Worldometer, Największe miasta w Kanadzie według liczby ludności (2025)*

*From: <https://www.worldometers.info/pl/populacja/najwieksze-miasta-w-kanada/>*

From the data collected in Table 1 it follows that – no significant changes are expected in the city ranking. The only exception is the national capital Ottawa, which will move up in 2050 from 7th to 6th position. Winnipeg will drop from 6th to 7th place in the same year.

| No. | Year | Population | Median Age | Urban Population in % | Urban Population | Migrants (net) | Canada Global Rank |
|-----|------|------------|------------|-----------------------|------------------|----------------|--------------------|
| 1.  | 2030 | 41,655,589 | 41,7       | 80,8                  | 33,662,820       | 266,663        | 39                 |
| 2.  | 2035 | 42,905,267 | 42,8       | 81,9                  | 35,120,468       | 240,507        | 41                 |
| 3.  | 2040 | 43,951,417 | 43,8       | 83,1                  | 36,540,219       | 244,845        | 44                 |
| 4.  | 2045 | 44,850,096 | 44,6       | 84,6                  | 37,921,907       | 263,720        | 47                 |
| 5.  | 2050 | 45,621,882 | 45,1       | 86,0                  | 39,233,850       | 261,957        | 46                 |

*Table 2: Canada Population Forecast*

*Source: Worldometer, Canada Population Forecast to 2050*

*From: <https://www.worldometers.info/world-population/canada-population/>*

The data contained in Table 2 are very optimistic and show, that Canada's population will consistently grow in the coming decades. This process will rely primarily on population growth in cities and urban areas. But most of the country is sparsely populated. The majority of citizens inhabit the areas south of the 55<sup>th</sup> parallel north, at the distance up to 160 kilometers (100 miles) from the border with the United States. It should be noted that, so-called: "The Quebec City-Windsor Corridor" is the most densely inhabited and heavily industrialized region accounting for nearly 50% of the total population. More than 60% of Canadians live in just two provinces: Ontario and Quebec (McMurry P. H., Sheherd M. F., Vickery J. S. 2004). Two official languages are used in Canada:

- English: It is the native language of approximately 58% of the population and predominates in most provinces.
- French: It is the native language of approximately 22% of the population.

More than 85% of Canadian Francophones live in the province of Quebec. However, the number of French speakers is decreasing year by year. It was 27,5% in 1971, but in 2024 only 22% of population. Approximately 18% of Canadians report fluency in both languages: English and French (Government of Canada, 2024). The percentage of bilingual individuals in the country is higher among the younger generation than among older people.

## 2. NATURAL RESOURCES

Canada possesses some of the richest deposits of natural resources on Earth. This is a result of the vast territory it occupies, as well as its diverse geological structure. Among the most important treasures of this land are (Student of History, 2026):

- Minerals and metals are significant natural resources found in Canada. British Columbia is the largest mining province in this country, with many mines for copper, gold, silver, lead and zinc. „The Land of The Maple Leaf" is one of the world's top gold producers with mines located mostly in the provinces: Ontario, Quebec and mentioned earlier British Columbia.
- Fossil fuels such as: coal, oil and natural gas are also extracted in Canada. Most of the coal mines are located in Alberta, British Columbia, Saschatchewan and New Brunswick. Canada is the world's fourth largest oil producer with most of its reserves in Alberta. Natural gas reservoirs are found in the southwest part of the country in Alberta, Saskatchewan and British Columbia.

- Rare Earth Element (REE) resources, estimated at over 15.2 million tons. These are gigantic resources on a global scale. This places Canada in fourth place globally. Behind China, Vietnam, and Brazil, but ahead of Russia, India, Australia, and the United States. REE resources are concentrated in four provinces: Quebec, Ontario, Saskatchewan and the Northwest Territories.
- Approximately 40% of Canada is covered by forests. The majority of these forests are concentrated in the north of the country, including the provinces of British Columbia, Alberta and the Northwest Territories. Forest resources constitute the foundation of a thriving timber and paper industry.
- The prairie provinces such as Alberta, Saskatchewan and Manitoba are known as the "Breadbasket of Canada". The rich fertile soil here provides ideal conditions for growing different grains as: wheat, barley, oats, corn, vegetables. Thanks to its extremely efficient and mechanized agriculture, Canada is one of the world's largest producers and exporters of grain. In the three aforementioned provinces, vegetables, fruits and various other agricultural products are also produced on a large scale.
- Potash is the common name for salt compounds that contain potassium and is used in the production of fertilizer. Canada is the world's largest producer of potash and is responsible for 60% of the global fertilizer supply.
- Extremely rich water resources are also found here. Canada's rivers and lakes contain about 20% freshwater. These resources are critical for safe drinking water, supporting agriculture and hydroelectric power generation. Most of the "Land of The Maple Leaf" hydroelectric power generation is found in Ontario and Quebec.

It should be added that global warming facilitates the future exploitation of Canada's natural resources, particularly in the country's northern regions, which have hitherto been difficult to access. This also opens up new and much broader perspectives for agriculture.

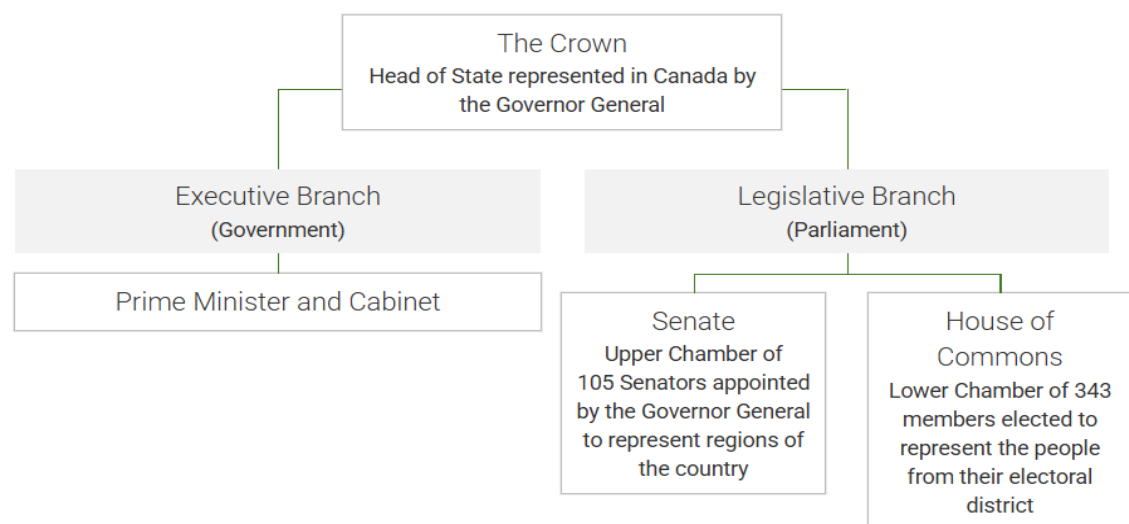
#### 4. POLITICAL SYSTEM

Canada is a constitutional monarchy and a parliamentary democracy. It is a federation composed of 10 highly autonomous provinces and three territories. Provinces derive their authority directly from the British Crown pursuant to the Canadian constitution. Territories are under the authority of the Canadian federal government (Britannica, 2026).

- **The capital of Canada is Ottawa** (*located in the province of Ontario*).
- **The ten provinces are** (*with their capitals in*): Alberta (*with its capital in Edmonton*), British Columbia (*Victoria*), Manitoba (*Winnipeg*), New Brunswick (*Fredericton*), Newfoundland and Labrador (*St. John's*), Nova Scotia (*Halifax*), Ontario (*Toronto*), Prince Edward Island (*Charlottetown*), Quebec (*Quebec City*), and Saskatchewan (*with its capital in Regina*).
- **The three territories are** (*with their capitals in*): Northwest Territories (*with its capital in Yellowknife*), Nunavut (*with its capital in Iqaluit*), Yukon (*with its capital in Whitehorse*).

Canada's system of government is based on that of the United Kingdom. It involves the separation of powers into three independent but interconnected branches (Elections & Democracy, 2026):

- **Legislative Branch:** Passes laws and represents the people. It consists of the Monarch (represented by the Governor General), the Senate, and the House of Commons.
- **Executive Branch:** Implements and enforces laws. It is made up of the Monarch, the Prime Minister, and the Cabinet.
- **Judicial Branch:** Interprets and applies the law. It consists of the Supreme Court of Canada and other federal and provincial courts.



*Graph 3: Canada's parliamentary system: Crown, Executive, and Legislative branches*

*Source: Parliament of Canada, ProceduralInfo (2024)*

*From: [https://www.ourcommons.ca/procedure/ourprocedure/parliamentaryFramework/c\\_g\\_p\\_arliamentaryframework-e.html](https://www.ourcommons.ca/procedure/ourprocedure/parliamentaryFramework/c_g_p_arliamentaryframework-e.html)*

The current monarch - the head of state is King Charles III, who is officially the King of Canada. Because the King resides in the United Kingdom and is absent from Canada, he appoints a Governor General to represent him in the country, however, the choice of Governor General is made by head of government - the prime minister. The current Governor General is Louise Arbour - born in Montreal, *Canadian lawyer, prosecutor, civil servant and jurist*. The current prime minister is Mark Carney – leader of the *Liberal Party of Canada*.

## 5. CANADIAN ECONOMY

Canada remains one of the world's most affluent nations. The country's economy ranks tenth (10) globally in terms of Gross Domestic Product (GDP). It is estimated at approximately 2.51 trillion USD in 2026. The GDP growth rate in 2026 is 1,5%, according to the International Monetary Fund (IMF). Gross Domestic Product (GDP) per Capita in Canada (with a population of 40 467 728 people) is 60.305 USD in 2026, an increase of 4.540 USD -from \$55 765 in 2025. This represents a change of 8,1% in GDP per capita (Worldometer III, 2026).

Canada's wealth derives from three primary pillars:

- vast natural resources
- robust manufacturing capacity
- highly developed international trade networks encompassing both exports and imports

**Export** is the most fueling factor driving the economic growth of the "Land of the Maple Leaf."

The key commodity groups for export include crude oil and refined petroleum products, natural gas, passenger vehicles and automotive parts, gold, wood and also wood products, aluminum, aircraft and aerospace products, potassium chloride used as fertilizer, and electrical machinery products. Agricultural products also play an important role in exports, including grains such as wheat, canola, oats, barley, as well as corn and soybeans.

**Import.** Indeed, even the second largest country in the world is not self-sufficient. The primary categories of Canadian imports comprise: motor vehicles, electrical and mechanical engineering equipment, chemicals, optical instruments, textiles and clothing, plastics, citrus fruits, alcohol, advanced technologies and pharmaceuticals.

Both exports and imports operate along distinct geographical channels, generating extensive flows of goods and commodities.

| Rank | Territory      | Exports<br>(CAN\$<br>Billions) | Total<br>Export<br>(%) | Rank | Territory      | Imports<br>(CAN\$<br>Billions) | Total<br>Import<br>(%) |
|------|----------------|--------------------------------|------------------------|------|----------------|--------------------------------|------------------------|
| -    | <b>World</b>   | 720.1                          | 100.00                 | -    | <b>World</b>   | 765.7                          | 100.00                 |
| 1.   | United States  | 547.4                          | 76.02                  | 1.   | United States  | 377.0                          | 49.24                  |
| 2.   | European Union | 34.5                           | 4.79                   | 2.   | China          | 88.8                           | 11.60                  |
| 3.   | China          | 29.3                           | 4.07                   | 3.   | European Union | 73.6                           | 9.61                   |
| 4.   | United Kingdom | 27.0                           | 3.75                   | 4.   | Mexico         | 47.3                           | 6.18                   |
| 5.   | Japan          | 14.8                           | 2.06                   | 5.   | Germany        | 23.8                           | 3.11                   |
| 6.   | Mexico         | 8.1                            | 1.25                   | 6.   | Japan          | 21.4                           | 2.79                   |
| 7.   | South Korea    | 7.5                            | 1.04                   | 7.   | South Korea    | 16.9                           | 2.21                   |
| 8.   | Netherlands    | 6.3                            | 0.87                   | 8.   | Vietnam        | 14.7                           | 1.92                   |
| 9.   | Switzerland    | 6.1                            | 0.85                   | 9.   | Italy          | 12.5                           | 1.63                   |
| 10.  | Germany        | 5.7                            | 0.79                   | 10.  | Brazil         | 10.2                           | 1.33                   |
| 11.  | India          | 5.1                            | 0.70                   | 11.  | France         | 9.9                            | 1.29                   |

*Table 3: List of the largest trading partners of Canada (Exports & Imports)*  
*Source: Highlights of Canada's merchandise trade performance - 2024 update*  
*From: <https://international.canada.ca/en/global-affairs/corporate/reports/chief-economist/annual/2024>*

The largest destinations for Canadian exports are the United States, with a share of 76.02%, followed by European Union in second place (4.79%), and China in third (4.7%).

The largest sources of Canada's imports are the United States in the first place (49.24%), China in the second place (11.60%), and European Union in third (9.61%).

## 6. CANADA - UNITED STATES RELATIONS

It is important to note that the territories comprising present-day Canada formerly belonged to the British Empire and, prior to that, to France. Following the proclamation of the Declaration of Independence in 1776, the United States was established. However, this development was not enthusiastically embraced by all British colonists in North America. Approximately 100,000 of them, known as Loyalists, chose to leave the territory of the newly formed nation in order to remain subjects of the British Crown. The largest contingent, numbering roughly 50,000 individuals, fled northwards to the territories of modern-day Canada. The remainder relocated to other British possessions, including the Caribbean islands of Jamaica, Dominica, and Saint Vincent, as well as the Bahamas. Others opted for Sierra Leone in Africa, whilst a substantial group of approximately 30,000 people decided to return to Great Britain (Wilson B.G., 2009). Understandably, the Loyalists who settled in British Canada harboured a well-founded resentment towards their newly liberated and independent neighbours to the south. Within a brief period, geopolitical tensions escalated, instigating seven interstate crises. Numerous smaller conflicts of a local scope also occurred. Among the seven largest crises: four of these disputes culminated in direct military action, two deteriorated into localized conflicts involving bloodshed, while one was successfully averted in its initial stages. These confrontations comprised (Klein C., 2015):

- The Invasion of Quebec (1775)
- The War of 1812 (1812–1814)
- The Patriot War (1838)
- The Aroostook War (1838–1839)

- The Pig War (1859)
- The Fenian Raids (1866–1871)
- Cypress Hills Massacre (1873)

On July 1, 1867, upon receiving the status of a British dominion, Canada became constitutionally a confederation of four provinces: Ontario, Quebec, Nova Scotia, and New Brunswick. Prior to this date, three British colonies existed in this area: Nova Scotia, New Brunswick, and the Province of Canada (within whose borders Ontario and Quebec functioned as a combined area of a single colony). Importantly, the Dominion of Canada received its own parliament in 1867. However, the country remained effectively British until December 11, 1931. It was then, by virtue of the Statute of Westminster, that the British Parliament officially recognized Canada as an independent and sovereign state possessing legislative autonomy. Foreign and defense policies also passed under the control of the government in Ottawa. **On April 17, 1982, Queen Elizabeth II signed the *Canada Act*, patriating the Canadian constitution (Gomez M., 2025).** Patriation was a long political process that led to full Canadian sovereignty. *Canada Act* removed the final constitutional ties with Great Britain, sealing the legal and formal separation from the mother country. Canada entered a new era of its existence, which marked the beginning of its growing significance and role in the modern world.

### 6.1. The periods preceding the First and Second World Wars

Returning to Canada–US relations, it must be stated that the final years of the nineteenth century and the first decade of the twentieth century failed to assuage the animosities between the two nations. Of particular concern to Canadians was the aggressive and increasingly pervasive nature of American expansionism policy:

- In 1890, the United States Congress in Washington enacted the so-called ‘McKinley Tariff Act’, through which the US introduced drastic import duties that directly impacted Canadian agriculture. This measure was intended to coerce Ottawa into an economic union with the United States. In response, the Conservative Prime Minister of Canada, John A. Macdonald, introduced retaliatory tariffs and sought to strengthen trade relations with Great Britain (Palen M-W., 2025). Numerous American politicians (for example: *William Sulzer*, *Ebenezer J. Hil*, *William Howard Taft*) openly asserted at the time. For example: the Speaker of the House of Representatives, Champ Clark, as late as 1911- that forcing such economic convergence was merely a prelude to the complete annexation of Canada by the United States (Bunch A., 2025).
- The Alaskan Boundary Dispute (about *Panhandle Region*) represented the gravest crisis of that era, culminating in 1903. Following the discovery of gold in the Klondike, a dispute arose between the two nations regarding the precise demarcation line separating Alaska (US) and Yukon (Canada). An international arbitration tribunal in London, where the decisive vote was cast by the British representative (*Lord Alverstone*), ruled in favour of the United States, granting it the territorial advantages. The Canadian representatives refused to sign the final decision. Consequently, vast swathes of Canadian land were cut off from the open ocean (Farr D.L.M., Block M., 2006). This decision provoked a profound sense of betrayal within Canada towards the authorities in London and significantly exacerbated anti-British and anti-American sentiments.
- The intensified territorial expansionism of its southern neighbour sparked legitimate concerns and a perceived threat within Canada. During this period, through a combination of armed conflicts and political pressure, the United States acquired numerous territories belonging to other nations. Chronologically, these acquisitions included the following territories (Burns A., Patrona T.D., 2017):

- 1867: Alaska
- 1867: Midway Islands
- 1898: Puerto Rico
- 1898: Guam
- 1898: Philippine Islands
- 1898: Hawaiian Islands
- 1899: American Samoa
- 1899: Wake Island
- 1899: Johnson Atoll
- 1903: The Panama Canal Zone

It should be added that the Americans also harboured designs on annexing entirety colony of British Columbia, though they ultimately failed to realise this intention.

The year 1914 marked the outbreak of the First World War. This date brought an end to the turbulent and conflict-ridden years in Canada-US relations. Regrettably, the culmination of these disputes and upheavals resulted in Canada ceding vast tracts of the Pacific coast to the Americans, alongside Detroit - which had historically been the third-largest settlement in the Province of Quebec.

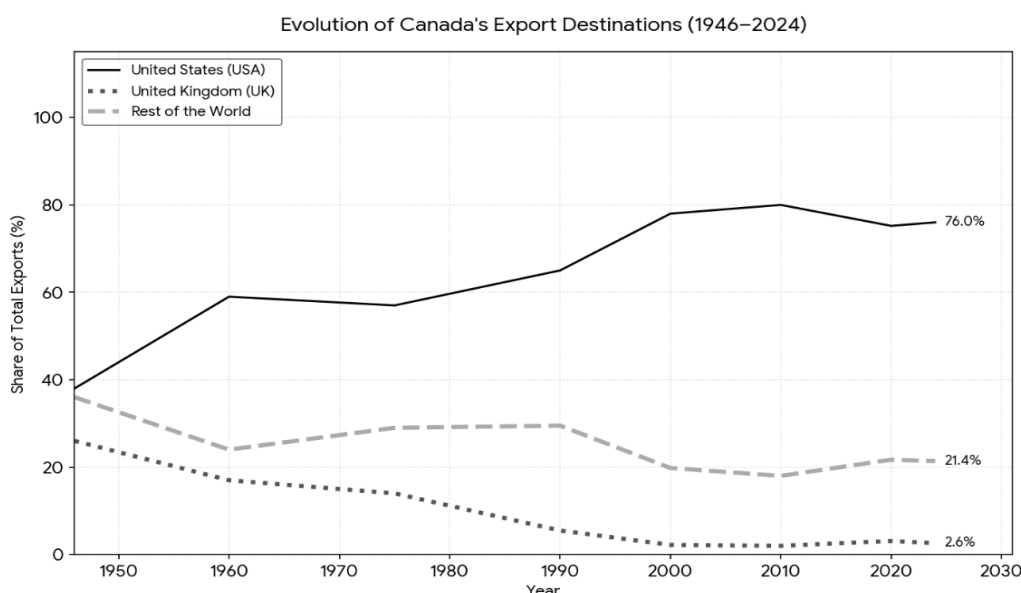
## **6.2. The Era of the World Wars (1914 - 1945)**

The Canadians participated in the First World War from its very inception. Their country entered the global conflict on August 4, 1914. It was fulfilling its obligation to fight in support of the Empire, supplying military equipment and personnel **to the theater of war**. This duty stemmed directly from Canada's status as a British dominion, which lacked the right to conduct an independent foreign and defense policy. The First World War lasted for Canada four (4) years, three (3) months, and seven (7) days. The United States remained neutral during the greater part of the First World War. Washington entered the war nearly three years later than their northern neighbour, exactly on 6 April 1917. It means that USA - participated in the first global conflict for only one (1) year, seven (7) months, and five (5) days. Before the United States officially entered the war, thousands of American volunteers wishing to fight against Germany crossed the border and enlisted in the Canadian Expeditionary Force (CEF). It is estimated that as many as 30,000 to 35,000 Americans served in Canadian uniforms. (Suatac D., 2017). In taking an oath of loyalty to the British monarch, Americans faced the risk of forfeiting their U.S. citizenship. With the entering their country to the war, this issue resolved itself. The brotherhood in arms of both nations soldiers forged a new reality. Through shared sacrifice, bonds of friendship and fraternity were sealed, effectively dissolving all past animosities, prejudices, and disputes. The triumph over Imperial Germany also had a profound impact on mutual political relations. Replacing the longstanding distrust and outright hostility, a new partnership emerged, paving the way for expanding economic cooperation. The joint struggle on the fronts of World War I proved to be a turning point in the history of these two nations. But the effort and sacrifice made in World War II reinforced all the positive changes in their existing relations. Added to this was a newfound mutual trust and respect, shared by the citizens and by politicians of both sides. The second global conflict brought about enormous geopolitical transformations. The British Empire lost its dominant global role to a new superpower - the United States.

## **6.3. The period after World War II**

After World War II, Canada completely changed its foreign and trade policy. The government in Ottawa realized that war-torn Great Britain and Europe could no longer support Canada's economic growth. Meanwhile, the United States economy was booming after the war.

The US needed vast amounts of raw materials, trusted partners, and new markets. In this situation, closer economic ties between Canada and the US became the perfect solution. Both sides acted quickly and smoothly. This cooperation brought fast benefits, and the two countries closely linked their macroeconomic interests. It created excellent conditions for sectors, industries, and businesses to grow on both sides of the border. The involvement of American capital and bilateral agreements between the governments in Ottawa and Washington, enabled the dynamic restructuring of Canada's economy. The country, previously reliant primarily on agriculture and raw material exports, was transformed into one of the major global economic power. It owed its position chiefly to the growth of industries such as automotive manufacturing, the oil and gas extraction industry, mining, metallurgy, the aerospace & defense industry, and the forest products and furniture industry. This cooperation also provided a vital foundation for the United States. American heavy industry and refineries thrived on access to Canada's vast, secure reserves of raw materials, oil, and gas. The 1965 Auto Pact allowed Detroit car giants to integrate production across the border, lowering costs and boosting profits. Furthermore, bilateral defense agreements strengthened the U.S. military sector during the Cold War. Ultimately, Canada supplied vital resources, integrated manufacturing chains, and became a massive consumer market for finished goods from the USA, securing America's position as a global superpower.

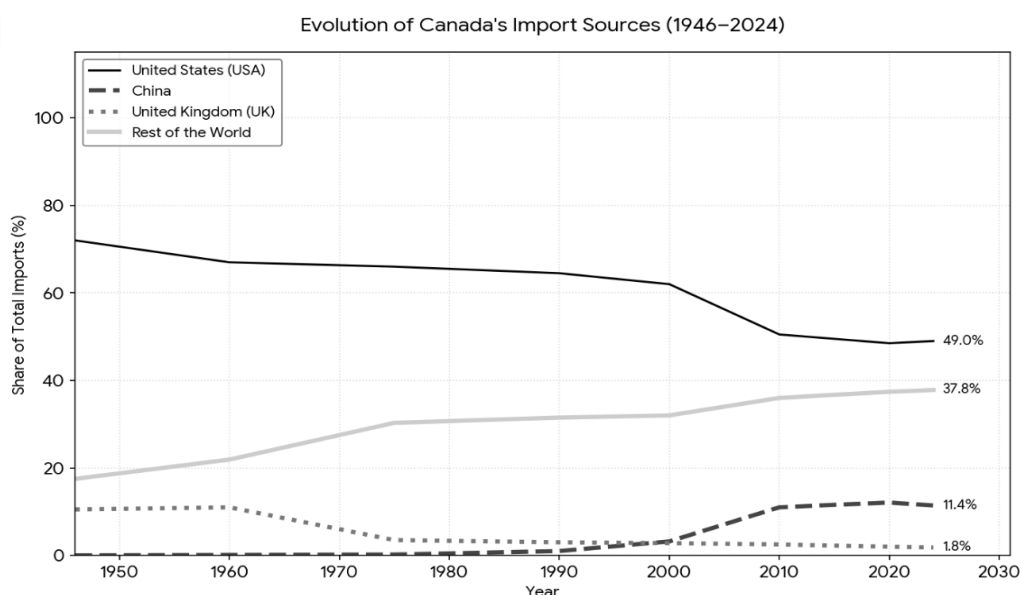


*Graph 4: Evolution of Canada's Export Destinations (1924-2024)*

*Source: Statistics Canada (StatCan) Historical International Trade Series*

*From: [https://www.statcan.gc.ca/en/subjects-start/international\\_trade](https://www.statcan.gc.ca/en/subjects-start/international_trade)*

Based on Graph 4, a reorientation of Canadian exports can be observed, shifting from two main recipients (namely the United Kingdom alongside the USA in 1946) to a single dominant customer - its southern neighbor. The result of 76.0% (in 2024) of all export goods directed to the USA demonstrates the complete dependence of the Canadian economy on this single strategic partner.



*Graph 5: Evolution of Canada's Import Sources (1924-2024)*  
Source: Statistics Canada (StatCan) Historical International Trade Series  
From: [https://www.statcan.gc.ca/en/subjects-start/international\\_trade](https://www.statcan.gc.ca/en/subjects-start/international_trade)

Graph 5 shows how consecutive Canadian governments have tried to diversify their supply sources for raw materials, components, and finished goods to lessen their reliance on the US. The tightening of economic relations between Canada and the US has translated into cooperation across many fields within various international institutions and organisations. Actively participating in them, both nations have frequently demonstrated similar positions and concern for their well-defined shared interests.

*Table ends on the next page*

| No. | Institution or organization abbreviation | Institution or organization full name | Nature of activity or field of operation                                   | Year of accession |      |
|-----|------------------------------------------|---------------------------------------|----------------------------------------------------------------------------|-------------------|------|
|     |                                          |                                       |                                                                            | Canada            | U.S. |
| 1.  | USMCA                                    | United States-Mexico-Canada Agreement | Promoting economic cooperation and regional free trade                     | 2020              | 2020 |
| 2.  | NATO                                     | North Atlantic Treaty Organization    | Providing collective military defense and political cooperation            | 1949              | 1949 |
| 3.  | UN                                       | United Nations                        | Peacekeeping and international cooperation                                 | 1945              | 1945 |
| 4.  | WB                                       | The World Bank                        | Global economic development and poverty reduction                          | 1945              | 1945 |
| 5.  | AC                                       | Arctic Council                        | Arctic environmental protection, climate research and regional cooperation | 1996              | 1996 |

|     |      |                                                        |                                                                          |      |      |
|-----|------|--------------------------------------------------------|--------------------------------------------------------------------------|------|------|
| 6.  | OSCE | Organization for Security and Co-operation in Europe   | Conflict prevention, crisis management, and post-conflict rehabilitation | 1975 | 1975 |
| 7.  | G7   | Group of Seven                                         | Global economic governance and international security cooperation        | 1976 | 1975 |
| 8.  | G20  | Group of Twenty                                        | International financial stability and global economic cooperation        | 1999 | 1999 |
| 9.  | OECD | Organisation for Economic Co-operation and Development | Promoting economic growth, prosperity, and trade expansion               | 1961 | 1961 |
| 10. | ICRC | International Committee of the Red Cross               | Humanitarian relief, disaster response, and medical aid                  | 1896 | 1881 |

*Table 4: International Organization Memberships: Canada & USA*

*Source: Official Membership Directories of the UN, NATO, OECD, G7, G20, IRC, AC & WB*

*From: <https://www.nato.int> <https://www.un.org/>; <https://arctic-council.org/>; ect.*

It should be noted that in 8 out of the 10 international organisations listed in *Table 4*, Canada and the US were founding member states. **Hence, in eight cases, the accession date to the organisation is identical.** The only exceptions are the G7, which Canada joined a year after its formation, and the ICRC, which was established by Switzerland. The United States-Mexico-Canada Agreement (*USMCA*) is placed at the top of the presented compilation. Due to the importance of this accord, it is essential to outline its main objectives at this point. *USMCA* is the direct successor to *NAFTA*, a 1994 trilateral economic agreement between Canada, the US, and Mexico. Its primary objective was to establish one of the world's largest free trade areas through The United States–Mexico–Canada Agreement is placed at the top of the presented compilation. the gradual elimination of tariffs and trade barriers, as well as by facilitating the movement of goods and services across North America. The new treaty modernised these existing regulations, continuing the mission to protect investments and build a stable economic market.

Alongside economic alliances involving active participation from Canada and the US, military alliances were also established. A key example is NATO, listed as the second item in *Table 4*. Although conceived as a peaceful military alliance, it also committed member states to economic and political cooperation, as well as the promotion of liberty and prosperity. For Canada, NATO membership additionally provided an effective way to counterbalance the dominant influence of the US within the pact. This was achieved by simultaneously strengthening ties with European countries within the structures of the alliance (Global Affairs Canada, 2026). Compared to NATO, the other treaty, NORAD (established in 1957), is a purely military alliance. The North American Aerospace Defense Command (NORAD) is a bilateral agreement between Canada and the US designed for continuous control, monitoring and effective defense of North American airspace and aerospace (NORAD History, 2020). It was originally created to provide early warning of potential missile attacks from the Soviet Union.

#### 6.4. The crisis in Canadian-American relations

At the very beginning of 2025, a crisis emerged in US-Canadian relations. The cause of the conflict between Ottawa and Washington, which continues to this day, is the 47th President of the United States, Donald Trump. Earlier, while still president-elect, he expressed the opinion that Canada should become the 51st US state. He then repeated this thought multiple times on various official occasions. On February 1, 2025, just over a dozen days after taking office at the White House, he signed an executive order introducing 25% tariffs on Canadian products, with the exception of strategic energy resources like crude oil and natural gas, which were hit with a 10% rate. Previously, energy resources, which accounted for about 43% of all imports from Canada to the US, were subject to a 0% rate. Meanwhile, other goods (manufactured products, cars, agriculture), which made up 57% of imports, were subject to a 13.5% tariff. The export of Canadian steel and aluminum to the US suffered the most. Tariffs on these two metals were raised to as much as 50%. It is very important information, because Canada is the largest supplier of these raw materials, accounting for over 20% of steel and about 53% of aluminum (Janzen N., 2025). The serving in 2025, prime minister of Canada - Justin Trudeau, responded almost immediately with retaliatory tariffs. The new Canadian tariff rates of 25%, valued at approximately USD 106 billion, covered hundreds of consumer and industrial products imported from the US, including (Kitamura K. H, 2026):

- **Food and consumer goods:** alcoholic beverages such as beer and wine, peanut butter, and cosmetics.
- **Household and recreational equipment:** home appliances and sporting goods.
- **The metallurgical sector:** steel and aluminum.
- **The automotive sector:** car parts and vehicles that did not meet USMCA agreement conditions.

Following negotiations in the fall of 2025, Canada suspended some of its retaliatory tariffs, and the US temporarily deferred tariffs on goods that were covered by the USMCA agreement. However, it quickly became apparent that improving relations with the US was not possible (PAP, 2025). At the end of October 2025, all negotiations with Canada were abruptly cut off by the US. This was a hasty, personal, and sovereign decision by President Donald Trump. The reason for this reaction was a broadcast aired on one of the Canadian television station. It recalled archival footage in which President Ronald Reagan criticized tariffs as an instrument that destroys the economy.

**In early 2026, Washington worsened relations and deepened the crisis.** President Trump again raised the tariff on Canadian goods - this time from 25% to 35%. The USMCA free trade agreement was still active, but the US completely ignored it when introducing these new restrictions.

**For historians, this was a clear case of *déjà vu*.** The situation between the US and Canada perfectly repeated the events of 1903. Everything was very similar. It started with statements suggesting the US might **incorporate** Canada and ended with a “tariff war”, that damaged both economies.

#### 7. ECONOMIC CONSEQUENCES OF THE CRISIS FOR CANADA

The ongoing “tariff war” with the southern neighbor caused noticeable losses for the Canadian economy in a relatively short period of less than a year and a half. The most significant data are provided below:

- On a macroeconomic scale, the crisis had a direct impact on GDP. Canada's economic growth decelerated from 1.5% in 2024 to a mere 1.0% in 2025. It is estimated that, baseline unchanged, the GDP level by the end of 2026 will be approximately 1.5% below pre-conflict projections (Bank of Canada, 2025).
- A significant decline in trade volume between the two countries occurred in 2025 (USTR, 2026):
  - Canada's exports to the U.S. stood at \$383.0 billion, representing a decrease of \$28.9 billion, or 7.0%.
  - Canada's imports from the U.S. reached \$336.5 billion, reflecting a decline of \$13.4 billion, or 3.8%.
- In 2025, the automotive, metallurgical (steel and aluminum), and chemical industries were hit hardest by the crisis (Owusu P., Quiroz K., 2026):
 

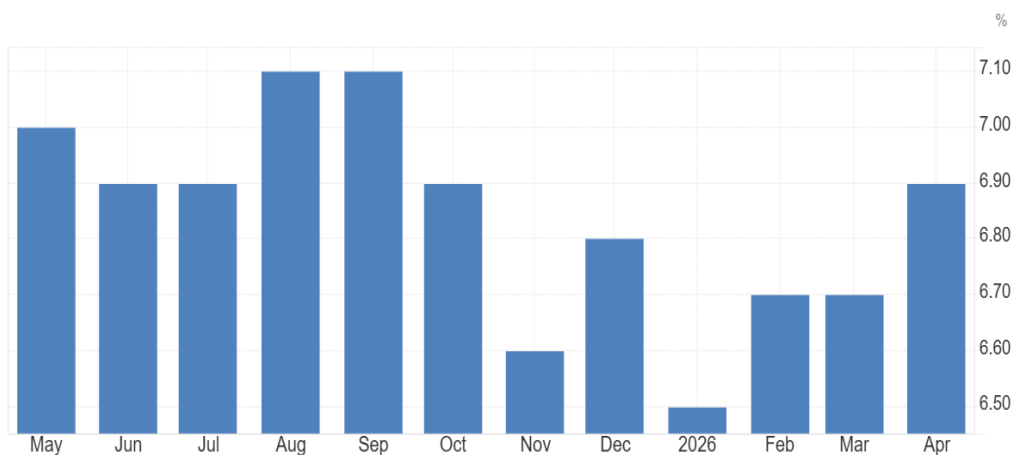
**The automotive sector** was exposed to approximately **\$5 billion in total tariff costs**. Driven by the 25% U.S. tariffs on non-compliant vehicles and auto parts, Canadian automobile production fell by **7%**

#### **The metallurgical industry**

- Steel exports decreased by approximately 32% year-over-year in total volume and dropped by approximately \$2.40 billion
- Aluminum exports decreased by about 12% in terms of overall value and decreased by about \$1.13 billion

**The chemical industry** faced massive disruptions within its integrated supply chain. The total value of chemical product trade between the U.S. and Canada shrank by approximately \$5.1 billion. The overall chemical trade volume fell by about 6.2% year-over-year.

**The labor market** also entered a dangerous phase beginning in 2025. Rise in the unemployment rate was registered (Trading Economics, 2026). At the beginning of 2025, unemployment in Canada stood at approximately 6.5%. Driven by the economic slowdown and job cuts in sectors dependent on trade with the U.S. (mainly manufacturing and automotive), the unemployment rate rose, reaching 6.9% in the end of April 2026. The 6.9% unemployment rate recorded in April 2026 meant that exactly 1.566 million people remained unemployed in Canada.



*Graph 5: Unemployment rate in Canada (May 2025 - April 2025) in %*

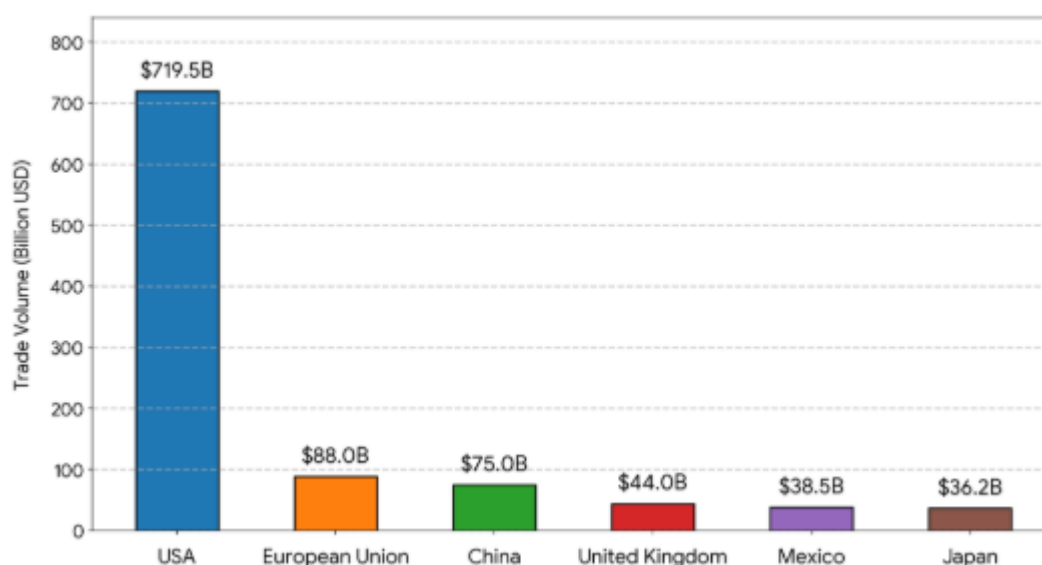
*Source: Trading Economics*

*From: <https://tradingeconomics.com/canada/unemployment-rate>*

The USMCA (United States-Mexico-Canada Agreement), which entered into force in 2020, regulates the rules of duty-free free trade between the US, Canada, and Mexico. It is a set of rules whose main task is to protect North American industry and agriculture from foreign competition from other countries. It covers six main areas: the automotive industry, agriculture and food, digital trade and e-commerce, labor rights and organisation of trade unions, intellectual property and patent rights, and environmental protection. When the agreement was signed, the member states agreed to discuss its 16-year extension after six years. The date for these negotiations is set for July 1, 2026. If the three countries agreed to continue, the USMCA would expire in 2036 (2020 + 16 years). If all countries agree to extend the agreement in the summer of 2026, the expiration date will be pushed another 16 years into the future-meaning until 2042. Due to the current trade conflict between the US and Canada, the chances of extending it are, in fact, very low (Wayne A., Hernandez-Roy C., Marroquin Bitar D., 2026). Any potential disruption to the existing cooperation would undo past achievements and halt the economic development of all participants in the agreement. Additionally, it would expose each of the three economies to the risk of serious external threats, especially from the Chinese side.

## 8. OPENING NEW PERSPECTIVES AND HORIZONS

Based on total trade volume with partners other than the United States, boosting existing economic ties can succeed in only two directions. The first is **the European region**, with the European Union's bloc of countries as the key partner. The second is the Asian region - with China as the main recipient and provider of raw materials, goods, and services.



*Graph 6: Canada's Top 6 Trading Partners by Total Trade Volume*

*Source: Author's elaboration based on Statistics Canada*

*From: <https://www150.statcan.gc.ca/n1/daily-quotidien/260219/dq260219a-eng.htm>*

Comparing the data from *Graph 6*, it is certain that the United States will remain the leader in trade with Canada for at least another decade. However, the European (UE) and Asian (China) directions appear highly promising in the long run.

### 8.1. People's Republic of China

An argument in favor of developing trade with People's Republic of China is the size of its market. It is a place of immense growth potential, fueled by 1.4 billion consumers.

Additionally, there is a strong pro-China lobby in Canada, effectively advocating for closer cooperation between both countries. Nearly 5% of Canadians report Chinese ancestry, with the community reaching 1.7 million people in 2021. This makes them the country's second-largest ethnic group, surpassed only by the South Asian diaspora. Notably, the size of this Chinese-Canadians population more than doubled between 1996 and 2021 (StatsCan Study, 2026). At the beginning of 2026, Canada and China signed an important trade deal. Announced by Canadian Prime Minister Mark Carney and Chinese President Xi Jinping, the agreement slashes Canada's tariffs on Chinese electric cars from 100% to just 6.1%. This special rate applies to a maximum of 49,000 vehicles per year. In return, Beijing removed restrictions on Canadian agricultural products. By opening its car market, Canada saved its farming sector and thousands of local jobs (Bankier.pl., 2026). Economic and political closer ties with China are heavily criticized by many groups in Canada. These critics include a large part of the parliamentary opposition, many economists, and the premiers of several Canadian provinces. They especially emphasize the threat of retaliatory tariffs from the United States. Donald Trump and American officials accused Canada of trying to become a "shipping hub" for cheap Chinese goods, including electric cars flooding all of North America. Washington threatened to put 100-percent tariffs on Canadian exports if Ottawa opens its market wide to China (Jung C., 2025). Other experts warn against becoming too economically dependent on the BRICS countries, where Beijing is the undisputed leader. For the "Land of the Maple Leaf", this could end in an economic disaster. Another issue raised is the threat of Chinese and Russian expansion in the Arctic region. Security commentators and officials remind that Canada, as a NATO member, is obligated to protect and secure its northern borders - against any ambitions from the Beijing-Moscow duo. The current Prime Minister Mark Carney is also often accused of trying to silence the debate on human rights in China in pursuit of profits from the Canada's agricultural sector sales. All of this shows that finding an alternative to trade with the US by choosing the Asian (China) channel may turn out to be complicated and difficult.

## 8.2. European Union

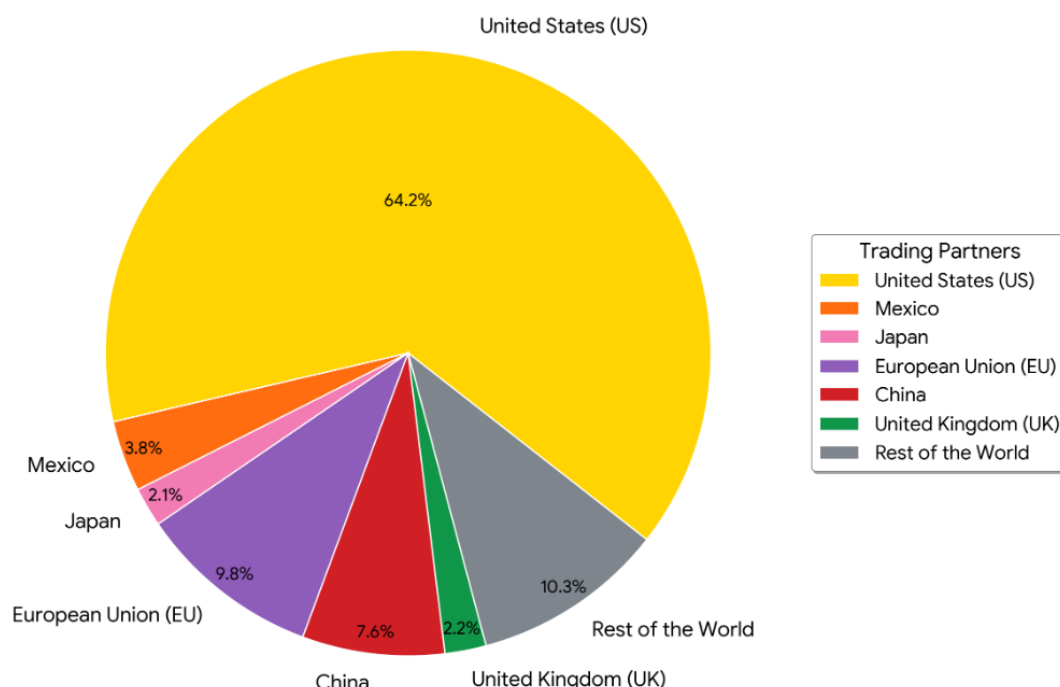
Canada is often considered the most European country outside of "**the Old Continent**". This is the result of centuries of close relationships, first with France and later with Great Britain. These strong bonds have shaped the entirety of its reality - from culture and history to politics, the economy, and social structure. Most young Canadians know English and French - two languages that make traveling around Europe much easier. For many of them, a trip across the ocean is also a chance to visit the countries of their ancestors. However, contacts between Canada and Europe extend far beyond tourism and nostalgic memories of the past. Since the creation of the European Union, both sides (Canada & EU) have systematically strengthened their economic and political relations. Although economic ties weakened after World War II, they are now rebuilding and continuously developing. Alongside the USA and China, the European Union is **now** one of Canada's three most important trading partners.

The European Union is an economic and political union of states whose main objectives are: **maintaining peace, raising the standard of living of its inhabitants, ensuring general security, protecting the environment, and striving for free and comprehensive development without internal borders.**

It should be remembered that the European Union does not constitute a single state built on federal principles. It remains a union of states bound together by treaties and agreements. In most statistical studies, the EU is presented as a bloc of countries constituting a single economic entity.

Currently, the community consists of 27 states that often differ significantly from one another in terms of economic development, geographical location, natural resources, surface area, and population size. From July 1, 2013, for nearly 6 years and 7 months, the European Union had 28 members. The situation changed on January 31, 2020, when the United Kingdom left this economic alliance. The process of exiting this international organization itself has gone down in history under the name "Brexit". In recent years, the European Union has found itself in a severe political and economic crisis as a result of numerous flawed decisions. Furthermore, during President Trump's term, severe restrictions were imposed on the EU. Much like with Canada, an aggressive and outright hostile tariff policy was applied. Various forms of political pressure were also exerted at multiple levels. Washington's policy ruthlessly exploited the EU's dependence on American technology. The authorities in Brussels even described these actions as an attempt by the United States to economically subjugate Europe. After Canada and the EU found themselves in a similar predicament, both sides decided to provide mutual assistance and declared their willingness to overcome the situation together by tightening economic relations. Currently, the EU is the second (2) largest trading partner of the "Land of the Maple Leaf", while Canada ranks twelfth (12) for the Union.

The European Commission's Directorate-General for Trade and Economic Security reported that in 2024, bilateral trade in goods reached **81.81 billion USD** (€75.6 billion), and trade in services amounted to **52.92 billion USD** (€48.9 billion). Canada accounted for nearly 1.4% of the EU's external trade in goods. In 2024, this exchange was dominated by machinery (24.4% of European Union exports to Canada and 15% of imports), chemical and pharmaceutical products (22.2% of EU exports and 19% of imports), and mineral products (26% of EU imports from Canada). Services exported from the Union came primarily from sectors such as tourism, transport, telecommunications, IT, and information (Tomeczak M., 2025).



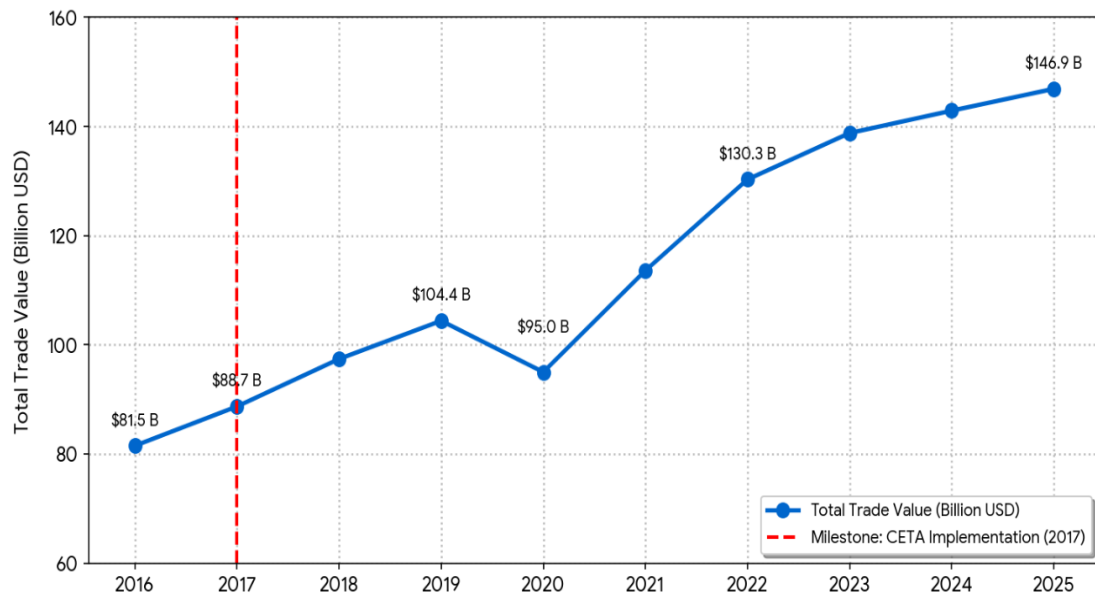
*Graph 7: Canada's Leading International Trading Partners*

*Source: Statistics Canada, International Merchandise Trade for Principal Trading Partners.*

*From: <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1210001101>*

Graph 7 illustrates the exceptionally high current dependence of Canada's economy on the United States. Despite the government in Ottawa taking decisive action toward diversification, over 64 percent of the country's trade continues to rely on relations with its massive southern neighbor.

Reducing export concentration and expanding the trading network seems to be the right approach, especially when choosing the European Union as a new economic partner of growing importance. This strategic move aligns perfectly with Ottawa's current efforts to broaden its economic horizons.



*Graph 8: Total Trade Value between Canada and European Union in USD (2016-2025)*

*Source:* Author's own elaboration based on European Commission data.

*From:* [https://policy.trade.ec.europa.eu/eu-trade-relationships-country-and-region/countries-and-regions/canada\\_en](https://policy.trade.ec.europa.eu/eu-trade-relationships-country-and-region/countries-and-regions/canada_en)

Graph 8 indicates that: from 2016 to 2025, the total trade value between the EU and Canada surged by 80.25%, rising from 81.5 billion USD to 146.9 billion USD. The main trends and key points of interest highlighted in Graph 8 are briefly outlined below:

- (2016–2017) Steady Growth: Trade exchange between the EU and Canada expanded at a moderate pace, rising from 81.5 billion USD to 88.7 billion USD. Although transatlantic relations were developing, the existing potential and opportunities in bilateral engagement remained underutilized.
- (2017) Breakthrough in Bilateral Trade Relations: The implementation of the CETA agreement, a *major milestone*. The accord eliminated tariffs on as much as 98% of goods exchanged between both partners, opened up markets extensively for investors, dismantled bureaucratic barriers, and removed double technical certifications.
- (2018–2025) Accelerated Growth: A decline in trade turnover to 95.0 billion USD was recorded in 2020, driven by the global pandemic, lockdowns, and the United Kingdom's departure from the EU. After that, the curve demonstrates a clear and sharp upward trend. By 2022, trade value climbed to 130.3 billion USD, ultimately reaching a record high of 146.9 billion USD in 2025.

In the context of strengthening economic cooperation and developing trade relations between Canada and the EU, it should be emphasized that the group of 27 European countries is the party more actively committed to deepening this process. The European Commission, acting as the executive branch of the entire economic community, has been actively seeking new export markets and supply sources worldwide for many years. This stems from a simple reason: the organization lacks funds. The root cause is the implementation of the European Union's climate policy. The execution of the financially burdensome and foundationally controversial program - the *European Green Deal (EGD)* - is widely considered a major mistake. The total cost of this initiative, based on the mobilization of both public and private funds, is estimated at an astronomical sum of at least 1 trillion euros over a decade. Its rollout, combined with the enforced rapid pace of reforms, strips the European industry of its competitiveness, drives energy prices up to an irrational level, catastrophically burdens the budgets of member states, and ruins the finances of households. One of the primary goals, which was to build the prosperity of citizens, is becoming a bitter illusion. Critics particularly target specific elements of the *European Green Deal*, such as the "Fit for 55" package and the *ETS2 system*, the *Energy Performance of Buildings Directive (EPBD)*, the proposed ban on the sale of internal combustion engine vehicles, restrictions on the use of pesticides and fertilizers, and the forced transition of farming into purely organic agriculture. The consequences of this policy are reflected in the decline of key economic indicators:

| No | Category / Indicator                                     | Global Share |       | Change<br>(in %) |
|----|----------------------------------------------------------|--------------|-------|------------------|
|    |                                                          | 2019         | 2025  |                  |
| 1. | Global nominal GDP (USD)                                 | 21,1%        | 17,2% | 3,9%             |
| 2. | Global GDP by purchasing power parity (PPP)              | 15,5%        | 13,9% | 1,6%             |
| 3. | Auto industry                                            | 21,0%        | 14,6% | 6,4%             |
| 4. | Chemical industry                                        | 18,0%        | 13,0% | 5,0%             |
| 5. | Agricultural industry and food processing                | 11,0%        | 8,5%  | 2,5%             |
| 6. | Exports of goods and raw materials<br>(steel, machinery) | 17,0%        | 14,0% | 3,0%             |
| 7. | Technology sector revenues                               | 22,0%        | 18,0% | 4,0%             |
| 8. | Foreign exchange reserves                                | 21,0%        | 19,7% | 1,3%             |

Table 5: The European Union's share in the global market from 2019 to 2025

Source: United Nations, The Sustainable Development Goals Report 2025

<https://unstats.un.org/sdgs/report/2025/The-Sustainable-Development-Goals-Report-2025.pdf>

The decline in the EU's global share across various fields between 2019 and 2025 was caused by the simultaneous occurrence of several important factors. A synergistic effect was triggered by: the implementation of climate regulations contained in the *European Green Deal*, the outbreak of the *COVID-19* pandemic, the United Kingdom's exit from the European Union (*Brexit*), the severe energy shock caused by the embargo on Russian raw materials following the invasion of Ukraine in 2022, and **the introduction of a "Tariff war" by the USA**. This decline directly reflects the fading confidence of the global financial markets in the economic stability and competitiveness of the European Union.

## 9. INTEGRATION BETWEEN CANADA AND THE EUROPEAN UNION

The CETA agreement is considered a milestone in economic relations between Canada and the European Union. It is an important step toward establishing a transatlantic free trade area and, at the same time, an integrating tool that serves to unify the rules and regulations under which two previously distinct economic systems cooperate.

CETA, or in its full name - the Comprehensive Economic and Trade Agreement, is an attempt by the EU to set global trade standards that could serve as a basis for concluding similar partnership agreements with other countries in the future.

The agreement in question was brought into force in two main stages:

**Stage I: September 21, 2017.** This marked the provisional application of the agreement's provisions. It allowed for the immediate activation of approximately 95% of the terms, including the elimination of most tariffs. This step made it possible to bypass the need to wait for the lengthy approval process by all member states of the bloc. The European Union was able to implement these provisions right away, as consent had been granted by the European Parliament and national governments within the Council of the EU.

**Stage II: April 30, 2019** - a milestone date for full implementation. On this day, the Court of Justice of the EU issued an official ruling declaring the investment protection court system compatible with EU law. This removed the most significant legal hurdle, stabilizing the agreement in international relations and giving member states the green light for domestic ratification. The effects of introducing the agreement following the initial period starting in September 2017 were also assessed. Currently, in its key points, the agreement covers, among other things (EC, 2026):

- Elimination of 98% of customs tariffs between the parties to the agreement;
- Equal operating rules and rights for Canadian and European companies across both continents;
- Simplification of immigration procedures, enabling businesses to temporarily deploy key personnel to work abroad;
- Compliance of Canadian food producers with stringent EU norms and standards;
- Specific annual quantitative quotas for duty-free trade in several sensitive goods. This applies, for instance, to the export of beef, veal, pork, wheat, and sweet corn from Canada to Europe. Conversely, export restrictions apply to European cheeses and dairy products, textiles and apparel, sugar, and certain high-sugar products, including chocolate confections;
- The right for European enterprises to bid on Canadian government procurement contracts at the federal, provincial, and local levels;
- Trademark and brand protection for certain goods. Canada has legally committed to protecting over 140 traditional, regional food and beverage products from the EU. These products cannot be counterfeited or bear the same name unless they originate from that specific European region.

It is worth noting that CETA has still not entered into force 100%. For this to happen, the domestic ratification process must be completed by the parliaments of all EU member states. Until then, its provisional scope from 2017 remains invariably in effect. To date, the ratification process has been completed by 17 countries, including: Austria, Croatia, Czechia, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Romania, Slovakia, and Sweden. The group of 10 member states that have not yet approved the agreement includes: Belgium, Bulgaria, Cyprus, France, Greece, Hungary, Ireland, Italy, Poland, and Slovenia (EC, 2026). From the perspective of eight and a half years of CETA being in effect, it can be concluded that its conclusion and implementation have proven to be a success. Efforts are currently underway to revitalize its achievements and potential. This would aim to establish a significantly broader trade partnership between the European Union and Canada. The rapidly growing digitalization and artificial intelligence (AI) industries are also subject to harmonization efforts. As a result of these endeavors, two important documents have recently entered into force.

The EU-Canada Digital Partnership was officially signed and inaugurated on November 24th, 2023. The Digital Partnership between the European Union and Canada, served as a prelude to a multi-stage geopolitical and technological project aimed at establishing an integrated technological zone based on shared legal standards.

The Digital Trade Agreement (DTA), signed on March 5, 2026, is a separate legal instrument that prohibits digital customs duties and protects corporate source codes simultaneously across the territory of both economic partners (EC, 2026).

However, the process of Canada's integration with the European Union continues to progress. Currently, the EU is implementing a new and large-scale program called SAFE.

SAFE (Security Action for Europe). It constitutes a powerful new EU defense mechanism worth 150 billion euros in preferential loans, created to support and accelerate the joint procurement of military equipment by European countries (Chiusa S, 2026).

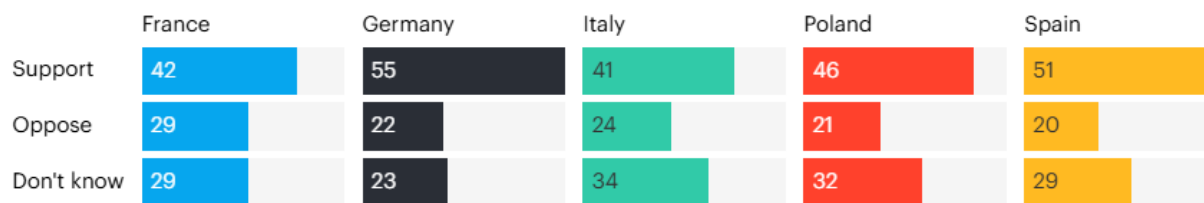
On May 20th, 2026, the European Parliament granted formal approval to a bilateral agreement under which Canada became the first and only non-European country admitted to this program. This is a great opportunity for the Canadian economy and the development of its defense industry. Procurements of military equipment by European countries are expected to create thousands of jobs in Canada and boost its economic growth.

Allowing Canada to share in the profits from the implementation of SAFE is also a clear incentive from Brussels for Ottawa to deepen the integration process.

### **9.1. Exploring the Frontiers of Deep EU-Canada Integration**

A major factor driving Canada's desire for closer ties with the EU is its spiritual heritage. "The Maple Leaf nation" has preserved its unique character and is considered "the most European land" outside the "Old Continent". Recent months, rich in pivotal events, demonstrate that relations between Canada and the European Union have progressed significantly beyond a conventional trade partnership. The economic instruments and mechanisms implemented to date have quickly and effectively mitigated systemic differences between both parties. Consequently, numerous sectors have already achieved complete integration. In the face of global shifts, Canada's formal integration into EU structures ceases to be a purely theoretical concept and becomes a viable strategy capable of delivering substantial, mutual strategic and economic advantages to both of sides. The starting point for this discussion is Article 49 of the Treaty on European Union, which traditionally associates membership with the concept of a 'European State'. While this provision is often interpreted in strictly geographical terms, today's world encourages defining Europe through shared values, democracy, and economic standards—criteria that Canada perfectly fulfills. From this perspective, the potential evolution of treaty law is not an obstacle, but a natural response to new geopolitical realities. The contemporary era has diminished the significance of geographical location as a determining factor for economic growth. The development of digital technologies, along with the resulting capacity for the instantaneous flow of capital and the networked consolidation of markets, have reduced the economic significance of physical location. Since, in today's world of technology and finance, traditional distances are losing their significance and cooperation relies on integrated systems, the geographical criterion embedded in treaty law should likewise give way to institutional proximity. Although Canada is located in North America, its potential accession to the European Union became a topic of political debate in early 2026. The escalating tariff war with the US had taken a dangerous turn. Washington's lack of compromise forced the government in Ottawa to consider joining existing European structures. People's expectations have aligned with this concept. Public support in Canada for this direction is surprisingly high, as confirmed by high-profile public opinion polls. According to a report by Spark Advocacy (Anderson B., 2026) released on April 6, 2026, nearly 58% of respondents demand a thorough examination of the possibility of joining the European Common Market. Meanwhile, a Nanos

Research poll for The Globe and Mail (Mackie A., 2026), published just a few days later on April 11, 2026, revealed that as many as 57% of citizens directly favor full membership in the EU structures. The results of similar studies in Europe were announced in April 2026. They were conducted in the five largest countries belonging to the European Union.



*Graph 9: Should Canada be allowed to join EU?*

*Source: YouGov*

*From: <https://yougov.com/en-gb/articles/54662-should-canada-be-allowed-to-join-the-european-union>*

To the question: "Should Canada be allowed to join the EU?", the majority of respondents in Germany and Spain answered in the affirmative (55% and 51% respectively). In the remaining three out of the five countries, the number of people in favour of Canada joining the EU was consistently higher than the number of those opposed to the idea. In percentage terms, the breakdown was as follows: Poland (Yes: 46% and No: 21%), France (Yes: 42% and No: 29%), and Italy (Yes: 41% and No: 24%). Following the recent positive talk about "The Maple Leaf nation", media in Europe have even started calling Canadians - "Honorary Europeans". The current Canadian Prime Minister is strongly pushing to reduce dependency on Washington. His government's noticeably pro-European stance and drive integration with the Single Market have even led to the coining of the term "Mark Carney's obsession". Brussels support for the Ottawa government is becoming increasingly tangible. Alongside enthusiastic statements from Ursula von der Leyen, former Belgian Prime Minister Guy Verhofstadt openly declared that there is "no reason why EU membership should be off the table". Furthermore, at the Yerevan summit in May 2026, EU nations opened the doors of the European Political Community to a non-European leader for the first time in history, inviting Prime Minister Mark Carney as an official guest (EC II, 2026). Assuming Canada joins the European Union, it would fundamentally restructure several international relations and global organisations:

- Dissolution of USMCA: The North American trade agreement established in 2020 would effectively dissolve.
- A geopolitical giant: The EU would gain its largest member by landmass and its fifth-largest by population.
- Schengen integration: Canada would eventually enter the Schengen Area, eliminating passport controls at airports and seaports for European travellers.
- European Parliament expansion: Canada would secure an estimated 56 to 58 seats, becoming the fifth-largest voting power—ranking just behind Spain (currently 61 seats) but ahead of Poland (53 seats).
- G7 consolidation: Four out of the G7 member nations would belong to the Single Market, significantly shifting the group's internal balance.
- G20 realignment: An integrated EU-Canada bloc would operate as a single economic titan, fundamentally altering the dynamics of political, trade, and climate negotiations with China and India.
- Combined, the European Union and Canada would create a consumer market of nearly half a billion people

- Arctic superpower status: Canada would grant the EU direct access to vast northern territories. Combined with Greenland (an autonomous territory of Denmark), this would reshape the Arctic Council and transform the EU into a dominant Arctic power.
- Eurozone amplification: Adopting the euro (EUR) would decisively elevate the currency's global status, transforming it into a far more formidable competitor to the US dollar (USD) and the rising Chinese yuan (CNY).
- Canada's accession to the EU would create a powerful transatlantic defence pillar, permanently shifting NATO's centre of gravity away from Washington and towards Brussels.

Without a doubt, it can be argued that these potential changes to the world order are entirely beneficial. In conclusion, the ultimate frontier achievable in the coming years is Canada's full integration through official accession into EU structures.

## 10. CONCLUSION

Canada needs the closest possible cooperation with Europe, just as the EU needs a new strategic - North American partner. Ottawa wants to reduce its reliance on the US while maintaining its position as a leading global economy. To keep its industry and agriculture producing at current high levels, Canada requires European money and funds. Meanwhile, to avoid a deep economic crisis, Europe requires Canadian raw materials and agricultural products. The EU also wants to boost its global political influence and defend itself against serious threats from the East. Deepening relations in all these areas will bring positive results for both Canada and the European Union, right now and in the future.

## LITERATURE:

1. Anderson B., (2026), Canada in the EU? Most Canadians think it's an idea worth exploring., spark\*advocacy, from: <https://sparkadvocacy.ca/insights/2026/04/canada-in-the-eu-most-canadians-think-its-an-idea-worth-exploring>
2. Bank of Canada, (2025), Outlook, Monetary Policy Report-October 2025-Canadian economy, Global economy, from: <https://www.bankofcanada.ca/publications/mp/mpr-2025-10-29/canadian-outlook/>
3. Bankier.pl (2026), Chiny I Kanada ogłaszają "nowe partnerstwo". Przelomowa umowa ws. cel i samochodów elektrycznych, Rynki, Gospodarka, Wiadomości, Publikacja, from: <https://www.bankier.pl/wiadomosc/Chiny-i-Kanada-oglaszaja-nowe-partnerstwo-Przelomowa-umowa-ws-cel-i-samochodow-elektrycznych-9069648.htm>
4. Britannica (2026), List of Provinces and Territories of Canada, Britannica Editors, History, from: <https://www.britannica.com/topic/List-of-Provinces-and-Territories-of-Canada>
5. Bunch A., (2025), The Revolt of Eighteen, The Toronto Time Traveller, History, from: <https://torontohistory.substack.com/p/the-revolt-of-the-eighteen>
6. Burns A., Patrona T.D., (2017), American Imperialism: The Territorial Expansion of the United States 1783-2013, European Journal of American Studies, Open Edition Journals, book reviews, from: <https://journals.openedition.org/ejas/12432>
7. Chiusa S., (2026), Win-Win for Defense Industry? Canada Joins EU SAFE Instrument, Geopolitical Monitor, Situation Reports, from: <https://www.geopoliticalmonitor.com/win-win-for-defense-industry-canada-joins-eu-safe-instrument/>
8. EC - European Commission, (2026), EU - Canada Comprehensive Economic and Trade Agreement (CETA) and Digital Trade Agreement, Trade and Economic Security, from: [https://policy.trade.ec.europa.eu/eu-trade-relationships-country-and-region/countries-and-regions/canada/eu-canada-agreements\\_en](https://policy.trade.ec.europa.eu/eu-trade-relationships-country-and-region/countries-and-regions/canada/eu-canada-agreements_en)

9. EC II - European Commission, (2026), Meeting of the European Political Community, from: <https://www.consilium.europa.eu/en/meetings/international-summit/2026/05/04/epc/>
10. Elections & Democracy (2026), Canada's Political System, Elections Canada, from: <https://electionsanddemocracy.ca/parliament/canadas-political-system>
11. Farr D.L.M., Block M., (2006), Alaska Boundary Dispute, The Canadian Encyclopedia, Article, from: <https://thecanadianencyclopedia.ca/en/article/alaska-boundary-dispute>
12. Gomez M., (2025), Kiedy Kanada stała się państwem: Kompletny przegląd, iRoamly, from: <https://www.iroamly.com/pl/canada-travel/when-did-canada-become-a-country.html>
13. Global Affairs Canada (2026), Canada and the North Atlantic Treaty Organization (NATO/OTAN), Government of Canada, from: [https://www.international.gc.ca/world-monde/international\\_relations-relations\\_internationales/nato-otan/index.aspx?lang=eng](https://www.international.gc.ca/world-monde/international_relations-relations_internationales/nato-otan/index.aspx?lang=eng)
14. Government of Canada, (2024), Statistic on official languages in Canada, from: <https://www.canada.ca/en/canadian-heritage/services/official-languages-bilingualism/publications/statistics.html>
15. Halpern-Shavim Z., Balkos E., (2026), U.S.- Canada Tariffs: Timeline of Key Dates and Documents, Blakes, from: <https://www.blakes.com/insights/us-canada-tariffs-timeline-of-key-dates-and-documents/>
16. Janzen N., (2025), How U.S. steel and aluminum tariffs would impact Canada's economy, Capital markets RBC, from: <https://www.rbccm.com/en/insights/2025/02/how-us-steel-and-aluminum-tariffs-would-impact-canadas-economy>
17. Jung C., (2025), Despite the Trump Tariff Threats, China Is Not a Reliable Partner for Canada, Source: The Diplomat, China Power, Diplomacy, East Asia, May 01, 2025, from: <https://thediplomat.com/2025/05/despite-the-trump-tariff-threats-china-is-not-a-reliable-partner-for-canada/>
18. Klein C., (2015), 7 times the U.S.- Canada Border Wasn't So Peaceful, History, Publisher: A&E Television Network, from: <https://www.history.com/articles/7-times-the-u-s-canada-border-wasnt-so-peaceful>
19. Kitamura K. H., (2026), U.S.- Canada Relations, Foreign Affairs; Trade & International Finance, CRS Product, from: <https://www.congress.gov/crs-product/IF12595>
20. Mackie A., (2026), Nearly 60% of Canadians support becoming a full member of the European Union, poll says, The Globe and Mail, Home, Canada, Ottawa, Opinion, from: <https://www.theglobeandmail.com/politics/article-canadians-support-becoming-member-european-union-nanos-poll/>
21. McMurry P. H., Sheherd M. F., Vickery J. S. (2004), Particulate Matter Science for Policy Makers: A NARSTO Assessment, Cambridge University Press, p 391.
22. Neilson Bonikowsky L., (2012), The Arctic, country by country, Canada, Diplomat, International Canada Magazine, from: <https://diplomatonline.com/2012/10/the-arctic-country-by-country/>
23. NORAD History (2020), North American Aerospace Defense Command, Home, from: <https://www.norad.mil/about-norad/norad-history/>
24. Owusu P., Quiroz K., (2026), Canada sidesteps recession-but key risks remain, Export Development Canada (EDC), from: <https://www.edc.ca/en/article/canada-recession-risks-2026.html>
25. Palen, M-W., (2025), Using Tariffs to Try Turn Canada into American State Backfired in the Past, Time, from: <https://time.com/7212675/tariffs-canada-american-state-backfired/>
26. PAP, (2025), Trump ogłosił zerwanie rozmów handlowych z Kanadą, wiadomości, Polska Agencja Prasowa (PAP), rynki finansowe, obserwator finansowy.pl, os/ kbm/ asa/ from: <https://www.obserwatorfinansowy.pl/forma/dispatches/trump-oglosil-zerwanie-rozmow-handlowych-z-kanada/>

27. RCGS, (2008), Canadian Geographic, Royal Canadian Geographic Society, p. 20.
28. Sevunts L., (2023), UNHCR calls for concerted action as forced displacement hits new record in 2022, United Nations High Commissioner for Refugees, The UN Refugee Agency, June 13, 2023, from: <https://www.unhcr.ca/news/unhcr-calls-for-concerted-action-as-forced-displacement-hits-new-record-in-2022/>
29. Singer C. R., (2025), Will Canada's Record 2024 Immigration Levels Ever Be Exceeded?, Immigrations.ca, February 12, 2025, from: <https://immigration.ca/will-canadas-record-2024-immigration-levels-ever-be-exceeded/>
30. StatsCan Study (2026), Portrait of the Chinese population in Canada, Multicultural Meanderings, from: <https://multiculturalmeanderings.com/2026/02/14/statscan-study-portrait-of-the-chinese-populations-in-canada/>
31. Student of History (2026), Canada's Natural Resources, World Geography Textbook, from: <https://www.studentsofhistory.com/canada-natural-resources>
32. Suatac D., (2017), Canada and the United States during Wartime, From Vimy to Juno, History, from: <https://www.vimytojuno.ca/en/news/canada-and-the-united-states-during-wartime>
33. Tomczak M., (2025), UE i Kanada zacieśniają współpracę, obserwator finansowy.pl, from: <https://www.obserwatorfinansowy.pl/tematyka/makroekonomia/trendy-gospodarcze/ue-i-kanada-zaciesniaja-wspolprace/>
34. Trading Economics (2026), Canada Unemployment Rate, Global Markets, Summary, from: <https://tradingeconomics.com/canada/unemployment-rate>
35. USTR(2026), Countries & Regions, Western Hemisphere, Canada, Office of the United States Trade Representative, from: <https://ustr.gov/countries-regions/americas/canada>
36. Wayne A., Hernandez-Roy C., Marroquin Bitar D., (2026), USMCA Review 2026, CSIS (Center for Strategic & International Studies), from: <https://www.csis.org/analysis/usmca-review-2026>
37. Wilson B.G. (2009), Loyalists in Canada, Article, The Canadian Encyclopedia, from: <https://thecanadianencyclopedia.ca/en/article/loyalists>
38. World Population Review, (2026), Where is Canada in the World?, Countries, Canada, Location, from: <https://worldpopulationreview.com/countries/canada/location>
39. Worldometer, (2026), Największe państwa świata (uszeregowane według powierzchni), from: <https://www.worldometers.info/pl/geografia/najwieksze-kraje-swiate/>
40. Worldometer II (2026), Population, World, Northern America, Canada population, from: <https://www.worldometers.info/world-population/canada-population/>
41. Worldometer III (2026), PKB Kanady 2026 według Międzynarodowego Funduszu Walutowego (MFW), from: <https://www.worldometers.info/pl/pkb/kanada-pkb/>
42. Zimmerman K. (2010), Canada, p.51, Edited: Lonely Planet, Red Ventures, Fort Mill, South Carolina, USA

# EDUCATION AND KNOWLEDGE MANAGEMENT: TRANSFORMING TEACHING PRACTICE INTO INSTITUTIONAL LEARNING CAPACITY

**Khalid Lahlou**

*Faculty of Letters and Human Sciences  
Ben M'Sik- Hassan II University of Casablanca, Morocco  
Hay El Baraka Av. Errahmouni Boualam, Casablanca 20670  
khalid.lahlou@univh2c.ma*

**Moulay Sadik Maliki**

*Faculty of Letters and Human Sciences  
Ain Chock- Hassan II University of Casablanca, Morocco  
BP.8507 Hay Inara, Casablanca  
sadikmaliki@yahoo.fr*

**Omar EL Ghazi**

*INSAD, Mohammedia, Hassan II University of Casablanca, Morocco  
omar.elghaziuh2c@gmail.com*

## ABSTRACT

*The aim of this paper is to identify how Knowledge Management (KM) initiatives can boost the quality of education, develop organizational learning, and contribute to the viable capacity of educational institutions (schools, universities, and training organizations). Using a knowledge-intensive approach, this paper examines processes involved with turning knowledge - developed from teaching and professional practice- into usable learning resources, curriculum changes and adjustments to institutes' policies. In addition, this paper evaluates core KM mechanisms currently utilized in educational settings such as knowledge capture (documenting knowledge of practice and instructional methods), codification (organizing and indexing knowledge so it can be reused), personalization (mentoring and expert to expert sharing), and knowledge transfer (communicating knowledge to other classrooms, departments, and cohorts); and how they support improvements in pedagogy and contribute to an organization's institutional memory. The ultimate purpose of this paper is to academically identify how digital technology can support knowledge management processes. This will be carried out through reviewing three types of technology:*

- a) learning management systems,*
- b) knowledge repositories, and*
- c) collaborative technology platforms.*

*In the course of this paper, the integration of learning analytics and evidence-based evaluation to identify knowledge gaps, evaluate the effectiveness of instruction, and develop data-informed decision-making are discussed. Several implementation issues can be identified, including resistance to sharing knowledge due to culture, difficulty maintaining quality and current knowledge, information overload due to excess knowledge in many cases, lack of appropriate structures for governance, and lack of alliance between KM activities and pedagogy. The paper advances that when KM is lined up with institutional learning goals and supported by the appropriate infrastructure, governance, and professional development, it can help improve learning organizations, preserve continuity of institutional knowledge, and provide student-centered educational experiences.*

**Keywords:** Education, Educational Experience., Institutional Knowledge, Knowledge Management, Organizational Learning

## **1. INTRODUCTION**

Across the world, educational systems are continuing to undergo a multitude of changes due to how rapidly we are advancing technologically, globally, demographically and also due to continuing changes in the world of work. As a result, decision-makers and higher education institutions are beginning to evaluate the usefulness of their institutions based on more than just their ability to provide content-based education — they are starting to assess the usefulness of their institutions in developing students' critical thinking capabilities, their ability to adapt and their ability to become lifelong learners (World Bank, 2018). Because of this shift, there have been numerous reforms created by government authorities and private higher education leaders (e.g., curriculum redesign, digital education, competency-based education and increased emphasis on teaching staff professional development). However, while efforts have been made to boost the effectiveness of education through these reforms, the spirit of restructurings does not always lead to continuous transformation. This ongoing issue appears to be primarily attributed to the fact that most educational institutions focus their reform efforts exclusively on their “own” teaching and learning experience. Creating KM (Knowledge Management) provides a means to close this knowledge gap. This can be done by considering knowledge to be an asset - as an asset of the organization that is created, captured, organized and used again (Davenport & Prusak, 1998; Zack, 1999). While KM is widely used in business and industry, it has not been used consistently or often in education. KM initiatives often target certain types of technological systems such as repositories and learning platforms without deeply addressing pedagogical, cultural and organizational aspects of knowledge. Knowledge in education is multi-faceted, self-motivated and constructed through social means. Teaching is about making continuous decisions and therefore create tacit knowledge that are specific to the context in which they were created (Polanyi, 1966). If an educational institution has not created or successfully shared such knowledge, they miss the opportunity for learning and improvement. However, success in implementing KM will give schools and educational institutions an organizational learning capability that promotes an ongoing learning and improvement process. This article argues that educational institutions might improve their ability to create knowledge by implementing knowledge management (KM). Institutions can achieve this by creating processes for knowledge management from pedagogically- embedded, socially- mediated, and evidence-based teaching practices. An investigation of a) the unwritten rules of KM, as well as of how knowledge is created, transformed, or used in an educational context, b) the key mechanisms associated with KM in education, c) enabling technologies, and d) learning analytics is also an important aspect of this paper's argument. In addition to offering a new integrated framework for successful implementation of KM, this paper also discusses the issues associated with introducing KM into education.

## **2. METHODOLOGY**

This study adopts a conceptual and literature-based approach to examine the role of Knowledge Management in educational settings. Rather than relying on empirical data collection, the paper draws on key contributions from the fields of Knowledge Management, organizational learning, educational theory, and learning analytics. Relevant scholarly literature was reviewed and synthesized to identify the principal mechanisms of KM in education, explore their implications for teaching and learning, and develop an integrated framework for KM implementation within educational institutions. The objective is not to test specific hypotheses but to provide a theoretically informed discussion of how KM can contribute to institutional learning and educational improvement.

### **3. EDUCATIONAL KNOWLEDGE IS A RESOURCE UNIQUELY SITUATED AMONG OTHER RESOURCES**

#### **3.1 Knowledge: A Relational Resource of Self-Direction / Institutional Memory and Organizational Learning**

According to Argyris and Schön (1978), organizational learning is the ability of an organization's staff to use their past experiences for improvement. In educational institutions, it often involves developing operative teaching strategies, updating curricula, and revising policies among other things. Fink et al. (2016) and Tsai and Huang (2014) agree, though in different terms, that institutional memory describes how knowledge has been developed, maintained, and shared. Although institutional memory can help an establishment retain its traditions, institutional memory may also result in an organization becoming rigid by keeping conventional ways of doing things that are no longer applicable. Consequently, the knowledge management (KM) system or mechanisms must strike a balance by providing a strong store of knowledge while also promoting a supportive environment for innovation and adaption in the future. This can be accomplished by:

- a) having a KM system capable of meeting both storage/retentions needs,
- b) creating an opportunity for self-reflection and
- c) continually updating the knowledge stored or retained.

Senge's (1990) description of a learning organization contains an outstanding model through which we can explain how knowledge management (KM) relates to an organization. It should be noted that characteristics of a learning organization are:

- a) systems thinking,
- b) a common vision (i.e. mission) and
- c) an ongoing commitment to learning.

To create learning organizations within the educational setting, all structural, cultural and "ceremonial" barriers that impede learning must be overcome. Barriers include (but are not limited to):

- a) hierarchical governance structures,
- b) standard assessment processes (i.e., rigid assessments that restrict creativity for teachers/students) and
- c) a lack of time to collaborate with others.

### **4. FROM TEACHING TO CREATING KNOWLEDGE ASSETS**

#### **4.1 The Knowledge Transformation Process**

Teachers create knowledge through lesson design, engagement with their students, assessing student work, and reflecting on their performance. However, when this knowledge is created without any systematic processes in place, it exists only in a "localized" format. The development of practice-based knowledge into institutional knowledge assets takes place through multiple and interrelated processes including:

1. **Knowledge creation** – the result of teaching/learning interactions
2. **Knowledge capture** – the recording of teacher insights
3. **Knowledge codification** – capturing knowledge in a manner that makes retrieval easy
4. **Knowledge transfer** – sharing knowledge with other individuals in different contexts
5. **Knowledge evaluation** – the evaluation of the effectiveness of the knowledge as it has been used operationally.

Although these processes are generally documented as linear, they are actually iterative and recursive in nature, and thus, continuously revisited, redefined or reframed by the teacher.

Nonaka's SECI (Socialization, Externalization, Combination and Internalization) model (Nonaka et al., 2000) offers a self-motivated model of knowledge transformation emphasizing the interaction of tacit knowledge and explicit knowledge throughout the four processes. Adapting Nonaka's SECI model to the educational setting calls for consideration of the variability of context and the institutional limitations within the educational institution.

#### **4.2 Curriculum Development and Policy Change**

Given that curriculum development is not simply a technical process, it involves negotiating all of the various needs, desires, and perspectives of all the various decision-makers with respect to one another (Bennett & Maton, 2017). An example of this is that teachers may choose to not implement practices that have been externally prescribed to them that do not fit with their understanding of the learning context while decision-makers may prefer more uniform curriculum models. Although KM plays an important role in the creation of opportunities for dialogue and collaboration among interested parties, the KM process also needs to make sure that there is no one-size-fits-all decision created by KM for decision-makers. At the same time, KM processes should not promote uniform solutions that overlook contextual realities. Effective knowledge management should facilitate informed decision-making while allowing sufficient flexibility for adaptation to local needs and circumstances. Rather than imposing a one-size-fits-all approach, KM should support the development of context-sensitive policies and curricula that draw upon both institutional knowledge and professional expertise.

### **5. CRITICAL ANALYSIS OF CORE KM MECHANISMS**

#### **5.1 Knowledge Capture: Balancing Depth and Feasibility**

Capturing Knowledge is one of the most important KM issues (activities). However, the educational institutions have significant ambiguities associated with them. Capturing knowledge involves balancing the need for providing depth of context (rich, contextual information) *versus* creating documents that are useable as quickly as possible. These mixed objectives may lead to one of two outcomes—either too much weighty documentation that is too cumbersome to wade through *OR* too little, and therefore not valuable, documentation. In addition to institutional priorities and power dynamics of the institution, capturing knowledge demonstrates how much value is placed on these types of practice. Conversely, certain types of capturing practices (particularly those deemed as "culturally relevant pedagogy and non-formal educational practices") are typically rendered less valuable through the way they are delivered and represented within institutional practice.

#### **5.2 Codification: Accessibility Versus Reductionism**

Knowledge can be organized, categorized, and coded into an easily accessible form (Alavi & Leidner, 2001). When capturing knowledge, the various elements of teaching have the potential to be condensed into broad categories. This inevitably eliminates the contextual and nuanced characteristics associated with application of teaching methods. For codifications in education to be functional, they must contain contextually relevant metadata, explanatory narratives, and implementation procedures. The presence of these supplemental elements provides more value to codified knowledge while preserving the contextual and nuanced nature of the knowledge. Unfortunately, the financial resources and management necessary to maintain such codified literature can be exorbitant.

### **6. PERSONALIZATION: DEPTH VERSUS PERFORMANCE**

In Wenger (1998)'s view, personal/qualified sharing of tacit knowledge through personalization mechanisms such as mentoring, coaching and communities of practice help develop deeper levels of understanding through reflection and collaboration.

However, they are time-consuming and challenging to reproduce on a larger organizational scale. To maintain a balance between depth of learning/development and achieving a level of performance across large organizations requires the use of multiple forms (hybrid) systems which incorporate a combination of formal and informal methods of delivery. In order for both types of personalization mechanisms to continue within an organization, the institute will need to allocate necessary resources (time, funding, staff) and develop processes to support them.

### **6.1 Knowledge Transfer: Adaptation and Context**

When people talk about knowledge transfer, they often think about applying knowledge in a context other than the original. This requires adaptation rather than replication (Van den Bossche et al., 2015). In the context of education, this can be thought of as teachers needing to engage with, interpret and modify knowledge in a way that is tailored to their own unique classroom circumstances. Knowledge management systems that promote the use of standardized best practices may limit innovative and flexible behaviors. Instead, the transfer of knowledge should be viewed as being a process of transformation and co-construction.

### **6.2 Digital Technologies as Enablers of Knowledge Management**

While digital technology is the necessary foundation for Knowledge Management (KM), it is not adequate by itself. Learning management systems, knowledge repositories and collaborative platforms allow for the identifying, storing, organizing and sharing of knowledge (Rosenberg, 2001). In order for these technologies to function successfully, they must also be incorporated into pedagogical practices. Repositories tend to become low-utilized if there is not a connection between the repository and the users' requirements or workflows. In addition, collaborative platforms can create information overload if they are not accurately curated (Kukulska-Hulme & Viberg, 2018). It is important to avoid technological determinism which suggests that technology alone can resolve KM obstacles. A successful KM process includes technology, pedagogy, and organization.

## **7. LEARNING ANALYTICS AND EVIDENCE-BASED EVALUATION**

As a tool for supporting knowledge management (KM), learning analytics allows for data-driven insight into both learning processes as well as outcomes (Siemens, 2014). According to Chatti et al. (2011), learning analytics enables institutions to identify patterns, evaluate programs designed to improve learning, and propel decision-making. While this tool creates many prospects in the education field, it also has its challenges. The majority of learning analytics focus on quantifiable outcomes to the point that there may be no attention given to engaging, critical thinking or other "soft" metrics associated with learning. Evidence-based evaluation is complementary to learning analytics and uses both quantitative and qualitative data together (Braun & Clarke, 2006). The evidence-based evaluation approach concedes that the overall interpretation of data must occur through a teaching and learning perspective. Therefore, KM systems should facilitate reflection and reasoning as an input to the learning process.

## **8. IMPLEMENTATION CHALLENGES IN KNOWLEDGE MANAGEMENT**

The implementation of Knowledge Management in educational settings is associated with several interconnected challenges. One of the most significant barriers is resistance to knowledge sharing. Such resistance may stem from concerns about professional autonomy, fear of evaluation, or reluctance to expose personal practices to scrutiny (Rasmussen, 2018). Addressing these concerns requires the development of trust, collaboration, and supportive organizational cultures.

Maintaining the quality and relevance of knowledge resources presents another challenge. For knowledge repositories and KM systems to remain useful, knowledge must be regularly reviewed, updated, and validated (Zack, 1999). This requires clear governance procedures and sustained institutional commitment. Information overload can also reduce the effectiveness of KM initiatives. When large volumes of information are stored without adequate organization or filtering mechanisms, users may struggle to identify relevant knowledge resources (Long & McGill, 2013). Effective KM systems therefore require appropriate structures for organizing, categorizing, and retrieving information. Governance represents another critical component of successful KM implementation. Institutions need clear governance frameworks that define roles and responsibilities, establish standards for knowledge management practices, and ensure accountability (Lundberg, 2021). Without such structures, KM initiatives may become fragmented, inconsistent, and difficult to sustain. Finally, KM initiatives must be closely aligned with pedagogical objectives. Treating KM as an additional administrative responsibility rather than an integral component of teaching and learning often undermines its effectiveness. Sustainable implementation requires embedding KM practices within educational processes so that knowledge creation, sharing, and utilization become part of everyday professional practice (Gold et al., 2021).

## **9. TOWARD AN INTEGRATED KNOWLEDGE MANAGEMENT FRAMEWORK**

To develop a KM Framework for Education that is fruitful, it must display solutions to the different limitations and challenges posed in this paper. Some of these components include, but are not limited to, the following:

1. **Pedagogical Configuration** – KM supports or line up with teaching and learning objectives,
2. **Contextually Sensitive** – Knowledge is located or bound to a specific context,
3. **Social Learning** – KM promotes collaboration, sharing, and community of practice,
4. **Technological Integration** – KM processes utilize digital tools and technology,
5. **Evidence- Based Practice** – Professional judgement and utilization of analytics,
6. **Adaptive Governance** – Continually balancing stability and innovation.

The framework provides an understanding of KM as an active and participatory process that provides an organization with opportunities for its organizational learning and its ongoing improvement.

## **10. IMPLICATIONS FOR PRACTICE**

There are vast outcomes of the incorporation of KM into education in each type of environment. In primary and secondary schools, KM can enrich the continuity of instruction as well as create opportunities for collaboration between staff members. For higher education institutions, KM can promote the interdisciplinary approach to learning as well as provide greater uniformity in curriculum delivery. For training departments/academic institutions, KM can offer a means by which standardization and on-going improvement are realized. However, the value of KM being implanted into day-to- day operations will require appropriate resources (structures, culture) to facilitate this process. Educational institutions need to provide financial support to implement the necessary systems (professional development, governance, technology) to enable the durability of KM initiatives.

## **11. CONCLUSION**

The practice of knowledge management offers opportunities to change how we educate and develop our ability as institutions to learn from the processes we use to teach. Capturing, organizing, and using knowledge in a systematic manner is a means of improving our quality of teaching through improved teaching practices and providing opportunities for continuous

improvement in our processes. In order to achieve this implementation of knowledge management (KM), it is important for institutions to consider KM beyond being strictly a technical approach and see it as a complex social and pedagogical process. This transformation will occur when KM efforts are lined up with institutional educational goals and supported by appropriate governance structures, evidence-based policies, and practices. As a result, through KM processes, institutions will develop the capability to operate as learning organizations. This will allow institutions to adapt to constant changes in their external environments and to provide enthusiastic educational outcomes.

## LITERATURE:

1. Alavi, M., & Leidner, D. E. (2001). Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*, 25(1), 107–136.
2. Argyris, C., & Schön, D. A. (1978). *Organizational learning: A theory of action perspective*. Addison-Wesley.
3. Bartels, A., et al. (2020). Knowledge management in education: A systematic review. *Educational Research Review*, 31, 100362.
4. Bélanger, F., & González, V. (2013). Knowledge repositories and organizational memory in knowledge-intensive organizations. *Knowledge and Process Management*, 20(4), 244–259.
5. Bennett, S., & Maton, K. (2017). Knowledge democracy and the politics of higher education. *Journal of Education Policy*, 32(3), 313–334.
6. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
7. Chatti, O., et al. (2011). A reference model for learning analytics. *Educational Technology & Society*, 14(3), 141–161.
8. Chen, X., & Song, X. (2022). Learning analytics for educational improvement. *Education and Information Technologies*, 27(8).
9. Davenport, T. H., & Prusak, L. (1998). *Working knowledge: How organizations manage what they know*. Harvard Business School Press.
10. Dewey, J. (1938). *Experience and education*. Macmillan.
11. Dixon, N. M. (2000). *Common knowledge: How companies thrive by sharing what they know*. Harvard Business School Press.
12. Drucker, P. (1969). *The age of discontinuity*. Harper & Row.
13. Fink, A., et al. (2016). Institutional memory and organizational learning. *Higher Education Policy*, 29(2), 127–145.
14. Garvin, D. A. (1993). How to build a learning organization. *Harvard Business Review*, 71(4), 78–91.
15. Garrison, D. R., & Anderson, T. (2003). *E-learning in the 21st century*. Routledge.
16. Gold, A., et al. (2021). Knowledge management and education. *Educational Technology Research and Development*, 69(2).
17. Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, 17(S2), 109–122.
18. Hansen, M. T., et al. (1999). What's your strategy for managing knowledge? *Harvard Business Review*, 77(2), 106–116.
19. Kukulska-Hulme, A., & Viberg, S. (2018). Mobile collaborative learning. *The International Review of Research in Open and Distributed Learning*, 19(3).
20. Lave, J., & Wenger, E. (1991). *Situated learning*. Cambridge University Press.
21. Lemieux, G., & Gagnon, D. (2022). Learning analytics as a tool for institutional learning. *Journal of Applied Research in Higher Education*, 14(1), 90–108.
22. Long, P., & McGill, G. (2013). Knowledge repositories and information retrieval. *Information Processing & Management*, 49(1), 1–15.

23. Lundberg, D. (2021). Governance models for learning analytics. *Educational Technology & Society*, 24(1).
24. Marzano, R. J. (2007). *The art and science of teaching*. ASCD.
25. Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1), 14–37.
26. Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company*. Oxford University Press.
27. OECD. (2018). *Learning analytics: Opportunities for learning systems*. OECD Publishing.
28. Polanyi, M. (1966). *The tacit dimension*. University of Chicago Press.
29. Rasmussen, J. (2018). Knowledge sharing and culture in schools. *Educational Management Administration & Leadership*.
30. Reinhold, S., & Schieffer, U. (2018). Knowledge management and educational improvement. *Higher Education*.
31. Roberts, M., & P. P. (2019). Communities of practice in education. *Teachers College Record*.
32. Rosenberg, M. J. (2001). *E-learning: Strategies for delivering knowledge in the digital age*. McGraw-Hill.
33. Senge, P. M. (1990). *The fifth discipline*. Doubleday.
34. Siemens, G. (2014). Learning analytics. *Journal of Learning Analytics*, 1(3).
35. Sveiby, K.-E. (1997). *The new organizational wealth*. Berrett-Koehler.
36. Teece, D. J. (2018). Profiting from innovation. *Research Policy*, 47(3).
37. Tsai, W.-C., & Huang, M.-C. (2014). Knowledge management and organizational memory. *Journal of Knowledge Management*, 18(5).
38. Van den Bossche, P., et al. (2015). Transfer of training and knowledge. *International Journal of Training and Development*, 19(1).
39. World Bank. (2018). *World development report 2018: Learning to realize education's promise*. World Bank.
40. Zack, M. H. (1999). Developing a knowledge strategy. *California Management Review*, 41(3), 125–145.

# GLOBAL TRADE POSITION OF THE EUROPEAN UNION IN THE NEW GLOBAL ORDER: A DATA-DRIVEN ANALYSIS

**Damir Sebo**

*Academy of Arts and Culture in Osijek, Josip Juraj Strossmayer University of Osijek  
Ulica Julija Knifera 1, 31000 Osijek, Croatia  
dsebo@aukos.hr*

**Marija Sain**

*Academy of Arts and Culture in Osijek, Josip Juraj Strossmayer University of Osijek  
Ulica Julija Knifera 1, 31000 Osijek, Croatia  
msain@aukos.hr*

**Iva Buljubic**

*Academy of Arts and Culture in Osijek, Josip Juraj Strossmayer University of Osijek  
Ulica Julija Knifera 1, 31000 Osijek, Croatia  
ibuljubic@aukos.hr*

## ABSTRACT

*For much of its history the European Union has presented itself as a defender of liberal trade and multilateral rules. That self-image now sits uncomfortably with reality. Tensions between major powers, fragmenting supply chains and the slow drift towards a multipolar world have changed what trade policy is for. Brussels still defends open markets, yet in the same breath it talks of economic security and strategic autonomy. The tension between those two vocabularies is, in itself, part of the story we want to tell. Our aim is to look at where the EU actually stands in international trade once the rhetoric is stripped away. We focus on the shape of trade flows, on the two partners that anyhow dominate the picture (the United States and China), and on how two recent shocks — the COVID-19 pandemic and the war in Ukraine — redrew the EU's external map and reordered priorities inside the Union. The empirical material comes from Eurostat, supplemented by other international sources where useful. We work with conventional indicators: exports, imports, the trade balance, and the partner mix, between 2015 and 2023. Read together, the numbers tell a more conflicted story than the official line allows. Trade and geopolitics overlap now in ways that are visible in the data, and the EU faces real openings as well as real exposures as it tries to defend its place in a tougher international environment.*

**Keywords:** *European Union, international trade, global economy, economic security, strategic autonomy*

## 1. INTRODUCTION

What counted as ordinary trade policy ten years ago does not count as ordinary today. The European Union, long associated with open markets and rule-based multilateralism, has discovered that economic interdependence carries political risk instead of buying political insurance. Several pressures converged: tensions between major powers, the breakdown of supply chains during the pandemic, and the steady sharpening of the rivalry between Washington and Beijing. Brussels has had to ask, sometimes uncomfortably, what its trade instruments are actually meant to do. The academic literature reads the shift in broadly similar terms. Meunier and Nicolaïdis (2019) speak of a “geopoliticization of trade and investment policy” and place the EU close to the centre of the process. The claim is not that the Union has walked away from openness. It is that openness has been reinterpreted, with security and resilience now setting much of the agenda (Schmitz and Seidl, 2022).

Strategic autonomy is the concept that holds all this together. It does not mean choosing dependence over independence, or the reverse; it means managing external dependencies while keeping the European economy plugged into global flows (Helwig and Sinkkonen, 2022). In practical terms the agenda is concrete enough: defending against economic coercion, securing critical assets and supply chains, tying trade to broader objectives such as sustainability (Gehrke, 2022). Economic security has become the umbrella label for all of this — a shorthand for combining openness with resilience and risk management (Miró, 2022). What is happening with Washington and Beijing matters more than anything else here. The EU largely declines to take sides in their bilateral rivalry, yet its market size, regulatory reach and capacity to set global standards give it considerably more leverage than is sometimes admitted (Hoffmeister, 2023; Poletti, 2026). Gstöhl (2022) captures the same trajectory in different language, as a move away from the older “managed globalization” template towards a more assertive geo-economic stance built on reciprocity, enforcement and value-based trade. Our paper sits inside this debate. The question we put is simple to state but not simple to answer: how do the structure and dynamics of EU trade reflect the Union’s role as a global economic actor in a changing geopolitical environment? To answer it properly requires both a theoretical lens fit for the geoeconomic turn and a serious engagement with recent trade data. The bulk of our material comes from Eurostat. Where another international source helps, we use it. The indicators are deliberately compact: export and import flows, the trade balance, the partner structure. The time-frame runs from 2015 to the most recent year for which complete data are available — enough to see long-run patterns, narrow enough to keep the recent shocks in view. A short map of what follows. Section 2 develops the conceptual framework: the EU as a geoeconomic actor, plus the working definitions of geopoliticization, strategic autonomy and economic security. Section 3 covers data and methods. Section 4 reports the empirical results. Section 5 returns to the literature with what we found. Section 6 closes.

### **1.1. Research questions and hypotheses**

We work with one main research question and two narrower ones.

**RQ1:** how do the structure and dynamics of the EU’s international trade reflect its role as a global economic actor in today’s geopolitical environment?

Two more specific questions follow from this.

**RQ2:** how have recent geopolitical events shaped the EU’s trade relations with its principal partners, especially the United States and China?

**RQ3:** to what extent do observable shifts in EU trade patterns indicate a turn towards economic security and strategic autonomy?

From the questions, three hypotheses follow. They will be tested against the data.

**H1.** The EU’s trade structure reflects its standing as a major global economic actor, evidenced by strong trade ties with its principal partners.

**H2.** Recent geopolitical events — above all the COVID-19 pandemic and the war in Ukraine — have left measurable traces on the structure and dynamics of EU trade.

**H3.** Observable shifts in EU trade patterns indicate a growing weight placed on economic security, supply-chain resilience and strategic autonomy.

H2 and H3 are assessed in Section 4. H1, which is more about position than dynamics, is treated jointly in Section 5.

## **2. THEORETICAL FRAMEWORK**

The conceptual ground for the analysis breaks into four parts. First, the EU as a geoeconomic actor. Second, the so-called geopoliticization of trade. Third, strategic autonomy together with economic security. And fourth, the link between trade policy and global influence.

### **2.1. The European Union as a geoeconomic actor in the new global order**

How the EU is portrayed in current literature has moved. Earlier accounts — most visibly Bradford (2020) on the “Brussels Effect” and Damro (2012) on “market power Europe” — anchored European power in regulation and market access. The newer contributions add a different layer. Economic instruments now serve strategic and geopolitical ends, not market-integration ends alone (Gstöhl, 2022). Trade rules, regulatory frameworks and investment screening have all moved into that second category. The foundations of EU economic power are mostly the same as they were before. A large internal market. Considerable regulatory capacity. An institutional structure capable of coordinated external action. The Union does not project hard power. It works instead through what may be called a trade–regulatory nexus, in which access to the European market gives third countries reason to align with European rules. Bradford (2020) reads this as a kind of extraterritorial regulatory influence. More recent scholarship has nuanced the picture: such influence is uneven and varies with the specific political and economic relationship in play (Kennis and Liu, 2024).

### **2.2. Geopoliticization of trade**

Of the changes visible in EU trade policy, the most consequential is what scholars call its geopoliticization. The term refers to a shift in priorities. Geopolitical considerations have moved from the margins of trade and investment policy to its core. From around 2017 onwards, the EU began to take more seriously the vulnerabilities that come with openness: dependence on individual suppliers, exposure to coercion, and so on (Rosén and Meunier, 2023).

The new agenda has a name in EU jargon — open strategic autonomy. Gehrke (2022) breaks it into four priorities: addressing economic distortions, defending against coercion, linking trade with values and sustainability, and protecting critical assets and supply chains. Gstöhl (2022) describes the same shift in different language, as a move away from “managed globalization” towards a more assertive geo-economic position built on reciprocity, enforcement and value-based trade. A more theoretical reading is available as well. Haroche (2024) calls the geoeconomic turn a process of co-constitution: global power competition and EU integration shape each other reciprocally. On that view, the geopoliticization of trade is not just a response to external pressure. It is also part of how the Union consolidates itself.

### **2.3. Strategic autonomy and economic security**

Strategic autonomy now sits near the centre of the EU’s economic vocabulary. The literature treats it not as decoupling or isolation, but as a framework for handling interdependence. Helwig and Sinkkonen (2022) explicitly reject reading the concept in binary terms — dependence on one side, independence on the other. Their preferred reading is dynamic: a balance struck between engagement and resilience. Borrajo (2022) pushes this further. He defines strategic autonomy as a set of policy practices designed to secure useful dependencies while reducing harmful ones. The practical translation is less abstract than the language suggests: building up supply-chain resilience, securing access to critical raw materials, and improving Europe’s ability to absorb external shocks. Closely tied to all of this is the concept of economic security. It has gained traction in both academic and policy debate. Economic security refers, broadly, to the EU’s ability to protect its economic system, keep strategic sectors functional, and ensure stable access to essential inputs.

Glencross (2024) documents how the toolkit in the critical-raw-materials area has expanded — state aid, stockpiling and active industrial policy have all become acceptable instruments again.

## **2.4. EU trade policy and global influence**

The EU's global weight rests heavily on its capacity to shape the rules of international economic activity through trade policy. Even now, with the United States and China competing more openly than at any time in recent decades, Brussels remains an important player in global trade governance. Transatlantic trade relations are one channel. The EU is still an active partner with Washington in shaping international rules. But the constraints are real too: the Union operates between two larger powers, and that limits its independent room for action in particular settings (Poletti, 2026). What it retains is leverage — market size, regulatory capacity, the capacity to set global standards. Two functions of trade policy follow from this. Outward: trade policy projects European standards, values and economic preferences onto partners. Inward: it provides a protective layer that reduces vulnerabilities, diversifies partnerships, and safeguards strategic autonomy. The EU thus reads, in our framework, as a hybrid — market power, regulatory influence, and a more recent geoeconomic orientation rolled into one.

## **3. RESEARCH METHODOLOGY**

Our approach combines quantitative and qualitative work. The design is data-driven and brings together secondary statistics with the relevant academic literature. Most of the empirical material comes from Eurostat. Eurostat delivers reliable and comprehensive trade statistics, and we draw in particular on its dataset of long-term indicators for trade in goods. Where additional context is required, other international databases and institutional reports are used. The indicators are conventional ones for international trade research. Export and import values. The trade balance. The structure of trade by major partner. We work with annual data from 2015 to the most recent available year. The window is wide enough to bring structural trends into view, but narrow enough to keep the impact of the major disruptions — the pandemic and the war in Ukraine — in the foreground. Three analytical techniques are used. Descriptive statistics outline the basic features of EU trade flows. Trend analysis tracks the evolution of those flows over time. Comparative analysis sets the EU's relations with the United States and China side by side, though data limitations mean part of this discussion remains illustrative rather than fully evidenced. What this combination of theoretical and empirical perspectives lets us do is assess the EU's role with some balance, and provide a basis for thinking about how trade and geopolitics interact in the present international setting.

## **4. GLOBAL TRADE POSITION OF THE EUROPEAN UNION: DATA ANALYSIS**

In this section we report the empirical results. We follow the main trade indicators — exports, imports, the trade balance — across the study period, with attention to both longer-term structural trends and the more recent shocks. From the numbers we then try to read what they may say about external dependencies and the EU's broader economic position.

### **4.1. Data and methodological approach**

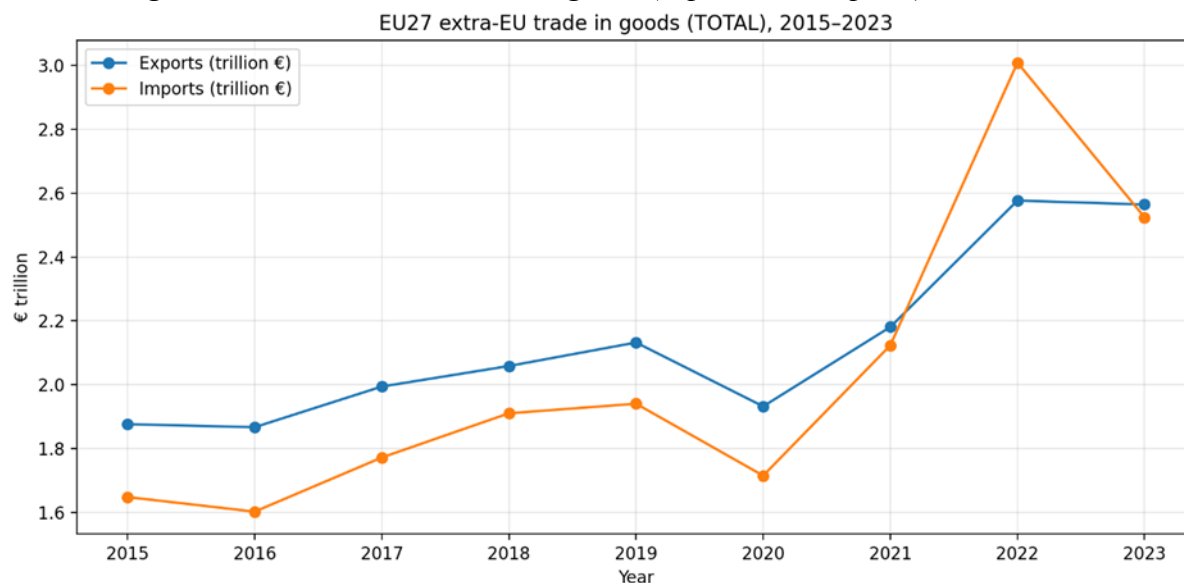
The data come from Eurostat. Specifically, we use the long-term indicators dataset on international trade in goods (Eurostat, 2026), under code `ext_lt_intertrd`. The file came as a compressed TSV with several dimensions packed into a single column, which is not usable for analysis in that form. Some preparation was therefore required. We decomposed the compound column into separate variables — frequency, indicator, product group, partner and geographical unit — then transformed the dataset from wide to long format for time-series analysis. Missing values were handled according to Eurostat conventions and numerical fields were standardised.

The analysis works with annual data (frequency = A), the EU27 grouping, the SITC total for goods, and extra-EU trade flows, between 2015 and 2023.

#### 4.2. EU position in global trade

Across 2015–2023, the EU held a strong position in international trade. Exports rose from roughly €1.88 trillion in 2015 to €2.13 trillion in 2019. Imports tracked a similar climb over the same years, from €1.65 trillion to €1.94 trillion. These were years of steady growth and deep integration into global flows. They ended abruptly in 2020. The pandemic produced a clear contraction in both exports and imports.

Figure 1: EU27 extra-EU trade in goods (exports and imports), 2015–2023



(Source: Eurostat, *ext\_lt\_intertrd*, authors' calculation)

Figure 1 shows the rebound clearly. Trade flows recovered strongly in 2021 and pushed above pre-pandemic levels. After that comes the more troubling divergence in 2022: imports rise sharply relative to exports, signalling a real shift in external trade conditions and pointing to a deeper external dependency than the earlier figures suggested.

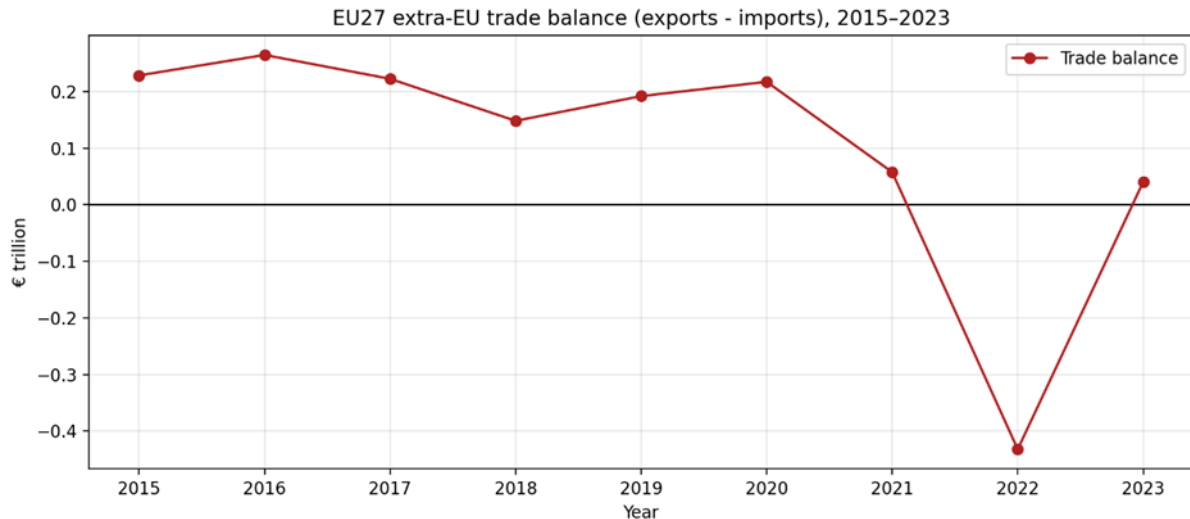
#### 4.3. Export and import dynamics

Looking at exports and imports together, three phases stand out. 2015–2019: stable growth in both flows. 2020: the COVID-19 shock, with trade volumes falling sharply as supply chains broke down and demand contracted. 2021–2023: a strong but uneven recovery, marked by considerable volatility along the way. The 2022 figure deserves particular attention. Imports rose above €3 trillion, well past export values. The surge reflects sharp price increases on global markets, particularly for energy and raw materials. Figure 1 captures this divergence well enough to show that the post-2021 imbalance is no minor episode.

#### 4.4. Trade balance

The trade balance offers another way of reading structural change in the EU's external economic position.

Figure 2: EU27 extra-EU trade balance (exports – imports), 2015–2023



(Source: Eurostat, *ext\_lt\_intertrd*, authors' calculation)

For most of the period under study the EU ran a positive trade balance, as Figure 2 shows. The surplus peaked in 2016 and narrowed gradually after that. Even the gradual narrowing pointed to a growing import intensity. Then 2022 happens. The Union records a substantial trade deficit of roughly €432 billion. The cause is not subtle: the geopolitical context, and the war in Ukraine in particular, drove energy import costs sharply higher. By 2023 the balance returns to a small surplus, around €40 billion, suggesting a partial stabilisation of trade flows after the shock. Even so, 2022 marks a structural turning point in the trajectory of the EU's external trade balance, and the 2023 recovery should not be read as a return to the pre-2022 pattern.

#### 4.5. Limitations of the analysis

The dataset has its limits. It includes only aggregated partner categories — extra-EU and intra-EU — which means a direct analysis of partners such as the United States or China is not feasible on this data alone. That said, the dataset is a sound basis for assessing overall trends in the EU's external trade and for picking out the major structural changes through time.

### 5. DISCUSSION

The empirical findings line up well with the framework set out earlier. They speak especially to two of its central concepts: the geopoliticization of trade and strategic autonomy. Three structural patterns become visible across 2015–2023. The pre-2020 years are years of stable growth in trade flows. The COVID-19 pandemic introduces a major disruption that is followed by a strong but uneven recovery. The pattern matches the empirical literature on global value chains as the principal channel through which the pandemic shock travelled, causing significant declines in trade during the pandemic itself (Álvarez et al., 2021; Kejžar et al., 2022). But the size of the shocks is not really the point. What matters is how those shocks reshaped how trade is understood and used inside Europe. The COVID-19 crisis, as the literature notes, accelerated a discursive shift away from liberal openness towards categories such as resilience, autonomy and supply-chain security (Jacobs et al., 2022). The data confirm it. The post-2020 recovery is uneven, marked by volatility and by a widening gap between exports and imports. Where the case for geopoliticization is strongest, though, is 2022. The trade balance does not move there in a way that ordinary cycles can explain. As Figure 2 shows, a long-standing surplus becomes a substantial deficit — a structural change, not a passing fluctuation. The link to the war in Ukraine is direct, particularly through the increase in energy import costs and the wider reorganisation of trade relations that the war set in motion.

Recent scholarship supports what the data imply. The 2022 energy crisis turned economic dependence from a primarily economic issue into a geopolitical one (Rokicki et al., 2023; Siddi and Prandin, 2023). Trade policy is now being framed accordingly: less about promoting efficiency, more about managing vulnerabilities and reducing external dependencies. These same patterns speak to strategic autonomy, understood (once more) not as economic isolation but as a capacity to manage interdependence. The 2022 import surge and the partial stabilisation that followed in 2023 show two things at once: the EU's exposure to external shocks, and the need for policies designed to build resilience. The trajectory fits the definition of strategic autonomy as a set of practices for securing favourable dependencies while reducing harmful ones (Borrajó, 2022). The EU's response to recent shocks, it should be added, looks more like selective de-risking than full decoupling. Brussels uses trade policy to protect critical sectors, secure supply chains and respond to economic coercion, while keeping itself engaged in global trade (Gehrke, 2022; Christou and Damro, 2024). Read against our research questions, the findings answer reasonably clearly. The structure and dynamics of EU trade do reflect the Union's role as a global economic actor operating in a complex geopolitical environment. Trade patterns now visibly respond to external shocks and geopolitical considerations alongside the conventional economic factors. The picture on the hypotheses is mixed but mostly positive. H2 and H3 receive strong empirical backing. The pandemic and the war in Ukraine have shaped EU trade patterns, and the observed structural shifts point unmistakably towards a growing emphasis on economic security and strategic autonomy. H1 is only partly confirmed. The EU does maintain a strong global trade position, yet the 2022 deficit also exposes its vulnerability to external shocks and the depth of its dependence on critical imports. Taken together, the discussion supports a clear reading. The EU is moving from a predominantly liberal trade actor into a more strategic, geoeconomic one. Trade is no longer simply an instrument of economic efficiency. It has become, in addition, an instrument for pursuing broader geopolitical and security objectives.

## 6. CONCLUSION

The purpose of this paper was to examine the EU's role as a global economic actor in the new geopolitical environment, with a focus on the link between trade and geopolitics. By combining theoretical analysis with empirical work on Eurostat data, the paper offers a reasoned account of how EU trade policy has evolved. The findings indicate that the EU remains a major global trading power. Trade flows grow over the observed period, which confirms the EU's central position in international trade. But the analysis also shows a growing exposure to external shocks, particularly during the pandemic and in the period of geopolitical disruption that followed the war in Ukraine. The empirical evidence confirms that EU trade patterns have undergone significant structural changes. The 2020 contraction, the strong but uneven recovery that followed, and the substantial 2022 trade deficit all point to the sensitivity of EU trade to global disruptions. The broader implication is that external dependencies — particularly in energy and other critical sectors — now matter politically as much as they do economically. The findings also support the wider theoretical claim that trade has become more politicized. Trade policy no longer functions solely as a vehicle for economic efficiency. It is bound up with economic security, resilience and strategic autonomy. The EU is moving, in that sense, from a predominantly liberal trade actor into a more strategic, geoeconomic one. On the research questions, the results show that the structure and dynamics of EU trade reflect the Union's position as a global economic actor working in a complex and uncertain international environment. The hypotheses are largely confirmed, particularly those concerning the impact of geopolitical events and the rising relevance of economic security. A few limitations should be acknowledged. The principal one concerns the use of aggregated trade data, which does not permit a detailed examination of individual trading partners.

For that reason, the discussion of bilateral relations with the United States and China remains essentially theoretical here. Further research could build on the present analysis by using more disaggregated data and by focusing on particular sectors or bilateral trade relationships. The broader takeaway is simple. Trade policy in Europe can no longer be read in purely economic terms. It belongs to a wider geopolitical strategy, and serious work on the EU's global position needs to read it in that frame.

**DISCLOSURE ON THE USE OF GENERATIVE ARTIFICIAL INTELLIGENCE:** *The authors used ChatGPT (OpenAI) exclusively for language editing and improving terminological consistency. No substantive content, analysis, interpretation, or conclusions were generated by artificial intelligence. The authors take full responsibility for all aspects of the manuscript.*

**ACKNOWLEDGEMENT:** *This paper was developed within the project “Kreativna industrija i društvena transformacija kroz medije i inovacije – KREATIV”, funded by the European Union – NextGenerationEU (project code: 581-UNIOS-02).*

## LITERATURE:

1. Álvarez, J. et al. (2021). COVID-19 and Global Value Chains: Impacts on European Trade. *Journal of International Economics*.
2. Borrajo, D. (2022). *La autonomía estratégica de la Unión Europea más allá de la seguridad y la defensa: la seguridad de las cadenas de suministro y la potenciación de la conectividad*. *Revista Electrónica de Estudios Internacionales*.
3. Bradford, A. (2020). *The Brussels Effect: How the European Union Rules the World*. Oxford: Oxford University Press.
4. Christou, G. and Damro, C. (2024). Frames and Issue Linkage: EU Trade Policy in the Geoeconomic Turn. *Journal of Common Market Studies*.
5. Damro, C. (2012). Market Power Europe. *Journal of European Public Policy*, 19(5), pp. 682–699.
6. Eurostat (2026). *International trade in goods – long-term indicators (ext\_lt\_intertrd)*. Retrieved 10.02.2026 from [https://ec.europa.eu/eurostat/api/dissemination/sdmx/2.1/data/ext\\_lt\\_intertrd?format=TSV&compressed=true](https://ec.europa.eu/eurostat/api/dissemination/sdmx/2.1/data/ext_lt_intertrd?format=TSV&compressed=true).
7. Gehrke, T. (2022). EU Open Strategic Autonomy and the Trappings of Geoeconomics. *European Foreign Affairs Review*, 27(3), pp. 359–376.
8. Glencross, A. (2024). The Geopolitics of Supply Chains: EU Efforts to Ensure Security of Supply. *Global Policy*.
9. Gstöhl, S. (2022). The European Union's Trade Policy: From Managed Globalization to Geoeconomic Strategy. *Journal of European Integration*, 44(5), pp. 701–717.
10. Haroche, P. (2024). Geoeconomic Power Europe: When Global Power Competition Drives EU Integration. *Journal of Common Market Studies*.
11. Helwig, N. and Sinkkonen, V. (2022). Strategic Autonomy and the EU as a Global Actor: The Evolution, Debate and Theory of a Contested Term. *European Foreign Affairs Review*, 27(2), pp. 153–170.
12. Hoffmeister, F. (2023). Strategic Autonomy in the European Union's External Relations Law. *Common Market Law Review*, 60(2), pp. 367–400.
13. Jacobs, S. et al. (2022). The Hegemonic Politics of 'Strategic Autonomy' and 'Resilience': COVID-19 and the Dislocation of EU Trade Policy. *Journal of Common Market Studies*.
14. Kejžar, K. et al. (2022). COVID-19, Trade Collapse and Global Value Chain Linkages: European Experience. *World Economics*.

15. Kennis, M. and Liu, F. (2024). The European Union's Regulatory Power: Refining and Illustrating the Concept with the Case of the Transfer of EU Geographical Indication Rules to Japan. *Journal of Common Market Studies*.
16. Lindseth, P. L. (2023). Anu Bradford, The Brussels Effect: How the European Union Rules the World. *The American Journal of Comparative Law*.
17. Meunier, S. (2017). Integration by Stealth: How the European Union Gained Competence over Foreign Direct Investment. *Journal of Common Market Studies*, 55(3), pp. 476–493.
18. Meunier, S. and Nicolaïdis, K. (2019). The Geopoliticization of Trade and Investment Policy. *Journal of Common Market Studies*, 57, pp. 103–113.
19. Miró, J. (2022). Responding to the Global Disorder: The EU's Quest for Open Strategic Autonomy. *Global Society*, 36(3), pp. 423–440.
20. Poletti, A. (2026). EU–US–China Trade Relations. In *Contemporary Trade Politics*. Springer.
21. Rokicki, T. et al. (2023). The Impact of the 2020–2022 Crises on EU Countries' Independence from Energy Imports, Particularly from Russia. *Energies*.
22. Rosén, G. and Meunier, S. (2023). Economic Security and the Politics of Trade and Investment Policy in Europe. *Politics and Governance*.
23. Schmitz, B. and Seidl, T. (2022). As Open as Possible, as Autonomous as Necessary: Understanding the Rise of Open Strategic Autonomy in EU Trade Policy. *Journal of Common Market Studies*, 60(3), pp. 834–852.
24. Siddi, M. and Prandin, M. (2023). EU Energy Policy and Geopolitical Shifts after the War in Ukraine. *Energy Policy*.
25. Young, A. R. (2023). European Trade Policy in Challenging Times. *Journal of European Public Policy*, 30(1), pp. 1–20.

# THE IMPACT OF GLOBALIZATION ON DIFFERENT AREAS OF LAW – THE SERBIAN CASE

**Aleksandar S. Djordjevic<sup>1</sup>**

*Institute of Comparative Law, Belgrade, Republic of Serbia*

*Terazije 41., 11102 Belgrade, Serbia*

*aleksandar.djordjevic@advokatdjordjevic.com*

## **ABSTRACT**

*Globalization is an integral context on national level in many countries; it is a diligent force that changes the purpose, the sources and means by which legal professionals operate. This research analyzed how efforts of globalization have spread widely across law branches in Republic of Serbia, a country that is member state of Council of Europe, and is in negotiations with European Union. This paper is focused on key channels where globalization is entering domestic law – obligations in existing treaties, harmonization with EU laws and regulation, influence of private companies and their standards, as well as circulation of legal initiatives coming from professionals themselves. Since this kind of research requests empirical dimensions, the authors made a study that consists of 128 law firms from Serbia, that perceive globalization across eight branches of law. Results of that study show that intellectual property law and data protection law are under heavy influence of globalization, while family law and criminal law remain insulated, and lastly constitutional law is in intermediate position and requires heavy redefinition and orientation. Research findings suggest that globalization in Serbia has produced inequalities of great magnitude, concentrated in economic power houses, and also there is a discussion of implications for new legal practitioners, legislative processes and domestic of Serbia's autonomy.*

**Keywords:** legal, globalization, intellectual property, data protection

## **1. INTRODUCTION**

In contemporary legal themes, correlation between law and globalization efforts occupies a central place. Since in the previous centuries, state governments were the exclusive authors of all norms, last 40 years have made a very significant impact on each country worldwide, making the isolation totally impossible. Reasons are numerous – trade, investments in international markets, digitalization, migration of workforce, and also engagement of international organizations in specific countries. That engagement has generated a lot of pressure, that surpasses borders, settling steadily in domestic law and legislation procedures. Globalization has been perceived as an unstoppable force and as a series of events that further jeopardize the independence of each country and its legal system (Petrov & Prelić, 2019; Petrov & Stanković, 2020). In case of Serbia, it has occurred with an even greater intensity and velocity. Serbia was under large pressure from Western Europe and USA, as well as Russia and China, that has caused overlapping goals, projects, while being bound by the EU legislation all the time. Since further stabilization and alignment with EU is mandatory, Serbia needs to undergo through system change and harmonization of the whole legislation with the EU acquis. While Serbia is still not part of the WTO, it is worth mentioning that the country is part of all other major instruments and organizations, including security, tax, judicial and all other kinds of cooperation.

---

<sup>1</sup> ORCID ID: 0009-0001-4513-0250

All of these commitments are creating a belt of responsibilities that is influenced by external legal decision makers, being incorporated slowly into the domestic system. Aim of this paper is to define a concept of channels where globalization is influencing national law, observed in the case of Republic of Serbia across several domains of law (Djordjević & Jevtić, 2025; Djordjević, Dedjanski, Jevtić, 2024; Djordjević, Jevtić, Dedjanski, 2024). Also, this paper attempts to present an empirical study, where Serbian legal professionals have assessed the strength of globalization and its impact across eight legal domains. This paper provides a combination of empirical perspectives across doctrines, and it attempts to move beyond the hypothesis that everything is already globalized. Correlations are detected based on sample survey responses. The remainder of the paper is organised as follows. Section 2 sets out the theoretical framework. Section 3 describes the methodology of the pilot survey. Section 4 presents and discusses the results, and Section 5 concludes.

## **2. GLOBALIZATION INFLUENCING CHANGE**

For a long period of time, globalization has been seen as a formal sign of sovereignty, and also through losing a significant part of real autonomy over understanding content of its rule. The state is still in the manner of advocating statutes and laws, forcing dispute resolutions, the whole menu of options is not coming from internal sources, but from external kitchens. Several authors explain that legal orders from largest countries from the world intertwine, and in some cases those interferences cause contradictions in smaller countries. The outcome is that legal landscape is constructed of less hierarchy, than it was the case before, having adjustment, consultations, negotiations and interactions between major national public. There are four distinct flows where international obligations and conditions interfere with national ones. Treaties and association agreements invoke duties that a state must translate into domestic law, that is under frequent external monitoring. Reports from Serbia show that these conditionalities are attached to EU accession. Mostly it is the case of dealing with the rule of law, corruption, competition on the market, as clearest examples of the mechanism. Second flow is harmonization and regulatory transplantation. Since large external legal ways of work are imposed, states are quite often importing entire regulatory frameworks, and such countries are not designing their own from internal principles. These states are doing it voluntarily, driven by a need for credibility in any case, or afraid of staying isolated from accession to major organizations. Serbia is in a specific situation where: „company law, competition law, consumer-protection law and data-protection law have all been substantially modelled on European templates, with the domestic legislator adapting the imported text to local institutions.“ This is a quite common situation, burdening new generations from thoroughly creating the means for change (Djordjević, 2022). Third flow is the influence of private companies and their standards, often multinational corporations, that generate norms, quality standards based on indicators of performance, rating agencies etc. Last flow is the open circulation and exchange of ideas within academic and professional circles. Even though legal education, professional training and participation in international networks, judges from Serbia, attorneys and all scholars internalize concepts and doctrines that are originating from elsewhere. Long term direction is shaping how the next generation lawyers are thinking and doing their work.

## **3. RESEARCH METHODOLOGY**

The study includes an exploratory pilot conducted among legal professionals in Serbia. The goal of research was to get a structured, comparable benchmark of how legal professionals evaluate and perceive the intensity of globalization efforts in different domains of law. Research instrument includes a short structured questionnaire that is distributed electronically during the period of one month. It has been answered by a sample of 128 people.

The core of the questionnaire asked respondents to rate, on a five-point Likert scale (1 = no perceptible impact, 5 = very strong impact), to quantitatively describe perception where globalization transformed law domains of Serbian law in the past 10 years. Other dimensions in the research were professional role and years of experience of the surveyed party. The data was analysed using descriptive statistics.

## 4. RESULTS AND DISCUSSION

### 4.1. Description of the sample

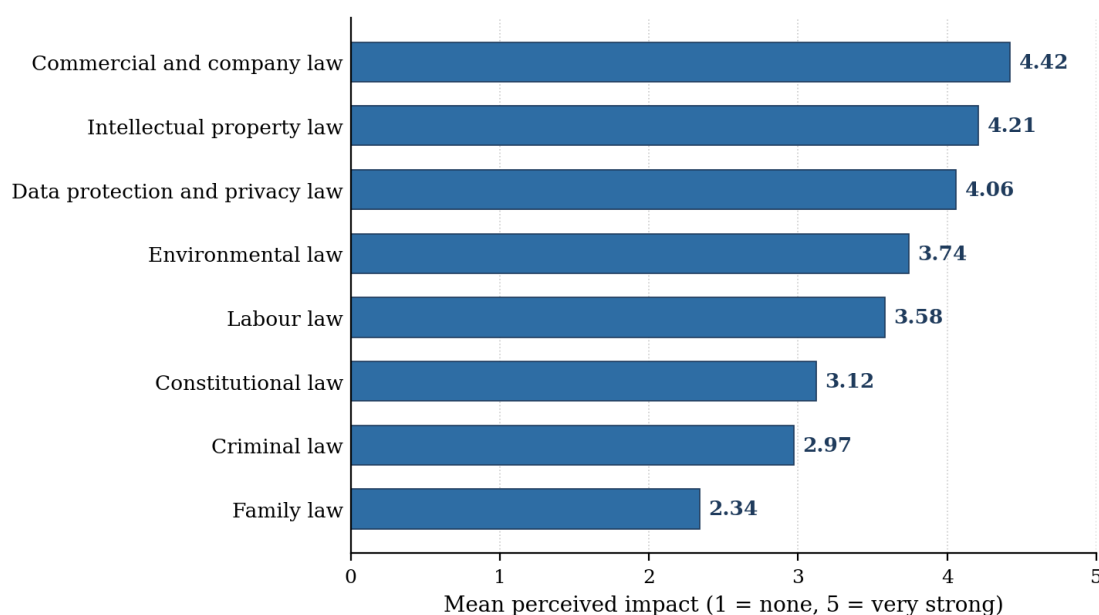
The sample combined several professional roles within the Serbian legal community. Attorneys in private practice formed the largest group, followed by in-house counsel employed in companies, academics, and judges and prosecutors. The distribution of respondents and their average professional experience is summarised in Table 1.

| Professional role             | Respondents (n) | Share (%) | Avg. experience (years) |
|-------------------------------|-----------------|-----------|-------------------------|
| Attorneys in private practice | 52              | 41.4      | 11.3                    |
| In-house / corporate counsel  | 29              | 21.9      | 11.3                    |
| Academics and researchers     | 20              | 16.4      | 12.0                    |
| Judges and prosecutors        | 19              | 14.1      | 16.7                    |
| Other legal professionals     | 8               | 6.2       | 8.7                     |
| Total                         | 128             | 100.0     | 13.9                    |

*Table 1: Distribution of the pilot sample of Serbian law firms  
(Source: Author's survey, 2026)*

### 4.2. Results of globalization perception

Key results is the ranking of legal domains in the sense of the level of exposure to globalization. As shown in Figure 1, it is perceived that commercial and company law is the most globalized field, followed by intellectual property law and data protection and privacy of data law.



*Figure 1: Perception of impact of globalization across branches of Serbian law (n = 128, mean values displayed from sample)  
(Source: Author's survey, 2026)*

This pattern is in line with theory analysis from literature. Since the perception of most globalized law domains are very correlated to international economy and those in particular with high correlation are primary targets to be in line with EU acquis. Those with least globalization perceived value are bound to social values, and cases of monopoly control in a nation. The wide distribution of answers, captured by high standard deviations in case of constitutional law, and lowest in case of commercial law, suggests that professionals agree and localize altogether about strong globalization areas, but are very diversified when it comes to other areas of law.

#### **4.3. Discussion of results**

Main findings are the following – globalization in small countries causes major inequalities, significantly higher than uniform legal alignment. Consequently, family and criminal law are suffering in the form of poor or fake human rights standards. Constitutional law in the position of intermediary is also something that deserves attention. Since the Constitution is still the main symbol and instrument of sovereignty, its interpretation is shaped by European human rights standards imposed and also by the discipline of accession rules and formats. The relatively high standard deviation between respondents suggests that constitutional law is indeed internalized but it is also contested, leaving space for manipulation of every kind. Practical implications are numerous – for legal education, this research argues for embedding EU law across the curriculum rather than treating it as a specialist option. For the legislative processes, it is highlighted that real adaptation is essential, and far more important than copying foreign documents and procedures. Lastly, for policy, this research raised the ever lasting question of how to keep a domain of domestic autonomy in areas where the government still has a legitimate interest in setting its own road.

#### **5. CONCLUSION**

This research paper in its short form presents a pilot effort to argue globalization effects in Serbian legal system, not as something unique and connected to Serbia solely, but as an identified law of nature where large systems are flowing constantly over smaller ones and causing that different branches of law are aligned without direct sovereignty threat. The flows identified include binding obligations and conditionality, harmonization and effortless sync, as well as recognized big influence of private corporations and circulation of legal ideas in an open way. This pilot survey involved 128 legal professionals whose perception was an evidence to confirm this gradient of globalization empirically, while localizing constitutional law in a not disclosed intermediate position. Main contribution of this paper is to open space outside of very loud, existing narrative, with a more localized, grounded perception of those who practice law. Future expansions of this research can include perceptual data joined with some other measures, and that would enable tracking how the balance between global convergence and autonomy is achieved, while small countries progress and deepen their European and global legal ties.

#### **LITERATURE:**

1. Acemoglu, D., & Robinson, J. A. (2012). *Why nations fail: The origins of power, prosperity, and poverty*. Crown Business.
2. Berkowitz, D., Pistor, K., & Richard, J.-F. (2003). The transplant effect. *The American Journal of Comparative Law*, 51(1), 163–204. <https://doi.org/10.2307/3649143>.
3. Braithwaite, J., & Drahos, P. (2000). *Global business regulation*. Cambridge University Press. <https://doi.org/10.1017/9780521780339>.
4. Constitution of the Republic of Serbia, Official Gazette of the Republic of Serbia, No. 98/2006 (2006).
5. de Sousa Santos, B. (2002). *Toward a new legal common sense: Law, globalization, and emancipation* (2nd ed.). Butterworths LexisNexis.

6. Djordjević, A. (2022). Odnos Ustavnog suda i redovnih sudova u Republici Srbiji u oblasti zaštite prava na slobodu i bezbednost, Doktorska disertacija, Pravni fakultet Univerziteta u Beogradu, (Available on: <http://m.eteze.bg.ac.rs/application/showtheses?thesesId=8855>).
7. Djordjević, A., & Jevtić, B. (2025). Shaping A Digital Future That Safeguards Human Rights – Generational Perspectives From Serbia, *Pravo - teorija i praksa*: 42 ( 1), 19-37. <https://doi.org/10.5937/ptp2501019D>. (available on: <https://casopis.pravni-fakultet.edu.rs/index.php/ltip/issue/view/91/20>).
8. Djordjević, A., Jevtić, B., Dedjanski, S. (2024). Interactions Between Regulations, Law, New Technologies, And Organizational Policies In Financial Fraud Detection—A Case Study of Serbia, *Pravo-teorija i praksa*, ISSN: 0352-3713; 41(4), 48–68, <https://doi.org/10.5937/ptp2404048D>. (Available on: <https://casopis.pravni-fakultet.edu.rs/index.php/ltip/article/view/845/726>).
9. Djordjević, A., Dedjanski, S., & Jevtić, B. (2024). Challenges of human rights protection and security in the age of artificial intelligence, *Limes-plus* 20(2-3), 149-170, HESPERIAedu. <https://doi.org/10.69899/limes-plus-en-24212-3149d>. (Available on: Archives | Limes-plus; Vol. 20 No. 2-3 (2024): EXPANSION OF ARTIFICIAL INTELLIGENCE | Limes-plus; <https://limes-plus.com/index.php/lp/article/view/136/82>).
10. Halliday, T. C., & Shaffer, G. (Eds.). (2015). Transnational legal orders. Cambridge University Press. <https://doi.org/10.1017/CBO9781107707092>.
11. Held, D., McGrew, A., Goldblatt, D., & Perraton, J. (1999). Global transformations: Politics, economics and culture. Polity Press. <https://doi.org/10.2307/40203424>.
12. Keil, S., & Nikolić, D. (2014). The Europeanization of national constitutions in South East Europe. *Southeastern Europe*, 38(1), 87–111. <https://doi.org/10.1163/18763332-03801004>.
13. Kmezić, M. (2017). EU rule of law promotion: Judiciary reform in the Western Balkans. Routledge.
14. Law on Personal Data Protection, Official Gazette of the Republic of Serbia, No. 87/2018 (2018). Poverenik.
15. Legrand, P. (1997). The impossibility of "legal transplants." *Maastricht Journal of European and Comparative Law*, 4(2), 111–124. <https://doi.org/10.1177/1023263X9700400202>.
16. Petrov, V., & Prelić, M. (2019). Odnos Ustavnog suda i sudova u svetlosti ustavnog nadzora nad sudskim odlukama – analiza prakse Ustavnog suda Srbije, U: Šarčević, Edin i Darko Simović (ur), Ustavna žalba u pravnom sistemu Srbije, Sarajevo, Fondacija centra za javno pravo, 90-111.
17. Petrov, V., & Stanković, M. (2020). Ustavno pravo, Univerzitetski udžbenik, Pravni fakultet univerziteta u Beogradu, ISBN 9788676309153.
18. Ruso, J., & Filipović, J. (2025). Quality infrastructure legal framework: The case of Serbia, *European Review*, 33(4), 434–458, <https://doi.org/10.1017/S1062798725100367>.
19. Sassen, S. (2006). Territory, authority, rights: From medieval to global assemblages. Princeton University Press. (Available on: <https://doi.org/10.1515/9781400828593>).
20. Stabilisation and Association Agreement between the European Communities and their Member States, of the one part, and the Republic of Serbia, of the other part. (2013). *Official Journal of the European Union*, L 278, 16–473.
21. Stiglitz, J. E. (2002). Globalization and its discontents. W. W. Norton.
22. Teubner, G. (Ed.). (1997). Global law without a state. Dartmouth Publishing.
23. Teubner, G. (2012). Constitutional fragments: Societal constitutionalism and globalization. Oxford University Press. (available on: <https://doi.org/10.1093/acprof:oso/9780199644674.001.000>).
24. Twining, W. (2000). Globalisation and legal theory. Butterworths.
25. Watson, A. (1993). Legal transplants: An approach to comparative law (2nd ed.). University of Georgia Press.

# MACRO-DEMOGRAPHIC CHANGE AND SUSTAINABLE DEVELOPMENT IN A TRANSFORMING ECONOMY: A COMPREHENSIVE REVIEW OF THE LITERATURE

Vesna Buterin

University of Rijeka, Faculty of Economics and Business,  
Ivana Filipovića 4, Rijeka, Croatia  
vesna.buterin@efri.uniri.hr

## ABSTRACT

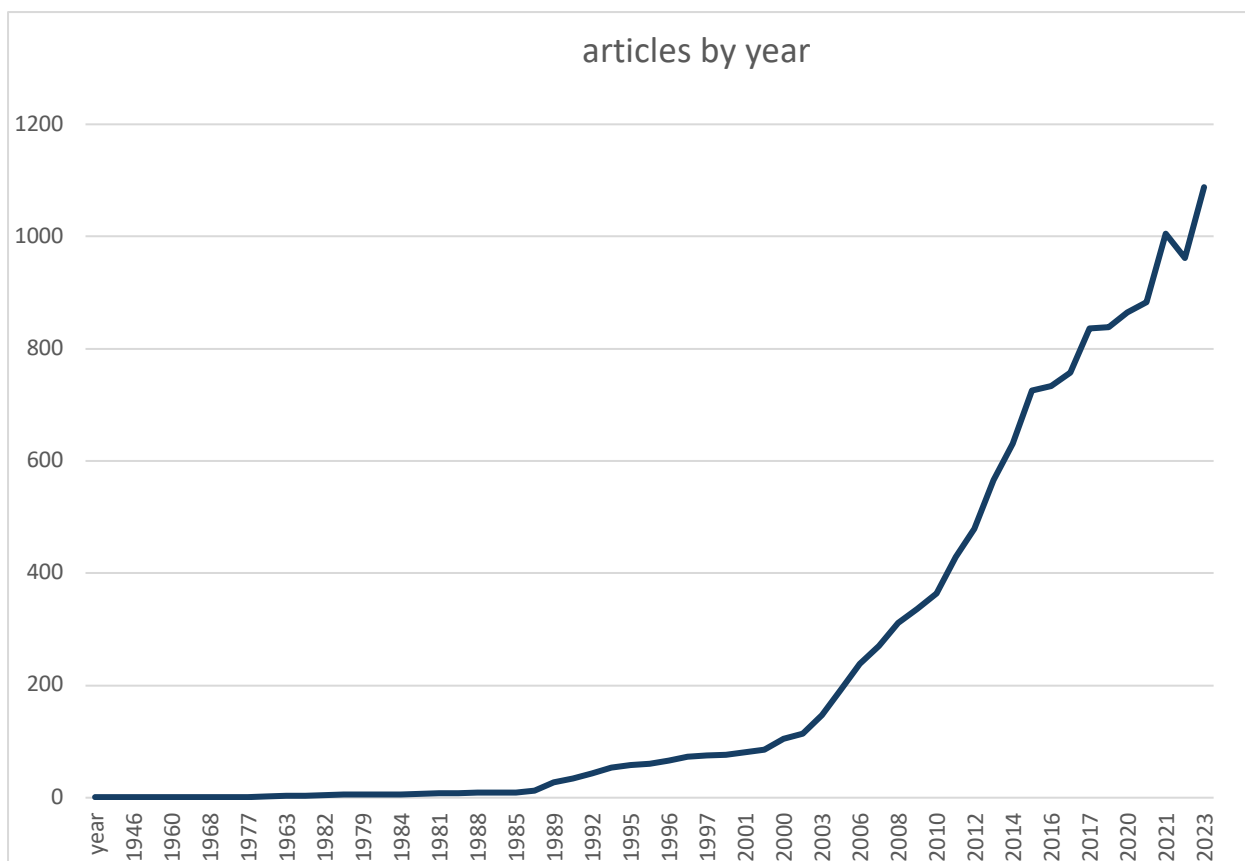
*Population ageing represents one of the key structural changes facing modern economies, with important implications for economic growth, labour markets, productivity, and the sustainability of public finances. This paper aims to analyse the main strands of scientific research linking demographic ageing to economic and labour market adjustments and to identify the dominant thematic areas and the relationships between them. Based on an analysis of the scientific literature, four main research clusters were identified: macroeconomic and demographic transition, active ageing and labour market participation, digital transformation and workforce adaptability and the geronto-environmental sustainability. The findings show that the economic effects of ageing cannot be reduced solely to rising dependency ratios, declining labour supply, and increasing fiscal burdens. Their magnitude largely depends on the ability of economies and institutions to adapt labour markets, pension systems, human capital investment, and the technological environment. The negative effects of ageing can be mitigated through productivity growth, technological progress, and the effective use of older workers' experience and knowledge. Extending working lives does not have the same effects on all workers; rather, these effects depend on education, gender, previous labour market position, and individuals' economic security. Policies aimed at extending working lives should therefore take into account differences among groups of older workers. At the same time, digitalisation, automation, and artificial intelligence may increase the risk of skills obsolescence and earlier labour market exit among older workers, but they may also enable longer working lives when accompanied by appropriate learning opportunities, organisational adaptation, and technological inclusion. The analysis of the four research perspectives points to a common conclusion: the economic consequences of demographic ageing are not predetermined but depend on societies' ability to align demographic change, institutional reforms, human capital development, technological transformation and the structural shift that demands a recalibration of environmental policy and ecological behavior.*

**Keywords:** *demographic transition, sustainability, labor market, digital transformation*

## 1. INTRODUCTION

To map the thematic structure of a large body of scientific literature and identify its most central contributions, a multi-step workflow was implemented that combines text-similarity analysis with network-based clustering. The methodological approach was ideated at the Faculty of Economics, University of Rijeka (UniRi), and is presented in Čišić et al. (2025). Records were retrieved from three major academic databases, Scopus, Web of Science (WoS), and IEEE, selected because, together, they provide broad and complementary coverage of peer-reviewed research across disciplines, thereby offering a robust foundation for large-scale analysis (e.g., Falagas et al., 2008). The search strategy targeted population aging and its implications for labor markets and macroeconomic outcomes using the following queries: “aging AND labor market sustainability”, “aging and demographic changes”, and “aging and economic growth.” These searches yielded 3,906 records from Scopus, 11,057 from WoS, and 776 from IEEE.

After consolidation across sources, 15,510 articles with available abstracts were retained for text-based analysis. The distribution of articles by publication year is presented in Figure 1, covering the period from 1939 to 2024. Overall, the annual number of scientific articles shows a clear upward trend, culminating in 1,088 publications in 2024, which indicates growing scholarly attention to aging-related challenges.



*Figure 1: Distribution of articles published by year  
(Source: Author)*

Before moving to the abstract-based analysis, article keywords were also examined to get a quick, “at-a-glance” view of what the literature has been focusing on recently. The most prominent keywords from the last five years were reviewed, and how they shift over time is visualized in Figure 2.

Evolution of Top 10 Research Keywords (2020-2025)

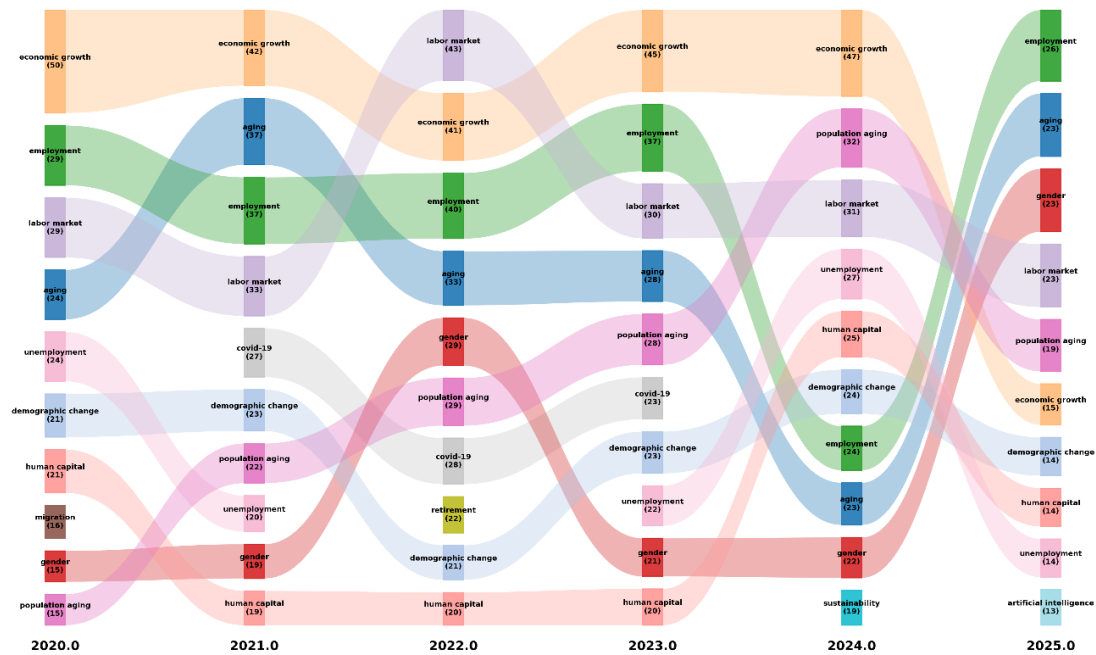


Figure 2: Keywords change during years

Figure 2 suggests that a few topics stay at the heart of the discussion throughout 2020–2025. Terms such as economic growth, employment, aging, and the labor market keep appearing among the most frequent keywords, which signals that research on aging continues to be strongly tied to questions about economic performance and work. At the same time, the figure also shows a gradual rebalancing: economic growth is very dominant in the earlier years, but it becomes less central by 2025, while themes closer to demographic structure and workforce realities become more visible. The keyword aging remains consistently important and tends to gain weight as the period progresses. Alongside it, more specific demographic terms, especially population aging and demographic change, become increasingly prominent from about 2022 onward. This points to a shift from treating aging mainly as a background driver of economic outcomes to treating demographic change as a core topic in its own right. Labor-related keywords also move around in interesting ways. Employment and labor market stay strongly connected across the years, but their relative positions change, suggesting that attention alternates between overall employment outcomes and the functioning of labor markets more broadly. The recurring presence of unemployment reinforces the idea that vulnerability and adjustment pressures in aging societies are a persistent concern. The figure also captures how the research agenda reacts to events and new directions. COVID-19 becomes highly visible in 2021–2023, reflecting the pandemic’s temporary but major influence on debates about work, labor markets, and aging. Keywords such as gender and human capital appear repeatedly, indicating steady interest in inequality, workforce composition, skills, and productivity. Toward the end of the period, newer terms like sustainability and artificial intelligence show up among the leading keywords, hinting that the field is increasingly connecting demographic aging with longer-term transitions and technological change.

## 2. METHODOLOGY

Abstracts were used as the primary textual unit because they provide a concise and relatively standardized representation of each study's research questions, methods, and key findings, enabling consistent comparison across journals and disciplines. To quantify semantic relatedness between articles, each abstract was represented as a vector in a high-dimensional feature space, and pairwise cosine similarity was computed between all abstract vectors. Cosine similarity is widely used in text mining because it captures the alignment between document vectors (their orientation rather than magnitude), making it well suited for detecting conceptual overlap in high-dimensional semantic representations (Huang, 2008). Prior to network construction and clustering, duplicate records arising from overlap between databases were removed; the deduplication process eliminated 1,792 rows, resulting in a final corpus of 13,718 unique, abstract-bearing articles for downstream thematic analysis and interpretation. Additional network analyses were conducted using several cosine similarity thresholds in order to evaluate the robustness of the semantic network and the trade-offs between coverage and structural interpretability. At a high threshold of 0.95, the network becomes very sparse, retaining only 212 nodes connected by 111 edges, with an average of 0.52 edges per node and a global clustering coefficient of 0.30. The resulting structure is highly fragmented, yielding 102 small communities, which reflects extremely strict semantic similarity and limited thematic cohesion at this level. Lowering the threshold to 0.90 substantially increases network size, producing 2,954 nodes and 3,378 edges, with 1.14 edges per node and a global clustering coefficient of 0.34. Despite this expansion, the network remains relatively sparse and fragmented, as indicated by the presence of 690 communities, suggesting that many topics remain weakly connected. At a cosine similarity threshold of 0.85, the network exhibits a markedly different structure. A total of 9,756 nodes are retained and connected by 117,269 edges, corresponding to an average of 12.02 edges per node, while the global clustering coefficient remains substantial at 0.29. The number of communities decreases to 308, indicating a balance between thematic differentiation and network cohesion. According to the silhouette criterion, this threshold provides the most suitable solution. The silhouette metric evaluates how well each node fits within its assigned community compared to other communities; higher (or less negative) values indicate clearer and more meaningful community separation. In this context, the silhouette results suggest that the 0.85 threshold best balances intra-community similarity and inter-community distinctiveness. Finally, at a low threshold of 0.80, the network becomes extremely dense, retaining 12,886 nodes and 1,644,950 edges, with an average of 127.65 edges per node and a global clustering coefficient of 0.35. The number of detected communities drops sharply to 49, indicating that many thematically distinct articles are merged into broad clusters, which reduces interpretability despite high connectivity. Overall, these results indicate that a cosine similarity threshold of 0.85 offers the most informative compromise between network size, connectivity, and community structure, preserving a large share of the literature while maintaining meaningful semantic differentiation. For the cosine similarity threshold of 0.85, the network was partitioned into 308 communities. Community sizes were unevenly distributed: most clusters were small, while only a limited number contained a large concentration of articles. Specifically, 201 communities contained 2 articles, 46 communities contained 3 articles, 14 communities contained 4 articles, and the remaining communities ranged from small groups (e.g., 5–12 articles) to a handful of substantially larger clusters. At the upper end of the distribution, single communities were observed with 1,054, 1,123, 1,236, 1,238, and 1,447 articles, indicating the presence of several dominant thematic concentrations alongside many niche or highly specialized groupings. To ensure interpretability and focus on the most substantively developed themes, subsequent analysis was restricted to communities containing more than 200 articles (nodes).

This filtering step limits attention to large, information-rich clusters that are more likely to represent stable and recognizable research streams, while excluding very small communities that may reflect marginal topics, highly specific subfields, or weakly connected remnants of the clustering process.

### **3. RESULTS**

To make the semantic mapping results easier to follow, the clusters are introduced as a set of connected research “storylines” that together show how scholars approach population aging and its wider consequences. These clusters are not isolated boxes; they overlap and build on one another. Some focus on the big-picture forces, demographic change and economic transition, while others zoom in on how aging plays out through places, life-course patterns, work, health, and retirement decisions. The later clusters highlight how societies are adapting through institutions, technology, and sustainability thinking. Presented in a logical order, the clusters help trace a clear path from macro-level shifts to everyday outcomes and finally to future-oriented responses.

Clusters analyzed:

- Macro-Demographic Economic Transition
  - The Active Ageing and Labor Market Participation
- Digital Transformation and Workforce Adaptability
- The Geronto-Environmental Sustainability

#### **3.1. Macro-Demographic Economic Transition**

The Macro-Demographic Economic Transition cluster represents a sophisticated body of literature dedicated to understanding the shifting age structures of global populations and their profound implications for long-term fiscal and economic stability. As life expectancies rise and fertility rates fall, this cluster contextualizes the movement from a youth-heavy “demographic dividend” to an era defined by the challenges of an aging workforce and increasing dependency ratios. Collectively, the reviewed literature posits that population aging is not merely a social phenomenon but a transformative economic force that reshapes consumption, savings, and productivity across both developed and emerging markets. Scholars in this domain seek to balance the pessimistic views of “secular stagnation” against optimistic prospects for a “silver dividend” driven by human capital accumulation and technological adaptation. Ultimately, this cluster defines the research community through a shared emphasis on the intergenerational transfer of resources and the necessity of structural policy reforms to sustain growth in a graying world. The high density of the associated social network data, comprising 1,236 nodes and 27,572 edges with an average degree of 22.3, indicates a robust, maturing scientific field characterized by intense cross-citation and theoretical integration. Early foundational work by Fougère and Mérette (1999) utilized overlapping-generation models to show how human capital investment could offset the decline in physical capital as populations age. This lifecycle perspective was expanded by Lee and Mason (2011), who defined the cluster as a “generational economy” dependent on complex intergenerational flows and transfers. Applying these concepts to Asia, Amornkitvikai et al. (2022) identify a potential “silver dividend” arising from older workers’ experience, while Ye et al. (2021) and Hu et al. (2021) document how China’s diminishing dividend requires a shift toward labor productivity and innovation. The critical role of technology is highlighted by Park et al. (2022) and Wang (2025), who find that automation and policy responses can mitigate the negative correlation between aging and growth. Global simulations by Tyers and Shi (2007) emphasize the importance of migration and pension reform, a sentiment echoed by Kozlovskyi et al. (2020) in their empirical comparison of advanced and developing nations.

Finally, Lobo and Falleiro (2024) provide a refined perspective by identifying a nonlinear relationship where the initial benefits of aging are eventually overtaken by the costs of high dependency. Across these varied methodologies, a shared definition emerges: aging is an inevitable transition whose economic impact is primarily dictated by the adaptive capacity of labor markets and technological ecosystems.

### **3.2. The Active Ageing and Labor Market Participation Cluster**

The Active Ageing and Late-Career Transition cluster defines the research community through its investigation into the extension of working life and the shifting boundaries between employment and retirement. This cluster conceptualizes the implications of aging as a series of micro-level adjustments and institutional "activation" policies aimed at maintaining workforce participation. It contextualizes aging not as a uniform decline but as a heterogeneous life-course trajectory influenced by gender, education, and prior labor market attachment. Collectively, the reviewed literature identifies a dominant trend toward "active ageing," where policy shifts increasingly demand that older individuals remain net contributors to government revenue. However, this community also critiques the "one-size-fits-all" approach, highlighting how social inequalities and precarious occupational paths create diverse outcomes for aging workers. The social network data, with 1,238 nodes and 20,227 edges (average degree 16.3), reflects a large, multidisciplinary community focused on the intersection of sociology and policy, though it is slightly less centralized than the growth cluster. Hartlapp and Schmid (2008) set the theoretical stage using "Transitional Labour Markets" to advocate for quality of life through employment, while Hofäcker and Naumann (2015) reveal that working beyond age 65 in Germany is often driven by financial need rather than choice, particularly for the low-educated. Cristea et al. (2022) apply the Active Ageing Index to map varied implications across the EU, matching the gendered life-course perspectives of Worts et al. (2016), who find that policy regimes in Italy and Germany reinforce traditional gender roles in later life. Research by Green (2009) and Gahan et al. (2017) emphasizes ageist barriers and recruitment challenges, while Frimmel (2021) identifies gender differences in re-integration following pension reforms. Brydsten et al. (2025) and Hamblin (2010) further complicate the "active" narrative by documenting the "precarity trap" and the loss of choice for vulnerable sub-groups. Finally, Boissonneault et al. (2020) conclude that while social security reforms have successfully pushed exit ages upward, significant unexplained variation remains, necessitating further organizational research.

### **3.3. Digital Transformation and Workforce Adaptability**

The Digital Transformation and Workforce Adaptability cluster focuses on what happens when a fast-moving tech economy meets a workforce that is getting older. At its core, this research looks at the friction between rapid technological change, digitalization, automation, and AI, and the real-life professional paths, health profiles, and learning opportunities of older workers. Aging is therefore framed through very practical questions: How quickly do skills become outdated? Who gets left behind by the digital divide? What kinds of flexibility do modern jobs demand, and who can realistically meet those demands? Across this literature, the main message is that the future sustainability of aging societies depends heavily on whether technological systems are designed and governed in ways that work with older employees rather than pushing them out. Instead of treating aging as inevitable decline, this cluster tends to describe it as a dynamic transition in human capital, where the biggest risk is the "knowledge gap" created by creative destruction: new technologies arrive, old skills lose value, and workers who cannot retool may exit the labor market earlier than they would otherwise choose.

The network profile (351 nodes and 1,223 edges; average degree 3.48) suggests a relatively small, specialized, and still-forming research niche, where conversations across labor economics, gerontology, and computer science are growing but not yet fully integrated. Several studies directly show how technology can shorten working lives if adaptation is hard. Mazzonna and Peracchi (2022) demonstrate that computerization can make the skills of older cohorts obsolete, increasing the likelihood of early labor market exit, especially among women. At the same time, the idea that productivity must fall with age is challenged by evidence such as Börsch-Supan and Weiss (2016), who find that manufacturing productivity does not necessarily decline with age, implying that experience and tacit knowledge can offset slower physical pace. The cluster also emphasizes that the stakes are not only economic. Mazzonna and Peracchi (2012) highlight a psychological and cognitive dimension: retirement itself may accelerate cognitive decline through a “use-it-or-lose-it” channel, tying labor market participation to brain health. More recent work adds nuance to the role of AI and digital tools. Eder and Wiens (2024) and Warning et al. (2022) show that digitalization can increase flexibility demands and even health risks, but it can also create opportunities for skill complementarity, especially when workers are able to self-organize and shape how technology is used. Friedberg (2003) similarly suggests that computer use can discourage early retirement, implying that digital engagement may help maintain labor market attachment. Other contributions focus on employability in a digital work world. Gilsdorf et al. (2025) and Fajertag et al. (2022) stress that older workers’ prospects increasingly depend on whether they can navigate digital working lives, both in terms of skills and confidence. Financial pressures also interact with these patterns: Bertoni et al. (2022) show that wealth shocks can shift retirement timing, while Lundberg and Pollak (2007) remind us that these decisions are often made within families and shaped by changing household structures. Taken together, the cluster frames aging societies’ main challenge as one of techno-cognitive synchronization: keeping the pace of technological change aligned with older workers’ learning opportunities, health, and working conditions, so that longer lives do not automatically translate into earlier exclusion from the labor market.

### **3.4. The Geronto-Environmental Sustainability**

The Geronto-Environmental Sustainability cluster investigates the intricate ecological consequences of global demographic shifts, specifically focusing on how rising median ages alter carbon footprints and resource consumption. Within this research domain, scholars evaluate the “graying” of populations not merely as a fiscal challenge but as a significant variable in the trajectory of climate change and environmental degradation. This cluster contextualizes aging through the lens of ecological transition, examining whether older societies facilitate or hinder the achievement of international carbon neutrality goals. Collectively, the literature explores the “silver footprint,” positing that age-specific consumption patterns, residential energy needs, and shifts in political preferences fundamentally reshape a nation’s environmental impact. By integrating demographic modeling with environmental science, this community seeks to reconcile the conflicting dynamics of increased health-related energy demands and the potential for a “demographic cooling” effect on industrial emissions. The associated social network data, comprising 297 nodes and 2,745 edges with an average degree of 9.24, reflects a specialized yet highly integrated intellectual space where transdisciplinary dialogue is essential for modeling complex socio-environmental feedback loops. The dominant definition across the literature views aging as a bi-directional environmental force that can both mitigate emissions through reduced overall mobility and exacerbate them through specific residential needs. For instance, Hondroyiannis et al. (2024) identify a mitigating effect, arguing that aging and human capital development in OECD populations lead to lower energy consumption.

Similarly, Siddique et al. (2022) utilize second-generation estimation techniques to demonstrate that while aging improves environmental quality in G7 nations by reducing CO<sub>2</sub>, it simultaneously creates a feedback loop that increases health expenditures. This nuance is supported by Zagheni (2011), who applies a life-cycle model to show that the carbon footprint of an individual often peaks in middle age before declining in later years. However, the impact is often mediated by household size; Cole and Neumayer (2004) and Liddle (2011) emphasize that smaller household units, common in aging societies, tend to be less energy-efficient per capita. Methodologically, the cluster frequently utilizes the STIRPAT framework, with York (2007) and Fan et al. (2008) demonstrating that age structure is a significant predictor of total air pollution and carbon intensity. Beyond physical consumption, the cluster addresses political-economic dimensions, as Thalmann (2004) explores how age influences public support for green taxes, while O'Neill et al. (2010) and Menz and Welsch (2012) project that global aging could significantly reduce long-term emissions by slowing economic growth and changing lifestyle preferences. Ultimately, the shared consensus within this cluster defines the implication of aging as a structural shift that demands a recalibration of environmental policy to account for the unique ecological behavior of older populations.

#### **4. DISCUSSION**

The results of the study show that the relationship between population ageing and economic developments is not straightforward. A declining labour supply, rising dependency ratios, and increasing pressures on pension and healthcare systems are well-known consequences of changes in the age structure of the population. Nevertheless, the literature included in the analysis shows that the demographic process itself does not lead to a clear-cut conclusion about its long-term economic effects. These effects depend to a large extent on productivity, human capital development, the functioning of labour markets, technological change, and institutional responses. In this sense, population ageing represents a structural change whose economic consequences are shaped by the way economies respond to it. This is particularly evident in the Macro-Demographic Economic Transition cluster. Declining fertility, increasing life expectancy, and the decreasing relative share of the working-age population alter the relationships between production, consumption, savings, and intergenerational transfers. At the same time, the growing share of older people increases fiscal pressures and may constrain the potential for economic growth. Such effects, however, are not the same across economies, nor are they necessarily proportional to the intensity of demographic ageing. Some of the negative effects can be offset by productivity growth, human capital accumulation, technological progress, migration, and institutional reforms. In this context, the distinction between demographic change itself and its economic consequences becomes particularly important. Similar changes in the age structure of the population may lead to different economic outcomes depending on the capacity of individual economies to respond to them. One of the most common institutional responses to population ageing is the extension of working lives. Such a response follows relatively straightforward economic logic: longer labour market participation increases the available labour supply, postpones retirement, and reduces pressure on pension systems. The results of the Active Ageing and Labor Market Participation cluster show, however, that the ability to remain in employment for longer is not equal for everyone. Education, gender, previous employment, occupational characteristics, and economic security significantly affect an individual's position in the later stages of working life. Extending working life may represent continued productive activity and a voluntary choice for one group, while for another it may be a consequence of economic necessity.

At this point, the issue of fiscal and economic sustainability becomes directly linked to social sustainability. The same increase in retirement age does not have the same consequences for a worker with in-demand skills, stable employment, and opportunities for workplace adjustment as it does for a worker whose career has been characterised by precarious employment, unemployment, or physically demanding jobs. Active ageing cannot be reduced to the formal extension of working life. Its effects also depend on whether conditions exist in which older workers can remain productively employed. Policies aimed at extending working lives thus become closely linked to employment, education, working conditions, and social security policies. Technological transformation is particularly important in this relationship. Productivity growth is one possible way of mitigating the economic consequences of a shrinking working-age population, meaning that automation, digitalisation, and artificial intelligence may play an important role in ageing economies. At the same time, technology changes the content of jobs and the value of existing knowledge and skills. This is precisely where the dual effect of technological development on older workers becomes apparent. New technologies can reduce physical limitations, increase productivity, and enable more flexible forms of work, but the rapid obsolescence of knowledge can make the position of workers who are unable to adapt quickly enough to new requirements more difficult. The pace of technological progress is therefore not the only factor that matters. Equally important is whether the workforce is able to adapt to that pace. If technological change advances faster than opportunities to acquire new knowledge and skills, an increase in overall productivity may be accompanied by a deterioration in the position of some older workers and their earlier exit from the labour market. In the opposite case, technology can enable people to remain capable of working for longer and allow better use of the experience and accumulated knowledge of older employees. Human capital development takes on an additional function in ageing societies: beyond increasing productivity, it becomes one of the conditions for maintaining labour market participation in circumstances of rapid technological change. The fourth identified cluster shows that the consequences of demographic ageing extend beyond the labour market and public finances. Changes in age structure are associated with changes in consumption, mobility, household size, and energy use, making demographic structure relevant to environmental sustainability as well. Here too, the literature does not indicate a single direction of effect. Lower mobility and changing consumption patterns among older populations may contribute to reducing emissions, while smaller households and specific housing, energy, and healthcare needs may increase resource consumption per capita. The environmental effect of ageing therefore depends on a combination of demographic change and changes in behaviour, consumption, and household structure. This perspective broadens the conventional understanding of the economic consequences of ageing. Changes in age structure affect not only labour supply and public expenditure, but also the structure of aggregate demand. Older populations allocate their consumption differently, have different housing and mobility needs, and indirectly alter patterns of energy use. The sustainability of ageing societies encompasses economic, social, technological, and environmental dimensions. An important contribution of this analysis is that it brings together research areas that often develop within different disciplinary frameworks. Semantic mapping showed that research on the economic consequences of demographic ageing is not concentrated solely around the traditional issues of economic growth, public finances, and labour markets, but is also connected with technological transformation and environmental sustainability. Viewed together, the four identified clusters indicate that the consequences of population ageing are shaped through interconnected economic, social, technological, and environmental processes.

Although they belong to different research traditions, the issues covered by the individual clusters are closely connected. Changes in age structure create pressures on the labour market and the system of intergenerational transfers; the extent to which these pressures can be mitigated depends on the length of working lives and productivity; the length of productive working life increasingly depends on adjustment to technological change; at the same time, changes in age structure affect consumption and resource use. The boundaries between these areas are therefore less distinct than might be assumed when each research stream is considered separately. Policies that are often designed separately need to be more closely connected. Pension reform is unlikely to achieve the expected effects if the extension of working lives is not accompanied by employment opportunities for older people. Technological investment can increase productivity, but its effect on older workers depends on opportunities for continuous education and workplace adjustment. Similarly, changes in consumption and household structure associated with population ageing have consequences that should be taken into account when designing long-term environmental policies. Demographic ageing is therefore not merely a question of adapting existing economic systems, but part of a broader structural transformation of the economy. The literature analysed in this study shows that its consequences depend to a considerable extent on the ability of society to link longer life expectancy with productive participation, technological development with continuous human capital development, and changes in population structure with appropriate institutional and environmental policies. The sustainability of ageing societies thus depends less on changing demographic trends themselves than on how effectively economies and institutions respond to their consequences. The analysis also has certain limitations. Semantic mapping is based on article abstracts, which allow a large number of publications to be processed and research from different fields to be compared, but do not contain all the information available in full texts. The structure of the analysed corpus depends on the selected databases and search terms, meaning that some research areas related to demographic ageing may be underrepresented. The clustering results are also affected by the selected cosine similarity threshold, although the threshold of 0.85 was chosen after comparing alternative solutions. Finally, focusing the interpretation on communities containing more than 200 articles made it possible to identify large and substantively developed research areas, but excluded smaller communities from detailed analysis, some of which may represent specialised or emerging research topics. Future research could therefore broaden the search strategy, include an analysis of smaller and emerging clusters, and track changes in their structure over time. It would be particularly useful to examine whether the links between demographic ageing, digital transformation, and environmental sustainability, which appear in this study as distinct but interconnected areas, become stronger over time.

## **5. CONCLUSION**

Population ageing is one of the most important structural changes facing modern economies. The aim of this paper was to analyse the main strands of scientific research linking demographic ageing to economic and labour market adjustments and to identify the dominant thematic areas and the relationships between them. The analysis showed that the literature is organised around four major research areas: macroeconomic and demographic transition, active ageing and labour market participation, digital transformation and workforce adaptability, and geronto-environmental sustainability. The results show that the economic consequences of demographic ageing cannot be viewed solely in terms of a declining labour force, rising dependency ratios, and increasing fiscal burdens.

Changes in the age structure of the population affect economic growth, productivity, savings, consumption, and intergenerational transfers, but their ultimate effects also depend on the ability of economies to respond to such changes. Human capital development, technological progress, the functioning of labour markets, and institutional reforms can mitigate some of the negative consequences of ageing. Extending working lives is one possible response to the declining share of the working-age population, but the results show that its feasibility and consequences are not the same for all groups of workers. Education, gender, previous labour market position, occupational characteristics, and economic security affect the ability to remain employed at older ages. At the same time, technological change further alters the position of older workers. Automation, digitalisation, and artificial intelligence can increase productivity and facilitate longer working lives, but they can also accelerate the obsolescence of existing knowledge and skills. The capacity for continuous human capital development will become increasingly important in economies with ageing workforces. The results also show that the sustainability of ageing societies cannot be reduced to economic and fiscal effects. Changes in population structure are associated with changes in consumption, mobility, household structure, and energy use, giving demographic ageing an environmental dimension as well. Linking this perspective with macroeconomic, labour market, and technological research shows that the different consequences of population ageing complement one another and are difficult to consider separately. Demographic trends develop slowly and are difficult to change in the short term. The long-term sustainability of ageing societies therefore depends primarily on how economies and institutions respond to changes in the age structure of the population. Longer life expectancy can represent economic and social potential if accompanied by opportunities for longer productive activity, while technological progress can mitigate the consequences of a shrinking labour force if accompanied by the development of knowledge and skills. At the same time, changes in consumption patterns and resource use require demographic change to be incorporated into long-term sustainable development policies. In this sense, the key challenge is not population ageing alone, but the ability of economies and institutions to adapt to its consequences in a timely and effective manner.

**ACKNOWLEDGEMENT:** *This research is part of the 101136834 – CROSS-REIS – HORIZON-WIDERA-2023-ACCESS-03 project, funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency. Neither the European Union nor the European Research Executive Agency can be held responsible for them.*

## **LITERATURE:**

1. Amornkitvikai, Y., Harvie, C., & Karcharnubarn, R. (2022). *The impact of demographic structure, human capital, migration and environmental degradation on economic growth in Asia*. Journal of Economic Studies, 49(8), 1464-1486.
2. Bertoni, M., Brunello, G., & Mazzonna, F. (2022). *Wealth shocks and retirement decisions: Evidence from the Italian pension reform*. Journal of Population Economics, 35, 123-154.
3. Boissonneault, M., Mulders, J. O., Turek, K., & Carriere, Y. (2020). *A systematic review of causes of recent increases in ages of labor market exit in OECD countries*. Ageing & Society, 40(11), 2325-2354.
4. Börsch-Supan, A., & Weiss, M. (2016). *Productivity and age: Evidence from work teams at the assembly line*. The Journal of the Economics of Ageing, 7, 30-42.
5. Brydsten, A., Hasselgren, C., Stattin, M., & Larsson, D. (2025). *The road to retirement: A life course perspective on labor market trajectories and retirement behaviors*. Journal of Aging & Social Policy.

6. Čišić, D., Drezgić, S., Buterin, V., Gržeta, I., Kovačić, B., Pošćić, P., ... Misuraca, G. C. (2025). *Semantic mapping of AI-for-government research: Uncovering the knowledge architecture of digital-era governance*. *Administrative Sciences*, 16(1), 19. <https://doi.org/10.3390/admsci16010019>
7. Cole, M. A., & Neumayer, E. (2004). *Examining the impact of demographic factors on air pollution*. *Population and Environment*, 26(1), 5-21.
8. Cristea, M. S., Pirtea, M. G., Suci, M. C., & Noja, G. G. (2022). *Workforce participation, ageing, and economic welfare: New empirical evidence on complex patterns across the European Union*. *Sustainability*, 14(7), 3841.
9. Eder, A., & Wiens, M. (2024). *The impact of automation and AI on the aging workforce: A task-based approach*. *Industrial Relations*, 63(1), 45-68.
10. Fajertag, S., et al. (2022). *Digitalization and the working life of older workers: Challenges and opportunities*. *European Journal of Ageing*, 19(3), 885-901.
11. Falagas, M. E., Pitsouni, E. I., Malietzis, G. A., & Pappas, G. (2008). *Comparison of PubMed, Scopus, web of science, and Google scholar: strengths and weaknesses*. *The FASEB journal*, 22(2), 338-342.
12. Fan, Y., Liu, L. C., Wu, G., & Wei, Y. M. (2008). *Analyzing the impact of financial structure and lifestyle on CO2 emissions from the perspective of industrialization and urbanization*. *Energy*, 33(4), 579-583.
13. Fougère, M., & Mérette, M. (1999). *Population ageing and economic growth in seven OECD countries*. *Economic Modelling*, 16(3), 411-427.
14. Friedberg, L. (2003). *The impact of technological change on older workers: Evidence from data on computer use*. *Industrial and Labor Relations Review*, 56(3), 511-529.
15. Frimmel, W. (2021). *Later retirement and the labor market re-integration of elderly unemployed workers*. *The Journal of the Economics of Ageing*, 19, 100322.
16. Gahan, P., Harbridge, R., Healy, J., & Williams, R. (2017). *The ageing workforce: Policy dilemmas and choices*. *Australian Bulletin of Labour*, 43(1), 1-22.
17. Gilsdorf, G., Geyer, S., & Schimany, P. (2025). *Digitalization and the aging workforce: Employment prospects in a changing technological landscape*. *Journal of Aging & Social Policy*.
18. Green, A. (2009). *Older people and transitions from employment to nonemployment: International perspectives and policy issues*. *Professional Geographer*, 61(1), 46-58.
19. Hamblin, K. A. (2010). *Changes to policies for work and retirement in EU15 nations (1995-2005): An exploration of policy packages for the 50-plus cohort*. *Journal of European Social Policy*, 20(4), 332-346.
20. Hartlapp, M., & Schmid, G. (2008). *Labour market policy for 'active ageing' in Europe: Expanding the options for retirement transitions*. *Journal of Social Policy*, 37(3), 409-431.
21. Hofäcker, D., & Naumann, E. (2015). *The emerging trend of work beyond retirement age in Germany: Increasing social inequality?* *Zeitschrift für Gerontologie und Geriatrie*, 48(5), 473-479.
22. Hondroyiannis, G., Papapetrou, E., & Tsalaporta, P. (2024). *The effect of population aging on environmental degradation: New evidence and insights*. *The World Economy*. Advance online publication.
23. Hu, Q., Lei, X., & Zhao, B. (2021). *Demographic changes and economic growth: impact and mechanisms*. *China Economic Journal*, 14(3), 223-242.
24. Huang, Z., & Qiu, Y. (2008, December). *Measuring semantic similarity between resource spaces*. In 2008 Fourth International Conference on Semantics, Knowledge and Grid (pp. 255-262). IEEE.
25. Kozlovskiy, S., Pasichnyi, M., Lavrov, R., Ivanyuta, N., & Nepytaliuk, A. (2020). *An empirical study of the effects of demographic factors on economic growth in advanced and developing countries*. *Comparative Economic Research. Central and Eastern Europe*, 23(4), 45-67.
26. Lee, R., & Mason, A. (2011). *Population aging and the generational economy: A global perspective*. Edward Elgar Publishing.

27. Liddle, B. (2011). *Consumption-based relative environmental impacts of age structure vis-à-vis total population change: A multi-country panel analysis*. *Population and Environment*, 32(2-3), 170-189.
28. Lobo, C. S. S., & Falleiro, S. P. (2024). *The implications of population ageing on economic growth: Evidence of nonlinearity*. *Asian Economic and Financial Review*, 14(6), 410-423.
29. Lundberg, S., & Pollak, R. A. (2007). *The American family and family economics*. *Journal of Economic Perspectives*, 21(2), 3-26.
30. Mazzonna, F., & Peracchi, F. (2012). *Ageing, cognitive abilities and retirement*. *European Economic Review*, 56(4), 691-710.
31. Mazzonna, F., & Peracchi, F. (2022). *Computerization, obsolescence and the length of working life*. *Journal of Human Resources*, 57(S), S150-S185.
32. Menz, T., & Welsch, H. (2012). *Population aging and carbon emissions: A combined economy-environment-demography analysis*. *Environmental and Resource Economics*, 52(2), 255-273.
33. O'Neill, B. C., Dalton, M., Fuchs, R., Jiang, L., Pachauri, S., & Zigova, K. (2010). *Global demographic trends and future carbon emissions*. *Proceedings of the National Academy of Sciences*, 107(41), 17521-17526.
34. Page, L., Brin, S., Motwani, R., & Winograd, T. (1999). *The PageRank citation ranking: Bringing order to the web*. Stanford infolab.
35. Park, C. Y., Shin, K., & Kikkawa, A. (2022). *Demographic change, technological advance, and growth: A cross-country analysis*. *Economic Modelling*, 108, 105742.
36. Siddique, H. M. A., Khan, M. A., & Ahmad, N. (2022). *Linking population aging, health expenditures, and renewable energy budgets with CO2 emissions: Evidence from G7 countries*. *Gondwana Research*, 106, 124-135.
37. Thalmann, P. (2004). *The public acceptance of green taxes: 2 million voters express their opinion*. *Public Choice*, 119(1-2), 179-217.
38. Tyers, R., & Shi, Q. (2007). *Demographic change and policy responses: Implications for the global economy*. *The World Economy*, 30(4), 537-566.
39. Wang, L. (2025). *Effect of population aging and economic growth: Evidence from the largest 15 countries*. *Journal of Economic Studies*. Advance online publication.
40. Warning, A., Weber, E., & Püffel, A. (2022). *On the impact of digitalization and artificial intelligence on employers' flexibility requirements in occupations*. IAB-Discussion Paper, (12/2022).
41. Worts, D., Corna, L., Sacker, A., McMunn, A., & McDonough, P. (2016). *Understanding older adults' labour market trajectories: A comparative gendered life course perspective*. *Longitudinal and Life Course Studies*, 7(1), 4-22.
42. Ye, Z., Chen, L., & Peng, X. (2021). *Is the demographic dividend diminishing in China? Evidence from population aging and economic growth during 1990–2015*. *Review of Development Economics*, 25(4), 2255-2274.
43. York, R. (2007). *Demographic trends and energy consumption in OECD nations, 1960–2000*. *Social Science Quarterly*, 88(1), 58-72.
44. Zagheni, E. (2011). *The leverage of demographic dynamics on carbon dioxide emissions: Does age structure matter?* *Demographic Research*, 24, 483-506.

# BEYOND THE BALANCE SHEET: UNCOVERING ESG CONCEPTS IN CONSTRUCTION COMPANIES THROUGH ANALYSIS AND EVALUATION OF NON-FINANCIAL REPORTS

**Lana Lovrencic Butkovic**

*University of Zagreb Faculty of Civil Engineering, Croatia  
lana.lovrencic.butkovic@grad.unizg.hr*

## **ABSTRACT**

*The construction industry is well-known as a traditional sector that is slow to adopt new trends, particularly when it comes to managing construction companies. This was primarily caused by the industry's characteristics and market conditions. Large construction companies play a significant role in developing and implementing new and modern management practices. Since implementing a new environmental, social, and governance (ESG) concept has become a hot topic in recent years, it is appropriate to look into the role of construction companies in achieving ESG goals. The European Corporate Sustainability Reporting Directive (CSRD) has resulted in numerous changes in business practices, including those of construction companies. Given the construction sector's significant influence in climate change and environmental protection, previous practice has shown that construction companies contribute the most to the environmental goals. However, the new European Sustainability Reporting Standards (ESRS) identify other important topics that construction companies may need to consider, such as their own workforce or management transparency. This paper investigates how Croatian construction companies report on ESG practices, how familiar they are with the new directive and standards, and what the biggest challenges and opportunities for them are. The findings of this paper will provide guidance for future steps to improve construction sector development in terms of non-financial reporting and readiness to implement ESG strategies.*

**Keywords:** *ESG concept, construction industry, construction companies, non-financial reporting, ESG strategies*

## **1. INTRODUCTION**

In the second half of the twentieth century, companies began to pay increasing attention to how they achieve business results rather than solely focusing on profit. Elkington (1997) created the term "Triple Bottom Line" (TBL), which refers to sustainability. Such a business model relies on a business strategy that begins with companies advocating for the social and environmental aspects of their operations in the same way that they advocate for the financial ones. Companies began to publish non-financial reports, also known as sustainability reports, to demonstrate their social and environmental contributions. since they have an important role in creating the market, the economy, and the society around them and have become key subjects in achieving a more sustainable future. To encourage companies and other institutions to transition to sustainable business, the European Union (EU) has developed a long-term strategy that includes sustainable, inclusive, innovative, and smart business models to address all of the issues that businesses and other organisations face today (Lovrenčić Butković & Omazić, 2022). After nearly 200 countries signed the Paris Agreement in 2015, to limit greenhouse gas emissions in order to keep global warming below 2 degrees Celsius above pre-industrial levels, as well as to maintain a global temperature rise of 1.5 degrees Celsius, the EU published the fundamental document in 2020 - The European Green Deal (EC, 2020). The European Green Deal states that the EU aims to become the first carbon-neutral continent by 2050. To achieve this goal, each member state agreed to reduce emissions by at least 55% from 1990 levels. In addition to numerous initiatives announced by the EU with the aim of achieving sustainable development, there are documents that directly concern the construction industry (CI), such as: Circular

Economy Action Plan (EC, 2020), EU Taxonomy (EU 2020/852), Renovation Wave Strategy (EC, 2020), Fit for 55 package (EP, 2021), Biodiversity Strategy for 2030 (EC, 2020) ili Sustainable Products Initiative (EC, 2021). It is undeniable that the CI plays a critical role in achieving the goals set by the transition to a sustainable economy. In 2022, the CI contributed 10.1% of the total value of the gross social product, with over 3 million companies and 12 million employees operating on European Union territory (FIEC, 2023). On the other hand, the CI is distinguished by its extensive use of various materials and natural resources and it is estimated that material extraction, construction product manufacturing, and building construction and renovation account for 5-12% of total national greenhouse gas emissions. The construction sector in the EU is responsible for approximately 40% of CO<sub>2</sub> emissions and generates more than 35% of total waste. This is why construction companies and all of their stakeholders will make significant contributions to achieving long-term goals through the adoption and implementation of European directives, as well as the publication of non-financial reports. To prevent non-financial reporting from becoming and remaining just a tool for »greenwashing«, sustainability reports needed to be standardised. In current practice, Environmental, Social and Governance factors (ESG) has become the most widely used measurement of sustainability standards for holding firms accountable (Howard-Grenville, 2021). The new Corporate Sustainability Reporting Directive (CSRD) was adopted in November 2022, and it is an EU regulation that requires all large companies to publish information on the environmental and social impacts of their activities, as well as any sustainability risks to which they may be exposed (EC, 2022). This regulation aims to assist investors, consumers, policymakers, and other stakeholders in assessing the ESG impacts of business, as well as the effects of climate risks. In July 2023, the EU adopted the European Sustainability Reporting Standards (ESRS) to establish ESG information standards as well as unify and standardise non-financial reports, marking another step towards the acceptance of the ESG concept in company operations (EC, 2023). Given the construction sector's significant influence in climate change and environmental protection, previous practice has shown that construction companies contribute the most to the environmental goals. However, the new ESRS identify other important topics that construction companies may need to consider, such as their own workforce or management transparency. However, it is well known that construction companies are quite inflexible and slow to adapt to new requirements, particularly those that are not directly related to the financial results. The article's primary focus is an exploration and analysis of the cumulative findings on non-financial reporting within large Croatian construction companies. It also looks into how they report on ESG practices, how well they understand the new directive and standards, and what their biggest challenges and opportunities are.

## 2. LITERATURE REVIEW

There are numerous reports and papers on the adoption trends in non-financial reporting, but few on the topic of construction companies. According to Siew et al., studies on non-financial reporting trends in the construction industry often have insufficient sample sizes to draw accurate conclusions. Lamprinidi and Ringland (2008), for example, identified 16 "global" construction and real estate companies, KPMG (2008), three to eight companies, and Brown et al. (2009), twelve. Construction companies have a social responsibility to integrate sustainability concepts into project planning, design, building, and management (Ershadi and Goodarzi, 2021), primarily because construction products have a direct and indirect impact on the population's standard of living and improve citizens' quality of life. The construction industry has an undeniable impact on the environment, so construction companies make the greatest contribution to the environmental aspect of ESG by implementing waste management plans, using energy-efficient equipment and practices, using sustainable materials,

implementing water conservation measures, protecting natural habitats, and offsetting carbon emissions (UGREEN, 2023). The majority of previous research has focused on the construction sector's impact on environmental goals, but its contribution to social goals is also significant, especially considering its large workforce. Sulaiman et al. (2024) recently evaluated current ESG practices disclosed in annual reports and sustainability statements among 55 construction sector companies listed on Bursa Malaysia. The results show that the social pillar has the highest percentage of ESG practice among construction companies, scoring 64% with a focus on health and safety. The environmental pillar practice continues to have the second highest score (57.45%), followed by governance (55%). Companies can consider the social impact of their construction projects by ensuring fair labour practices, engaging with local communities, creating accessible spaces, promoting diversity and inclusion, and giving back to the community (UGREEN, 2023). So far, perhaps the least attention has been paid to the governance aspect of ESG, but this may change soon, given the unique nature of construction management in organisations. Clear ethical guidelines, transparency in business practices, the implementation of effective risk management systems, and strong internal controls are all examples of how a company can demonstrate a solid approach to governance in the construction industry (UGREEN, 2023).

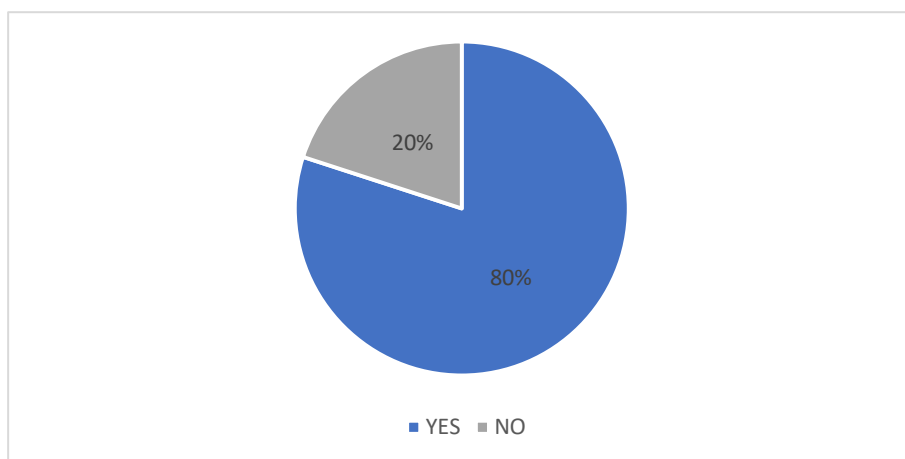
### **3. METHODOLOGY AND DATA**

The study wanted to investigate how existing rules and guidelines for non-financial reporting affect large construction companies in Croatia in terms of ESG disclosure. The research objectives were to examine how these Croatian companies reported on climate change in 2022. It included an examination of how they managed climate-related risks, the opportunities they discovered related to climate change, how they worked to mitigate the effects of climate change, and how they adapted to them. This type of responsible business practice can assist companies in discovering new ways to create value and set long-term goals while also dealing with major global environmental and climate issues, distinguishing them from less responsible companies (Painter et al., 2019). The CSRD currently applies to large companies with more than 500 employees and registered as joint-stock companies or identified as public interest entities, but it will be expanded to include all large companies by 2026. In 2022, there were 23 large construction companies in Croatia, with only 7 employing more than 500 people (CBS, 2023). The study thoroughly examined reports from those seven companies, and a short online questionnaire was sent via email to all 23 large companies through February 2024., gathering and analyzing the data in Microsoft Excel. The aim was to show how well they understand the new directive and standards, and what their biggest challenges and opportunities are.

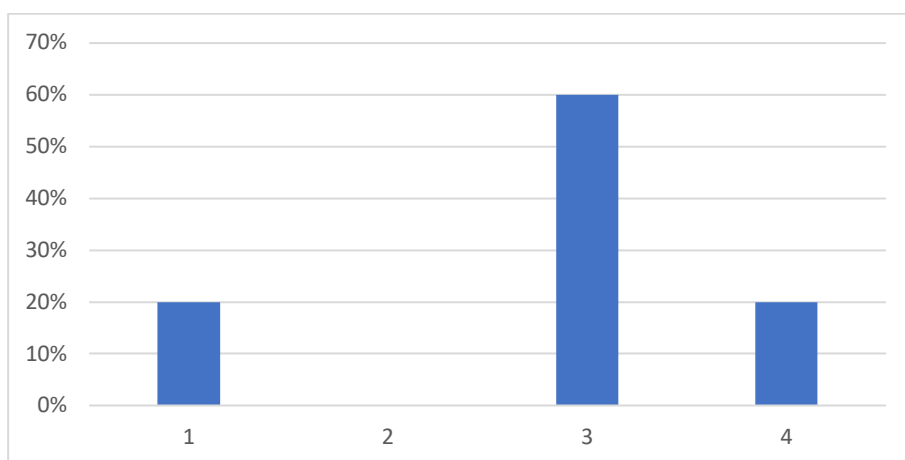
#### *a. The Research Results*

After the company analysis revealed that only two construction companies meet the current CSRD directive requirements for those liable for non-financial reporting, the first part of the research involved reviewing websites and available business reports. It was discovered that only one company consistently publishes a separate sustainability report, which is primarily based on GRI standards and UN sustainable development goals, whereas the other company, which is required to non-financially reporting, publishes non-financial indicators as part of its management board report. This is the clearest indication that ESG reporting is not even being considered in the business thinking or discussions of these large construction companies. In the second part of this research, short questionnaires were sent to all large companies that will be required to report non-financial information under CSRD, in which they were asked how familiar they were with the new EU regulation, which activities related to the ESG concept they use, which SDG goals they meet, and so on.

The questionnaires were distributed to the top or middle managers of 23 large construction companies, and 10 completed surveys were returned, yielding a 43,48 % response rate. According to the responses received, 80% of respondents said they are familiar with the concept of ESG (Graph 1). In the survey, respondents were asked to rate the importance of ESG principles in the company's operations on a Likert scale of 1 (unimportant) to 4 (very important). According to Graph 2, 20% of respondents believe that incorporating the ESG concept into construction company operations is not important at all, indicating a lack of awareness among top management levels in large Croatian construction companies reporting on climate, social, and governance issues.

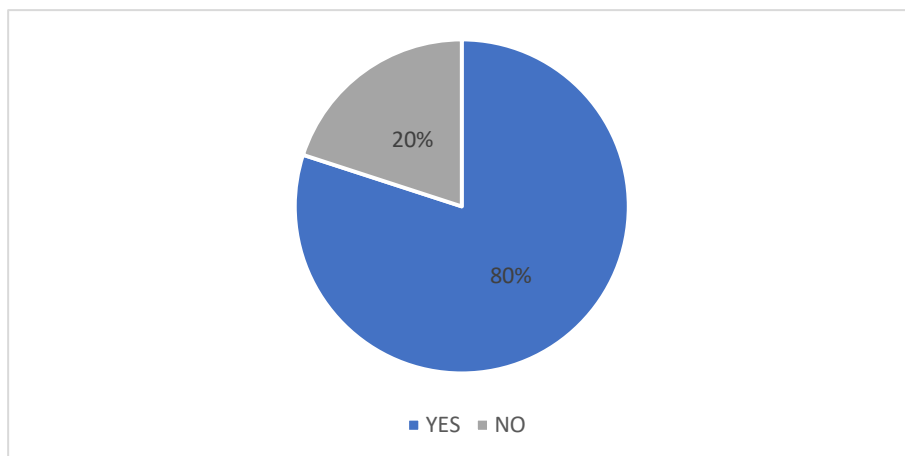


**Graph 1.** Understanding of ESG concepts in large Croatian construction companies  
**Source:** Author's research

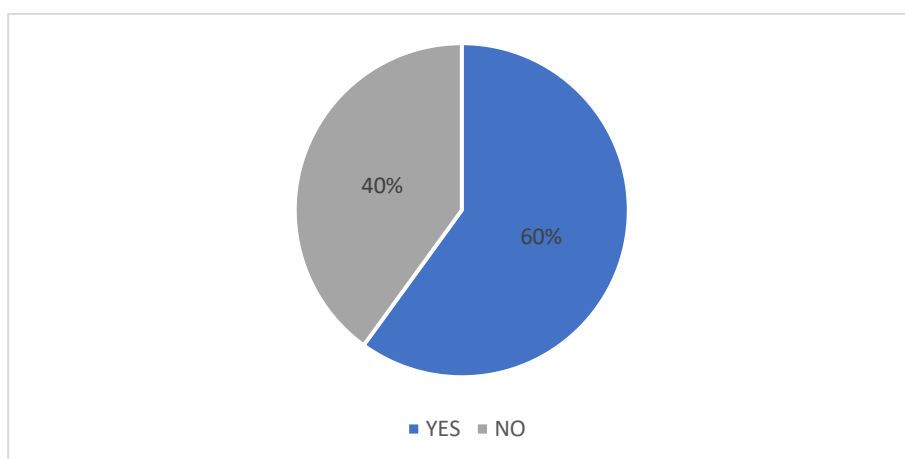


**Graph 2.** The importance of ESG principles  
**Source:** Author's research

When asked if they were aware that all large companies will be required to report on sustainability beginning in 2026, 80% responded positively (Graph 3), with 60% believing that by following to ESG principles, the company can improve its financial performance (Graph 4). This suggests that construction companies are still not prepared to not only introduce the ESG concept, but also to report on sustainability, despite the legal obligation to which they will soon be impacted by.

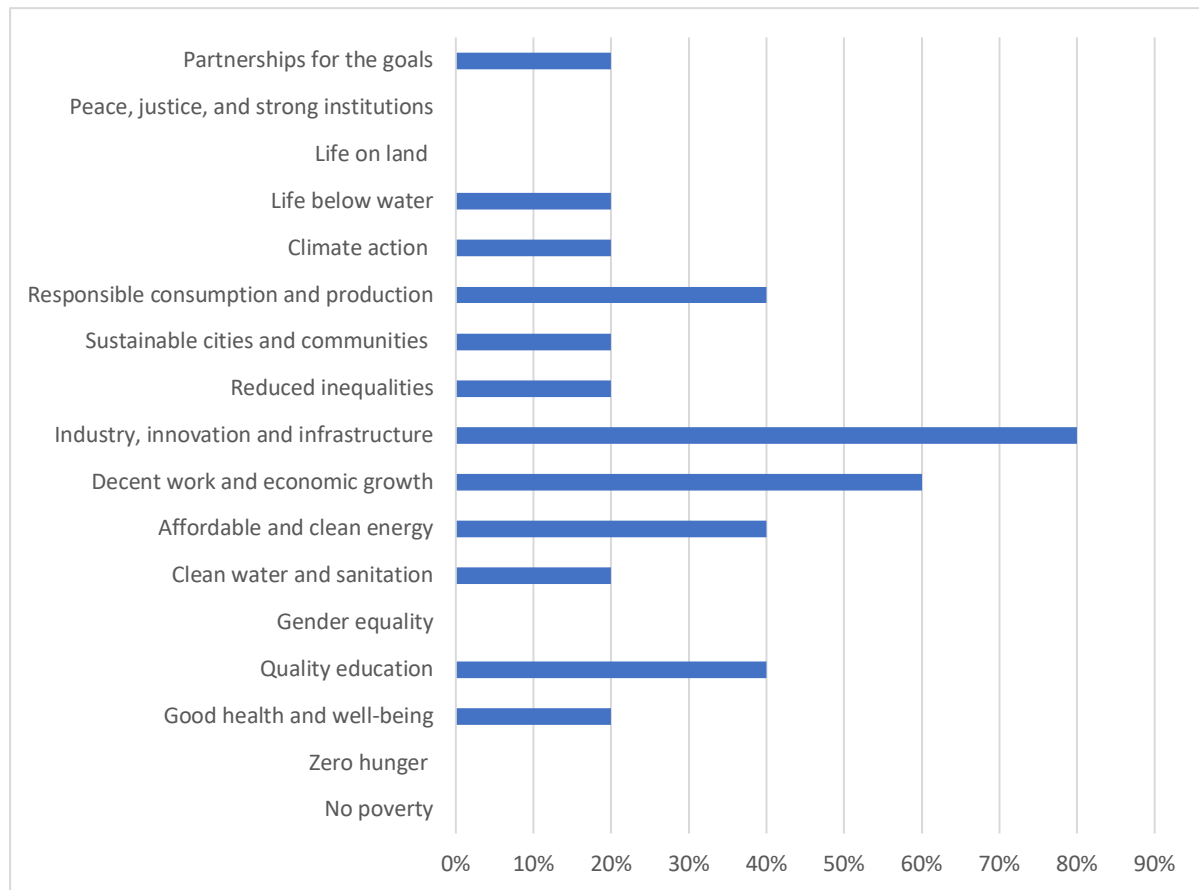


**Graph 3.** Large Croatian construction companies' awareness of reporting on sustainability beginning in 2026  
**Source:** Author's research



**Graph 4.** Large Croatian construction companies' believe that adhering to ESG principles can improve their financial performance  
**Source:** Author's research

Because the UN SDGs (UN, 2015) are widely used as sustainability reporting standards among construction companies worldwide, respondents were asked to list sustainable development goals to which their company directly contributes. Graph 5 shows that Croatian construction companies that took part in the research contribute the most to UN Sustainable Development Goal 9 – Industry, innovation and infrastructure, which was mentioned by 80% of respondents. Goal number 8 – Decent work and economic growth comes in second with 60%, while goals 4 – Quality education, 7 – Affordable and clean energy, and 12 – Responsible consumption and production are tied for third with 40% of respondents stating that their business activities help achieve them.



**Graph 5.** UN Sustainable Development Goals achieved by large Croatian construction companies  
**Source:** Author's research

#### *b. Discussion of the Research*

Within the framework of the EU's ambitious goals, large Croatian construction companies face incredibly difficult business ventures. To meet those ambitious ESG goals, these companies will need to make significant business efforts, including changes to their practices and procedures. There is still a lack of awareness among top management levels in large Croatian construction companies about reporting on climate, social, and governance issues, particularly since it is still voluntary. Lack of ESG awareness and training mechanisms can lead to unfamiliarity and lack of motivation among construction industry practitioners in implementing ESG practices (Wang & Xue, 2023). So companies' disclosure of non-financial information is becoming increasingly important to various stakeholders (investors, consumers, employees, suppliers, and so on), as these groups consider a company's sustainability factors when making decisions. Long-term investment requires more than just profitability (KPMG, 2019). According to the findings of research conducted among large construction companies, they will face numerous barriers and challenges if they are required to report non-financial information. When it comes to the need and obligation of non-financial reporting, in the Republic of Croatia, where socially responsible business is still in its early stages of development, when compared to the best in the EU, there are objective signals that reporting by some business entities may become more of a legal obligation than the need for the integration of management's social responsibility into business operations (Omazić et al., 2020). Croatian construction companies are definitely no exception to this. To incorporate ESG concepts into daily business operations, construction companies will need to change their organisational structure in order to prepare and communicate all relevant information.

Another significant challenge that can be addressed here is that CSRD requires companies to conduct and publish sustainable reports to declare the extent to which all subjects in their value chain contribute to the ESG goals. For example, construction companies will be required to publish how their subcontractors contribute to meeting esg standards.

#### **4. CONCLUSION**

Non-financial reporting is becoming increasingly important as key stakeholders, including investors, banks, contractors, consumers, and employees, demand that corporate non-financial reporting be transparent, relevant, and reliable. Understanding the importance of reliable, standardised non-financial data related to social and governance issues, as well as environmental issues, in assessing a construction company's long-term viability, this transition is raising the status of sustainable reporting to a level comparable to financial reporting in the near future. It was expected that construction companies in Croatia, especially large ones, would address climate change in their operations and report on it much more intense. However, the results of an empirical study presented in this paper, resulted in the following findings:

- according to the CSRD, only two construction companies in Croatia are required to report non-financial information now; however, only one of them consistently publishes a separate sustainability report;
- in 2022, there were 23 construction companies in Croatia that were classified as large companies based on the Accounting Law's criteria;
- 80% of respondents are familiar with the concept of ESG;
- 20% believe it is not important to incorporate ESG into construction company operations;
- 80% are aware that sustainability reporting will be required in 2026;
- 60% believe that following ESG principles can improve financial performance;
- construction companies that participated in the research were found to make the greatest contribution to UN Sustainable Development Goal 9 - Industry, Innovation, and Infrastructure.

These findings demonstrate that construction companies continue to lack an understanding of sustainable business practices and the ESG concept. The CSRD will require large corporations to publish reports, but what about small and medium-sized enterprises? Despite their importance in the construction value chain, many subcontractors are still exempt from this directive. They must show a more comprehensive approach to assessing and integrating ESG criteria, determining double materiality, and managing identified impacts. All of this presents significant challenges for construction companies in the coming years, primarily because financial indicators remain much more tangible and a powerful guiding star for contractors.

#### **LITERATURE:**

1. Brown, J., Parry, T. and Moon, J. (2009). Corporate responsibility reporting in UK construction. *Proceedings of the Institution of Civil Engineering Sustainability*. 162 (4), pp. 193-205.
2. Croatian Bureau of Statistics. (2023). Press release: Number and structure of business entities in 2022. [https://podaci.dzs.hr/media/zlfjgxuv/posl-2022-1-2\\_2-number-and-structure-of-business-entities-2022-by-counties.pdf](https://podaci.dzs.hr/media/zlfjgxuv/posl-2022-1-2_2-number-and-structure-of-business-entities-2022-by-counties.pdf)
3. Elkington, J. (1997). *Cannibals with forks – Triple bottom line of 21st century business*. Stony Creek, CT: New Society Publishers.
4. Ershadi, M. & Goodarzi, F. (2021). Core capabilities for achieving sustainable construction project management, *Sustainable Production and Consumption*, 28: 1396-1410.

5. European Construction Industry Federation (FIEC). 2023. Statistical Report. <https://fiec-statistical-report.eu>
6. European Commission (2018). Action Plan: Financing Sustainable Growth. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0097>
7. European Commission (2020). European Green Deal. [https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal\\_en](https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en)
8. European Commission (2020). Circular Economy Action Plan. [https://environment.ec.europa.eu/strategy/circular-economy-action-plan\\_en](https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en)
9. European Commission (2020). Renovation Wave Strategy. [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_20\\_1835](https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1835)
10. European Commission (2020). Biodiversity Strategy for 2030. [https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030\\_en](https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_en)
11. European Commission (2020). Sustainable Products Initiative. [https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12567-Sustainable-products-initiative\\_en](https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12567-Sustainable-products-initiative_en)
12. European Commission (2020). Corporate Sustainability Reporting Directive (CSRD). <https://eur-lex.europa.eu/legal-content/HR/TXT/?uri=CELEX:32022L2464>
13. European Parliament (2021). Fit for 55 package. [https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/733513/EPRS\\_BRI\(2022\)733513\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/733513/EPRS_BRI(2022)733513_EN.pdf)
14. Howard-Grenville, J. (2021). ESG impact is hard to measure-but it's not impossible. Harvard business review.
15. <https://hbr.org/2021/01/esg-impact-is-hard-to-measure-but-its-not-impossible>
16. KPMG (2008). International survey of corporate responsibility reporting. KPMG International. Available at: [www.kpmg.com/EU/en/Documents/KPMG\\_International\\_survey\\_Corporate\\_responsibility\\_Survey\\_Reporting\\_2008.pdf](http://www.kpmg.com/EU/en/Documents/KPMG_International_survey_Corporate_responsibility_Survey_Reporting_2008.pdf)
17. KPMG (2019). Impact of ESG disclosure. Available at: <https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2019/09/impact-of-esg-disclosures.pdf>
18. Lamprinidi, S. and Ringland, L. (2008). A Snapshot of Sustainability Reporting in the Construction and Real Estate Sector. *Global Reporting Initiative*, Amsterdam.
19. Lovrenčić Butković, L. & Omazić, M.A. (2022). Sustainable Construction as a New Normalcy in the EU Action Plan. *Proceedings of the 80<sup>th</sup> International Scientific Conference on ESD and 10<sup>th</sup> International OFEL Conference "Diversity, Equity and Inclusion: The Essence of Organisational Well-Being"*. Dubrovnik, Croatia, pp. 314-322.
20. Omazić, M.A., Markota Vukić, N., Ravlić Ivanović, I., Cigula, K., Marszalek, V. and Rösler, B. (2020). Analiza stanja nefinancijskog izvještavanja u Hrvatskoj 2017. i 2018. *Socijalna ekologija: journal for environmental thought and sociological research*, 29 (2). <https://doi.org/10.17234/SocEkol.29.2.3>
21. Painter, M., Hibbert, S. and Cooper, T. (2019). The Development of Responsible and Sustainable Business Practice: Value, Mind-Sets, Business-Models. *Journal of Business Ethics* 157, pp. 885–891. <https://doi.org/10.1007/s10551-018-3958-3>
22. Siew, R.Y.J., Balatbat, M.C.A. and Carmichael, D.G. (2013). The relationship between sustainability practices and financial performance of construction companies. *Smart and Sustainable Built Environment*. 2 (1), pp. 6 – 27. <http://dx.doi.org/10.1108/20466091311325827>

23. Sulaiman, N.N., Omar, A.J., Pakir, F. and Mohamad, M. (2024). Evaluating Environmental, Social and Governance (ESG) Practice Among Malaysian Public Listed Construction Companies Using FTSE Russell Rating Model. *International Journal of Sustainable Construction Engineering and Technology*. 15 (1), pp. 25-40. DOI: 10.30880/ijscet.2024.15.01.003
24. UGREEN (2023). How ESG Can Help Your Construction Business Thrive in a Changing World. Available at: <https://ugreen.io/how-esg-can-help-your-construction-business-thrive-in-a-changing-world/>
25. United Nations. (2015). Sustainable Development Goals. Available at: <https://sdgs.un.org/goals>
26. Wang, J., & Xue, F. (2023). Emerging trends of ESG in the construction sector: A promising pathway to sustainable and responsible development. *Proceedings of the 28th International Symposium on Advancement of Construction Management and Real Estate (CRIOCM2023)*, Springer, in press .

# ENVIRONMENTAL SUSTAINABILITY COMMUNICATION OF CROATIAN NAUTICAL MARINAS: EVIDENCE FROM OFFICIAL WEBSITES

**Dejan Miljenovic**

*University of Rijeka, Faculty of Economics and Business  
Ivana Filipovića 4, 51000 Rijeka, Croatia  
dejan.miljenovic@efri.uniri.hr*

**Ida Bajc**

*Adriatic Croatia International Club, nautical marinas segment - ACI d.d., Croatia  
Ida.Bajc@aci-club.hr*

## ABSTRACT

*Sustainability has become an increasingly important precondition for business success, which is also valid for coastal and nautical tourism, as their activities directly interact with maritime resources and local communities. This paper examines in which extent Croatian nautical marinas communicate environmental sustainability through publicly available information on their official websites. Analysis of previous research connects sustainable tourism, corporate sustainability in SMEs related to nautical tourism, and web-based environmental disclosure in tourist ports. This study applies content analysis to the official websites of Croatian marinas. Our research focuses on three dimensions: 1) the presence of environmental issues in mission, vision and value statements or homepage communication; 2) the availability of environmental regulations, certifications, codes, manuals or rules; and 3) the disclosure of environmental indicators or annual sustainability-related reports. The findings indicate that environmental communication practices among Croatian marinas remain limited and inconsistent. Environmental certifications and codes or manuals are the most frequently disclosed elements, whereas quantified environmental indicators and annual environmental reporting are almost absent. Analysis of individual marinas and marina networks shows that larger operators communicate sustainability practices more systematically, while individual, small marinas disclose significantly less information. Findings indicate relevant sustainability barriers for Croatian nautical marinas, primarily due to their size, which leads to limited resources, lack of expertise, and the absence of clear regulation, as well as sustainability monitoring and reporting. The paper contributes to research on nautical tourism sustainability by providing evidence from Croatia, a tourism-dependent Mediterranean economy, and by identifying the need for more transparent, standardised, and comparable environmental sustainability disclosure in marina operations.*

**Keywords:** Sustainability, Nautical marinas, Sustainability communication, Croatia, Content, Environment, Biodiversity

## 1. INTRODUCTION

The business sustainability context in the environmentally aware 21st century has become a mainstream model for managing contemporary business and social values. Organisations engage in sustainability practices because they identify with issues of sustainable development, recognise its potential benefits, and, importantly, because it is expected by regulators, customers, and other relevant stakeholders. This momentum is particularly evident in tourism, where companies operate directly at the intersections of economic development, natural resources, local communities, and public regulation. This reflects a state of full Corporate Social Responsibility (CSR), requiring simultaneous consideration of economic, environmental, and social performance, along with the expectations of relevant stakeholders (Chang et al., 2017;

Waligo et al., 2013). Coastal and nautical tourism are a relevant part of this industry branch, as they depend directly on the quality of coastal ecosystems and are therefore highly sensitive to any type of sustainability pressure (de Bruyn et al., 2023, p. 4). Modern tourism infrastructure and service activities generate environmental impacts through energy use, water consumption, waste, vessel-related pollution, and pressure on coastal space. Therefore, nautical marinas are among the key infrastructural actors in nautical tourism, as they provide berths, technical services, reception facilities, and a wide range of services for boaters and yachts. Their environmental performance is closely linked to basic biological processes, which redefines their sustainability management, together with the eco-friendly status of destinations and the public authorities that manage the maritime domain. Hall (2001) emphasised that marine and coastal tourism is one of the fastest growing sectors, where the complex relationships between various stakeholders, the aspects of sustainable development, and the political priorities of a country all present risks and challenges to the long-term sustainability of the coast. The concept of coastal tourism encompasses the full range of tourism, leisure, and recreation-oriented activities that occur in the coastal zone and offshore coastal areas (Hall, 2001, p. 602). These include tourism development, infrastructure supporting coastal development (such as retail businesses, marinas, and activity suppliers), and tourism activities such as recreational boating, coast- and marine-based ecotourism, cruises, swimming, recreational fishing, and diving. Croatia, as a highly tourism-dependent Mediterranean country, develops nautical tourism as a significant part of its domestic experience and overall tourist offer. To assess the sustainability aspects of marina service providers in Croatia, the availability of standardised and comparable sustainability information is crucial. Most marina operators are SMEs, which often face barriers to implementing and disclosing sustainability, including limited financial resources, limited specialised knowledge, and weak formal reporting obligations (Álvarez Jaramillo et al., 2019; Cantele and Zardini, 2020). Throughout this research, the objective is to identify the existence and content effectiveness of sustainability information among Croatian nautical marinas, using publicly available information from their official websites. The paper addresses two research questions: (1) what types of environmental sustainability information and indicators are publicly available for nautical marinas, and (2) what observable differences in the dissemination of sustainability information exist between Croatian marinas, particularly between individual marinas and marina networks? The paper's contribution is empirical and sector-specific: it provides evidence from Croatia and links the results to stakeholder theory and SME sustainability literature.

## **2. THEORETICAL BACKGROUND AND PRIOR RESEARCH**

The concept of sustainability in tourism may seem complex due to the high level of resource diversity and the existence of a large number of secondary stakeholders (outside the organisation or company), who may sometimes become as important as primary stakeholders (those within the company). Fulfilling the needs of all stakeholders in tourism is, as in any other industry, very difficult; therefore, effective, transparent, comprehensive, and realistic information on the environmental and social aspects of doing business is of utmost relevance. Tourism operators must consider current and future economic, social, and environmental impacts while addressing the needs of visitors, enterprises, host communities, and the environment. Sustainability management in the case of nautical marinas may not only be a destination-level concept but also an enterprise-level managerial requirement. Butowski (2019) emphasises that the sustainability of a destination can be interpreted through the balance between tourism benefits and tourism costs, while Waligo et al. (2013) place stakeholder involvement at the centre of sustainable tourism implementation. The sustainability of a specific destination occurs when the benefits of tourism reach at least a minimum satisfactory level, while all the various costs of tourism development remain at an acceptable level.

Research on this issue is expanding rapidly, with studies addressing company size, location, and environmental and social data availability. Scientific analyses of large tourism and hospitality companies often use ESG scores, GRI reporting, governance indicators, panel data, or regression models (Uyar et al., 2020; Kılıç et al., 2021; Gerged et al., 2023). In contrast, research on SMEs more frequently relies on surveys, interviews, and qualitative analysis because public non-financial data are less available. This distinction is important for marina research, as the sector is fragmented and often dominated by smaller operators, especially in small countries such as Croatia. Lukovic and Piplica (2021) state that, in the case of nautical marinas in Croatia, most are SMEs. The main challenge lies in the fact that nautical tourism affects various distinct segments and infrastructure along the coastline, combining marine resources, boating activities, port infrastructure, local communities, and destination services. Marinas are directly associated with environmental issues such as waste collection, wastewater recovery and water quality, fuel handling, seabed protection, renewable energy and its consumption, environmental certification, and emergency preparedness. Consequently, marinas represent a relevant unit of analysis for studying environmental sustainability communication. Nautical marinas, that is, companies operating in the maritime domain, often located in the centres of small tourist destinations and frequently in protected areas, should prioritise minimising their environmental impact. According to the literature review conducted by Spinelli and Benevolo (2022), the number of articles addressing nautical tourism is limited, with only 118 articles in Scopus-listed journals identified between 2001 and 2020. Of these 118 articles, 35 are categorised by the authors as addressing some aspects of environmental sustainability only; 17 of these were published between 2014 and 2020, and of these 17, only one directly addresses the area of nautical ports. Previous research focuses on how SMEs respond to sustainability requirements and pressures, analysing their responses to climate change, ways to accelerate SME engagement, drivers and motivations towards sustainability, and relevant policies required to expedite the process. Reviews indicate that research on nautical tourism has increased, but many studies concentrate on destination development, tourist behaviour, competitiveness, or general sustainability frameworks, rather than on quantified environmental disclosure at the marina-enterprise level (Martínez-Vázquez et al., 2022; Spinelli and Benevolo, 2022). Recent studies address topics such as energy transition, environmental footprint, non-indigenous species, and marina development, but comprehensive evidence on environmental indicators remains limited (Blayac et al., 2024; Bruccoleri et al., 2023; Crețu et al., 2024). Research focusing on marinas and the environmental impacts of their operations (Blayac et al., 2024; Bruccoleri et al., 2023; Crețu et al., 2024) has analysed the impact of non-indigenous species, the energy transition process, or the environmental footprint of marinas. However, no study has produced a comprehensive list of indicators that includes the impacts of marinas on environmental sustainability or indicators measuring these impacts. The most directly comparable approach is web communication analysis. Spinelli et al. (2024) analysed Italian tourist ports and found generally low commitment to environmental sustainability disclosure on official websites. Their results are relevant because websites are a primary channel through which marinas communicate with clients, local stakeholders, and the public. If environmental information is absent from official communication, stakeholders cannot easily assess the level of sustainability orientation or compare marinas. Published sustainability reports from larger marina operators demonstrate that a more advanced disclosure framework is possible. These reports include indicators such as energy consumption, eco-efficiency, greenhouse gas emissions (GHG), water consumption, waste, biodiversity initiatives, environmental certification, and environmental management systems. However, these examples are typically associated with larger operators or companies subject to broader reporting requirements, while smaller operators rarely publish comparable indicators.

| Area/Aspect of sustainability  | Examples of indicators or activities                                                                                             | Measurement logic                                                                                  | Examples from reports              |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------|
| Energy and emissions           | Electricity and fuel consumption; Scope 1, 2 and 3 GHG emissions; renewable energy generation; energy intensity.                 | MWh, GJ, tCO <sub>2</sub> e, intensity per employee or berth.                                      | Safe Harbor; D-Marin; Ilirija d.d. |
| Water and effluents            | Total water consumption; water intensity; discharge management; compliance with municipal and international rules.               | m <sup>3</sup> , m <sup>3</sup> per berth or m <sup>2</sup> , qualitative compliance descriptions. | D-Marin; Ilirija d.d.              |
| Waste                          | Hazardous and non-hazardous waste; mixed municipal waste; oil/water separator waste; waste separation and upcycling initiatives. | Tonnes by waste category, qualitative waste-management practices.                                  | D-Marin; Ilirija d.d.              |
| Biodiversity and certification | Blue Flag, Clean Marina, ISO 14001, habitat restoration, seabed cleaning, marine species initiatives.                            | Certification status and qualitative descriptions of biodiversity-related activities.              | Safe Harbor; D-Marin; Ilirija d.d. |
| Governance and risk            | Environmental policies, codes, rules, emergency and hazardous-weather plans, environmental education.                            | Existence of documents, number of trainings, qualitative risk-management practices.                | Safe Harbor; Ilirija d.d.          |

Table 1: Examples of environmental sustainability indicators in marina operators  
(Source: Authors' synthesis based on sustainability reports of nautical marinas in Croatia)

Identified companies in the marina sector with published sustainability reports highlight the importance of managing environmental risks and preserving the environment by increasing the use of renewable energy sources and optimising resource use. Such practices could become standard in the industry, given that marinas operate in the maritime domain for a limited period under concession agreements, and environmental preservation should influence all business decisions.

### 3. METHODOLOGY

Our research involves content analysis of the official websites of Croatian nautical marinas. The population was defined using official national records of categorised nautical marinas; however, the main prerequisite was that marinas must have existing official website communication regarding sustainability. Some marinas have a long tradition of sustainability practices, but they do not provide separate data on these or include them in their annual reports. This is a significant loss, as the analysis must rely on constructed quantified data. This is why we chose official websites, as qualitative data does not provide the same level of accuracy and trustworthiness. Therefore, the initial list included 65 marinas, four of which had no direct official website identified, while the remaining 61 websites were analysed (from June 2024 till May 2026). The research design follows the logic of web communication analysis used in previous research on tourist ports (Spinelli et al., 2024), adapted to the Croatian marina sector.

We used three types of indicators:

- 1) measuring the port perspective on environmental issues and includes references to environmental issues in mission, vision and value statements, references to environmental issues on the homepage, and autonomous website sections addressing environmental issues.
- 2) environmental regulation and management communication, including environmental certifications and codes, manuals or rules on environmental issues.
- 3) formal disclosure, including environmental indicators and annual environmental reports or specific environmental sections within annual reports.

To examine sector heterogeneity, the analysis distinguished between individual marinas and marina networks. A marina network is defined as an operator managing three or more marinas under a common corporate or brand structure. Using the terminology of chains, defined by the American Hotel & Lodging Association as three or more hotels operated under a single brand name (O'Neill & Carlback, 2011), and to similarities between the two industries (Benevolo & Spinelli, 2021) the same approach is used in this research, for the purpose of analysis. This distinction is relevant because larger operators may face greater stakeholder pressure and therefore engage in professional sustainability monitoring and management to communicate sustainability information more systematically than individual marina operators. This analysis also has some limitations because it uses publicly available website information and may therefore measure company-selected or stakeholder-relevant communication rather than the holistic aspects of nautical marina sustainability practices. A significant problem we faced was that a marina may implement environmental practices without communicating them online or in its annual report. Still, publicly available information is important because it enables stakeholder access to material information and the comparability of environmental sustainability practices across nautical marinas and the sector.

## 4. RESULTS AND DISCUSSION

### 4.1. Overall website communication results

The results show that environmental sustainability communication among Croatian nautical marinas is present but constrained by specific industry factors, company size, and the presence or absence of a CSR strategy. Formal information on environmental regulation is more common than broader strategic or performance-oriented disclosure. This suggests that marinas are more likely to communicate certifications, rules, and manuals than to publish systematic environmental performance indicators. This can be interpreted as addressing environmental issues and stakeholders in a specific, guidelines-driven manner, rather than developing an individual, company-oriented process of disseminating sustainable information as a value between the organisation and its stakeholders. Table 2 contains overall analysis of 61 analysed marina websites.

| Marinas perspective on environmental issues                      | Identified | Identified in % |
|------------------------------------------------------------------|------------|-----------------|
| Environmental issues in mission, vision and value statement      | 6          | 10%             |
| Reference to environmental issues on the homepage                | 8          | 13%             |
| Autonomous section addressing environmental issues               | 11         | 18%             |
| Environmental certifications                                     | 28         | 46%             |
| Codes, manuals, or rules on environmental issues                 | 30         | 49%             |
| Environmental indicators                                         | 1          | 2%              |
| Environmental annual report or specific section in annual report | 1          | 2%              |

Table 2: Results of the analysis of Croatian marina websites

(Source: Authors' research based on official websites of Croatian nautical marinas)

The most relevant disclosure categories were identified as follows:

- 1) Environmental certifications were identified on 28 websites, representing 46% of analysed websites.
- 2) Codes, manuals or rules on environmental issues were identified on 30 websites, or 49%.

In sharp contrast, environmental indicators and annual environmental reports were identified in only one case, representing 2% of the analysed websites. Unfortunately, this confirms that quantified and comparable environmental disclosure is almost absent from the public web communication of Croatian marinas, indicating an inconsistent presence of data relevant for basic sustainability analysis. This then leads to the conclusion that poor sustainability management may exist in marinas due to a lack of crucial Triple Bottom Line data (regarding simultaneous impact on the environment, society, and financial performance).

A higher presence of certifications and rules can be interpreted in two ways. First, certifications such as Blue Flag or ISO-related standards provide assurance regarding a range of third-party recognisable environmental indicators and confirm their actual existence within the analysed marina. These certifications are also most attractive for website communication. Second, codes, manuals and rules may be linked to operational requirements, concession obligations or client-facing instructions, making them more likely to be published even when broader sustainability reporting is absent. This likely explains why the lowest results concern formal disclosure. Only one company, a large one, with incorporated marina segment we analysed has published environmental indicators and annual sustainability-related information in a recognisable form on its website. This marina is a large, listed company, unlike the typical SME-type marina. This finding supports the argument that public sustainability reporting in the marina sector is influenced by company size, regulatory exposure, and stakeholder visibility.

#### 4.2. Differences between individual marinas and marina networks

According to the analysis, 27 companies manage one marina, 4 companies manage 2 marinas, 2 companies manage 4 marinas, and 1 company in Croatia manages 22 marinas, which could significantly impact the results. Therefore, the Croatian marina sector is heterogeneous. This is important because the number of marinas managed may indicate differences in organisational capacity, brand visibility, stakeholder pressure, and resources available for sustainability communication. Table 3 shows the distribution of marina operators by the number of marinas under management.

| Number of companies | Number of marinas managed |
|---------------------|---------------------------|
| 1                   | 22                        |
| 2                   | 4                         |
| 4                   | 2                         |
| 27                  | 1                         |

Table 3: Analysis by number of marinas under management  
(Source: Authors' research)

Table 4 shows that marina networks communicate environmental sustainability more frequently than individual marina operators in most categories. In particular, 67% of marina networks disclose environmental certifications and 67% disclose codes, manuals or rules on environmental issues. Among individual marinas, the corresponding values are only 7% and 15%. The difference is substantial and points to the relevance of operator size and managerial capacity.

| Port perspective on environmental issues                         | Identified - IM | IM in % | Identified - NM | NM in % |
|------------------------------------------------------------------|-----------------|---------|-----------------|---------|
| Environmental issues in mission, vision and value statement      | 2               | 7%      | 1               | 33%     |
| Reference to environmental issues on the homepage                | 4               | 15%     | 1               | 33%     |
| Autonomous section addressing environmental issues               | 7               | 26%     | 1               | 33%     |
| Environmental certifications                                     | 2               | 7%      | 2               | 67%     |
| Codes, manuals, or rules on environmental issues                 | 4               | 15%     | 2               | 67%     |
| Environmental indicators                                         | 1               | 4%      | 0               | 0%      |
| Environmental annual report or specific section in annual report | 1               | 4%      | 0               | 0%      |
| Total of analysed companies                                      | 27              |         | 3               |         |

Table 4: Results of the analysis by type of marina operator  
(Source: Authors' research. Note: IM = individual marinas; NM = marina networks)

The findings are specific to the Croatian case but are consistent with similar research on sustainability barriers in SMEs related to nautical tourism. Smaller operators may recognize the importance of sustainability but lack the resources, expertise or incentives to develop formal communication and reporting systems. Environmental sustainability may therefore be practiced through operational routines, certification or compliance-related documents, without being translated into strategic website communication or quantified indicators. From a policy and industry perspective, the results indicate a need for clearer and more comparable disclosure expectations. A basic set of indicators for marinas could include electricity consumption, renewable energy use, water consumption, hazardous and non-hazardous waste, wastewater and oil separator management, environmental certifications, biodiversity initiatives and environmental training. Even simplified indicators would improve transparency, benchmarking and stakeholder trust. These results are consistent with stakeholder theory, which explains that larger companies, facing greater stakeholder expectations, are more aligned with current sustainability practices and communicate these efforts more effectively, even though the results for the entire industry in Croatia indicate significant room for improvement. For SMEs (companies managing one or two marinas and providing no other services), the literature identifies the main obstacles as a lack of resources, the high initial capital cost of implementing sustainability measures, and a lack of expertise (Álvarez Jaramillo et al., 2019). Based on this research into the Croatian segment of nautical marinas, further areas of study could include qualitative analysis of individual industry participants and main stakeholders, particularly regarding their level of information and awareness of sustainability issues and requirements, including risks, impacts, and opportunities for the industry.

## 5. CONCLUSION

Stakeholders' expectations in every industry and therefore also in nautical tourism, are to plan and conduct business operations with consideration not only for the economic aspects but also for social relations, corporate governance standards, and especially environmental preservation.

The current state and perception of the sustainability impact of marinas on the environment are not aligned fully with principles of transparent and reporting on sustainability as it would be expected in a branch which is directly related to sea and its biodiversity, coastal resources and local communities. The findings show that environmental sustainability communication is limited and uneven, with comparisons between individual marinas and marina networks revealing meaningful differences. Marina networks disclose environmental certifications and environmental rules more frequently than individual operators, suggesting that size, visibility, and managerial capacity influence the communication of sustainability practices. This supports the relevance of stakeholder theory and SME sustainability literature in explaining disclosure patterns in the marina sector. Marinas in the Mediterranean play an important role in coastal tourism, and studying their impacts is of significant interest within academia. The EU has recognised the importance of both the industry and sustainable business, as well as preserving the environment, especially the seas and coastline with their full resources. A case study of Croatian nautical marinas, situated in a tourism-dependent Mediterranean economy with a developed nautical tourism sector, emphasises the need for standardised, transparent, and comparable environmental sustainability disclosure in marina operations. Such disclosure would support better stakeholder information, enable benchmarking, and help policymakers design proportional sustainability requirements for a sector dominated by smaller operators. Results also indicate similar issues and levels of communication in Croatian and Italian marinas. However, for Croatian marinas, additional analysis was conducted based on the size of the marina operators, differentiating between individual marinas and marina networks, with significant differences in results. Following these results, further research should analyse the level of environmental sustainability practices in marinas, including the challenges, barriers, and opportunities they face. It should also examine the actual implementation of environmental practices, the costs and benefits of sustainability measures, and the feasibility of developing a sector-specific set of environmental indicators for nautical marinas. This information could also help policymakers and national or supranational regulators to create or stimulate a sustainability environment and practices necessary for the further development of the industry.

**ACKNOWLEDGEMENTS:** *This paper has been written within the scope of the project “Modern challenges of sustainability management” (uniri-iz-25-76), funded by the European Union – NextGenerationEU via the Croatian National Recovery and Resilience Plan 2021–2026, in conjunction with the University of Rijeka, Faculty of Economics and Business Program Financing. The views and opinions expressed are solely those of the author and do not necessarily reflect the official position of the European Union or the European Commission. Neither the European Union nor the European Commission can be held responsible for them.*

## LITERATURE:

1. Álvarez Jaramillo, J., Zartha Sossa, J. W., Orozco Mendoza, G. L. (2019). Barriers to sustainability for small and medium enterprises in the framework of sustainable development— Literature review. *Business Strategy and the Environment*, 28(4), 512–524. <https://doi.org/10.1002/bse.2261>
2. Benevolo, C., Spinelli, R. (2021). Benefit segmentation of pleasure boaters in Mediterranean marinas: A proposal. *International Journal of Tourism Research*, 23(1). 134–145. <https://doi.org/10.1002/jtr.2403>
3. Blayac, T., Courtois, P., Sevaux, L., Rey-Valette, H., Page, A., Lautrédou-Audouy, N., Salles, J. M., Viard, F. (2024). Non-indigenous species and ecological degradations in Marinas: Perceptions and willingness to pay for improvements. *Marine Policy*, 166. <https://doi.org/10.1016/j.marpol.2024.106224>

4. Bruccoleri, M., Cannova, P., Cruz-Pérez, N., Rodríguez-Martín, J., Ioras, F., Santamarta, J. C. (2023). Leisure Boating Environmental Footprint: A Study of Leisure Marinas in Palermo, Italy. *Sustainability*, 15(1), 182. <https://doi.org/10.3390/su15010182>
5. Butowski, L. (2019). Tourist sustainability of destination as a measure of its development. *Current Issues in Tourism*, 22(9), 1043–1061. <https://doi.org/10.1080/13683500.2017.1351926>
6. Cantele, S., Zardini, A. (2020). What drives small and medium enterprises towards sustainability? Role of interactions between pressures, barriers, and benefits. *Corporate Social Responsibility and Environmental Management*, 27(1), 126–136. <https://doi.org/10.1002/csr.1778>
7. Chang, R. D., Zuo, J., Zhao, Z. Y., Zillante, G., Gan, X. L., Soebarto, V. (2017). Evolving theories of sustainability and firms: History, future directions and implications for renewable energy research. *Renewable and Sustainable Energy Reviews* 72, 48–56. <https://doi.org/10.1016/j.rser.2017.01.029>
8. Crețu, R. F., Gheorghe, S., Șerban, E. C., Țuțui, D., Crețu, R. C. (2024). Analysis of Influencing Factors of the Energy Transition Process in Sustainable Nautical Tourism: Case Study—The Netherlands. *Sustainability*, 16(4), 1416. <https://doi.org/10.3390/su16041416>
9. de Bruyn, C., Ben Said, F., Meyer, N., Soliman, M. (2023). Research in tourism sustainability: A comprehensive bibliometric analysis from 1990 to 2022. *Heliyon*, (9)8, e18874. <https://doi.org/10.1016/j.heliyon.2023.e18874>
10. Gerged, A. M., Tran, M., Beddewela, E. S. (2023). Engendering Pro-Sustainable Performance Through a Multi-Layered Gender Diversity Criterion: Evidence From the Hospitality and Tourism Sector. *Journal of Travel Research*, 62(5), 1047–1076. <https://doi.org/10.1177/00472875221111754>
11. Hall, C. M. (2001). Trends in ocean and coastal tourism: the end of the last frontier? *Ocean & Coastal Management*, 44(9-10), 601-618, [https://doi.org/10.1016/S0964-5691\(01\)00071-0](https://doi.org/10.1016/S0964-5691(01)00071-0)
12. Kılıç, M., Uyar, A., Kuzey, C., Karaman, A. S. (2021). Drivers and consequences of sustainability committee existence? Evidence from the hospitality and tourism industry. *International Journal of Hospitality Management*, 92, 102753. <https://doi.org/10.1016/j.ijhm.2020.102753>
13. Lukovic, T., Piplica, D. (2021). Marina business in SME approaches. *Naše More*, 68(2), 120–130. <https://doi.org/10.17818/NM/2021/2.8>
14. Martínez-Vázquez, R. M., Valenciano, J. de P., Milán-García, J. (2022). Impact Analysis of Marinas on Nautical Tourism in Andalusia. *Journal of Marine Science and Engineering*, 10(6), 780. <https://doi.org/10.3390/jmse10060780>
15. O'Neill, J. W., Carlback, M. (2011). Do brands matter? A comparison of branded and independent hotels' performance during a full economic cycle. *International Journal of Hospitality Management*, 30(3), 515–521. <https://doi.org/10.1016/j.ijhm.2010.08.003>
16. Spinelli, R., Benevolo, C. (2022). Towards a new body of marine tourism research: A scoping literature review of nautical tourism. *Journal of Outdoor Recreation and Tourism*, 40, 100569. <https://doi.org/10.1016/j.jort.2022.100569>
17. Spinelli, R., Fissi, S., Benevolo, C., & Gori, E. (2024). The Environmental Sustainability of Tourist Ports: A Web Communication Analysis. *Tourism*, 72(1), 82–86. <https://doi.org/10.37741/t.72.1.7>
18. Uyar, A., Kilic, M., Koseoglu, M. A., Kuzey, C., Karaman, A. S. (2020). The link among board characteristics, corporate social responsibility performance, and financial performance: Evidence from the hospitality and tourism industry. *Tourism Management Perspectives*, 35, 100714. <https://doi.org/10.1016/j.tmp.2020.100714>
19. Waligo, V. M., Clarke, J., Hawkins, R. (2013). Implementing sustainable tourism: A multi-stakeholder involvement management framework. *Tourism Management*, 36, 342–353. <https://doi.org/10.1016/j.tourman.2012.10.008>

# CORPORATE PHILANTHROPY AS AN INSTRUMENT WITHIN CSR: A CASE STUDY FROM CROATIA

**Maja Harsanji**

*Josip Juraj Strossmayer in Osijek, The Academy of Arts and Culture in Osijek,  
Julija Knifera 1, 31000 Osijek, Croatia  
maja.harsanji@aukos.hr*

## **ABSTRACT**

*The paper examines the role of corporate philanthropy as an integral component of corporate social responsibility (CSR) and its impact on the business and societal outcomes of a company operating in Croatia. The aim of this research is to analyse the influence of corporate philanthropy on various organizational and social factors, with particular emphasis on corporate reputation, employee motivation, sustainability, and the economic development of the community. The empirical part of the study is based on a qualitative case study methodology, employing in-depth interviews with employees from the corporate communications department, as well as content analysis of official company publications and reports. The sample consists of employees directly involved in the planning and implementation of philanthropic activities, which provides insight into internal processes, motives, and perceptions. The findings indicate that the company implements a wide range of philanthropic activities, including investments in education, science, environmental protection, humanitarian programmes, and local community development. Philanthropic initiatives are integrated into the company's strategic framework, and employees actively participate in volunteer actions, which confirms the hypothesis regarding the positive influence of philanthropy on corporate culture. Moreover, such activities enhance employee motivation, loyalty, and satisfaction, thereby strengthening internal cohesion. The study shows that philanthropic activities enhance the company's social reputation, increase employee engagement, contribute to long-term sustainability, and positively influence the economic development of the community. Philanthropy thus emerges as a strategic tool for creating shared value, as voluntary contributions to society simultaneously generate tangible business benefits. The paper highlights the need for continuous monitoring of philanthropic outcomes and for greater employee involvement in shaping future philanthropic programmes. The research also suggests that systematically planned philanthropy can act as a catalyst for organizational innovation, encouraging the company to develop new models of stakeholder collaboration and to strengthen its competitive position over the long term.*

**Keywords:** *corporate philanthropy, corporate social responsibility, environment, employers, sustainability*

## **1. INTRODUCTION**

Over the past decades, Corporate Social Responsibility (CSR) has evolved into one of the key strategic approaches of modern companies, with numerous studies confirming its contribution to long-term sustainability and overall business performance (Carvalho *et al.*, 2010, cited in Latif & Sajjad, 2018:1; Carroll, 2016; Singh & Misra, 2020). Although earlier definitions of CSR encompass a very broadly framed set of conceptual meanings – for example, describing it as a company's obligation to act in the interest of society while simultaneously considering its own interests (Davis, 1975, cited in Carroll, 2016:2) – contemporary approaches emphasize its strategic dimension (Porter & Kramer, 2002; Gautier & Pache, 2013). Carroll (2016) highlights that CSR comprises economic, legal, ethical, and philanthropic responsibilities, while the shared value theory underscores the inseparable connection between companies and the community, as well as their mutual dependence in both successes and failures (Matešić *et al.*, 2015).

At the core of CSR are stakeholders, defined as individuals or groups who can influence the organization's objectives or are influenced by the organization (Freeman & Reed, 1983; Mitchell *et al.*, 1997). Their involvement is not merely a component of risk management but also a mechanism for strengthening corporate sustainability (Matešić *et al.*, 2015). Corporate philanthropy, as an integral component of CSR, is becoming an increasingly important part of the strategic orientation of modern companies and of corporate economics more broadly (Cha & Rajadhyaksha, 2021:1). In today's business environment, the connection between business success and contributions to the community through philanthropic activities is increasingly recognized as a key factor for long-term sustainable development. Corporate philanthropy refers to voluntary corporate activities aimed at supporting society through various donations, sponsorships, and volunteer work (Vrdoljak-Raguž & Hazdovac, 2014:42). Companies that actively engage in social and humanitarian giving—through financial support, volunteering, and other forms of engagement – can generate a significant positive impact on society and the environment, while simultaneously strengthening their corporate values and reputation. Although existing literature offers numerous models and approaches to philanthropy (Fisman *et al.*, 2008; Ricks & Peters, 2013), empirical research examining how companies integrate philanthropic activities into their CSR strategies remains limited in the Croatian context (Bežovan & Matančević, 2019; Zanini Gavranić *et al.*, 2021; Šain, 2025). Therefore, the aim of this paper is to explore corporate philanthropy as an instrument within CSR through a qualitative case study of a selected company in Croatia. The focus is on understanding how philanthropic activities are implemented, how they relate to CSR, and how they are perceived and what effects they generate among key stakeholders. Accordingly, the following research questions are posed:

**RQ1:** *How does the corporate philanthropy of the observed company contribute to building and strengthening its social reputation.*

**RQ2:** *In what ways is employee engagement manifested in philanthropic activities, and how does this contribute to the development of corporate culture.*

**RQ3:** *How do philanthropic activities focused on education and youth development contribute to the company's long-term sustainability.*

**RQ4:** *How do the company's philanthropic initiatives influence the economic development of local communities.*

Through qualitative analysis, the study examines both formal and informal philanthropic practices, their underlying motives and perceptions, as well as their contributions to the company's reputation. This paper aims to enhance the understanding of the role of philanthropy in the business sector and to open space for further research in the field of responsible and sustainable business practices, particularly in Croatia. The observed company operates as a large national system with a dominant market position in its sector and is engaged in key infrastructural activities. However, since the focus of the research is not on the company's identity but on its philanthropic practices, the company is anonymized in the study in order to ensure ethical standards. The paper is structured as follows: next section provides a literature review and research questions. Methodology used was described in third section, followed by the presentation of the results, discussion of the findings and the implications of the research. Finally, a conclusion that identifies the limitations of the research and suggestions for future research is given.

## **2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK**

According to Rehman *et al.* (2020:1), a company's profitability can be enhanced precisely through CSR activities, often summarized by the expression "*doing well by doing good*". Such activities function as a form of corporate protection, as they reduce risks such as potential

financial difficulties or sudden crisis situations, while simultaneously contributing to the creation of positive business outcomes. They strengthen reputation, increase customer satisfaction, and positively influence employee motivation and engagement, thereby further supporting the overall success of the organization. Existing CSR theories assume that business depends on society; in other words, if companies treat societies fairly, it is more likely that societies will hold positive perceptions of them (Pedersen, 2010). Carroll's (2016:2) four-part definition of CSR encompasses the economic, legal, ethical, and philanthropic expectations that society has of an organization at a given point in time, forming the foundation of CSR, as illustrated in Figure 1.



*Figure 1. Carroll's pyramid of CSR  
(Source: Carroll, 2016:5)*

Although the pyramid may be understood as a static representation of responsibilities, it should be viewed as a dynamic and adaptable framework whose content is oriented toward both the present and the future. Moreover, all of its dimensions are shaped by the society and environment in which a particular company operates. On the other hand, von Schnurbein & Stühlinger (2015:4) identify five dimensions of CSR: environmental, social, economic, stakeholder-related, and voluntary. Although the environmental dimension was not originally part of CSR, it has recently become an increasingly important component. CSR develops differently depending on context, corporate needs, and organizational culture, yet successful practice always rests on the decision of top management to make social responsibility a fundamental part of business operations and the organizational mission (Što je to društveno odgovorno poslovanje, 2015). Transparent sharing of information about organizational activities contributes to higher-quality dialogue with relevant stakeholders, in line with stakeholder theory as described by Freeman (1984). The availability of information strengthens trust in the organization's work, and CSR communication can influence favorable or unfavorable stakeholder behavior toward the organization, with corresponding economic implications (Garcia Rivas *et al.*, 2023). When there is consistency between an organization's values, its actions, and the information communicated about CSR, such communication can contribute to building a positive reputation, which is reflected in economic outcomes. In this regard, stakeholders must be properly informed about a company's socially responsible practices in order to foster their support (MacGregor Pelikánová & Hála, 2021). As the concept of CSR has evolved, it has become increasingly complex and has come to encompass a broader range of practices, among which corporate philanthropy has taken on a more prominent role.

Philanthropy, in its broadest sense, is defined as benevolence or actions aimed at the welfare of others (Hrvatska enciklopedija, 2013), and philanthropists are those who use their resources – money, time, knowledge, or talents – to improve community life (12 famous philanthropists, n.d.). Although often associated with individuals, philanthropy has become an important element of the business sector, especially with the growth of corporations that use it as a mechanism for responsible profit management. The literature distinguishes between individual, organized, and corporate philanthropy (Zanini Gavrančić *et al.*, 2021). Definitions of corporate philanthropy are highly diverse, which Leisinger (2007) explains by noting that there are “as many definitions as there are definitions of corporate responsibility,” yet they share the understanding that companies voluntarily invest resources to reduce negative social, environmental, or political impacts. Stakeholders such as consumers, employees, investors, and the community play a key role in this process, while suppliers are less frequently considered relevant because they typically do not demand philanthropic activities; instead, companies expect them to comply with certain standards (Arco Castro *et al.*, 2020). The authors also emphasize that philanthropy is increasingly integrated into business strategies focused on sustainability, long-term value, and the creation of shared benefits. FASB (1993), as cited in Gautier & Pache (2013:346), defines philanthropy as a voluntary, non-reciprocal transfer of assets or the cancellation of obligations, while Ricks (2002) highlights that companies allocate resources to activities not necessarily related to their core business. Furthermore, Leisinger (2007) notes that philanthropic actions may include money, products, services, expert assistance, or employee volunteering, and Afrić Rakitovac (2017), in the brochure *Korporativna filantropija*, additionally mentions donating space, equipment, or organizing charitable events. Godfrey (2005) views corporate philanthropy as socially oriented actions aimed at promoting various societal goals in areas such as education, culture, minority welfare, health, and the environment. Although giving may initially appear to contradict the profit-driven logic of business – something Manne (1973), cited in Gautier & Pache (2013:346), describes as a kind of oxymoron – contemporary research shows that philanthropy can generate long-term benefits for both society and the organization itself. In recent years, companies have increasingly embraced corporate philanthropy as a valuable strategic tool for enhancing competitive advantage (Mihaljević & Tokić, 2015; Cha & Rajadhyaksha, 2021:2). According to the same authors, these advantages manifest through supporting key community stakeholders, building positive loyalty and corporate or brand reputation, maintaining employee satisfaction and commitment, and positioning the company as a responsible corporate citizen. This growing interest in corporate philanthropy is further evidenced by the exponential rise in academic research (Cha & Rajadhyaksha, 2021; Garcia Rivas *et al.*, 2023; Nurul Fatma Aziz *et al.*, 2024), which develops theoretical perspectives, identifies drivers, motives, and goals of philanthropic programs, and explains how these lead to various financial and business outcomes – providing a foundation for both researchers and practitioners. There is also a range of studies analyzing the effects of corporate behavior on financial indicators (Orlitzky *et al.*, 2003, cited in López Pérez *et al.*, 2018:706). However, philanthropic activities can also result in non-material benefits in areas such as mutual improvement, conflict reduction, increased cooperation, civic engagement, general well-being, social cohesion, stability, and innovation. According to López Pérez *et al.* (2018), the effects of corporate philanthropy on employee attitudes are also examined, as employees are considered special stakeholders who play a crucial role in the success of the company and its operations. This is also emphasized in the previously mentioned brochure (Afrić Rakitovac, 2017), which states that employees are the most valuable asset of a company and that socially responsible business practices should include respecting employee rights beyond legally prescribed standards.

Such an approach can bring numerous benefits to businesses, including the right to adequate working conditions, fair compensation, opportunities for advancement regardless of gender, age, race, or nationality, the right to professional development, and the right to propose improvements to business processes. It is essential to ensure that employees can express concerns about business processes or workplace relations without fear of sanctions. The right to information about corporate activities related to environmental protection and community quality of life further strengthens employees' roles as active participants in sustainable development. An employee whose opinion is valued and who is respected in the workplace is more likely to demonstrate satisfaction, thereby contributing to greater productivity and innovation, which ultimately strengthens the company's long-term competitive advantage. The review of the literature on CSR and corporate philanthropy has shown that organizational responsibility is most commonly examined through the dimensions of transparency, community relations, and strategic alignment with business objectives. In order to examine how these concepts manifest within the selected company, the following chapter presents the research methodology, which enables the systematic collection and analysis of relevant data.

### **3. METHODOLOGY**

This study applies a qualitative research approach based on the case study method, which enables an in-depth understanding of how a Croatian company implements corporate philanthropy and how these activities fit within the broader framework of Corporate Social Responsibility. The company was selected through purposive sampling, given that it engages in philanthropic activities and has established CSR practices. Data were collected through a combination of an in-depth semi-structured interview with individuals directly involved in the company's CSR activities – those responsible for planning or implementing philanthropic initiatives – and an analysis of publicly available sources, including the company's official website, printed publications, sustainability reports, and other relevant documents. The in-depth interview provided insight into internal processes and organizational perspectives, while document analysis served to verify and complement the information and to understand how the company communicates its philanthropic activities to the public. The collected data were analyzed using thematic analysis, through which key themes related to the role of philanthropy within CSR, stakeholder relations, and the perceived effects of philanthropic activities were identified. All data were anonymized, and the identity of the company and interviewee was not disclosed for ethical reasons and to protect business information. Prior to the interview, the participant was informed about the purpose of the research and the intended use of the data and voluntarily agreed to participate. This methodological approach enabled a comprehensive overview of the company's philanthropic practices and their strategic significance within socially responsible business conduct.

### **4. RESULTS**

The analysis of the selected company's official sources indicates a strong emphasis on sustainability, responsible energy management, and environmental stewardship. Based on the in-depth interview, an analysis of the company's CSR and philanthropic activities was conducted, revealing how its initiatives contribute to social reputation, employee engagement, project sustainability, and the development of local communities.

#### *Corporate Philanthropy and the Company's Social Reputation*

The company's philanthropic strategy is grounded in a strategic approach that includes assessing the needs of local communities and collaborating with relevant stakeholders. Although the literature identifies various motives for corporate philanthropy, this company makes donation decisions autonomously, aligning them with its values and with areas in which

it can achieve the greatest social impact. Its activities are particularly focused on education and science, where the company invests significantly in educational initiatives, student scholarships, support for schools and universities, and the funding of scientific research. Additionally, the company places considerable attention on sustainability and environmental protection through projects such as reforestation, energy efficiency, renewable energy, and the preservation of natural resources. Therefore, it can be concluded that corporate philanthropy enhances the company's social reputation.

#### *Volunteering and Other Philanthropic Activities as Part of Corporate Culture*

Employees play an essential role in implementing philanthropic activities, and their involvement extends beyond volunteering alone. They participate in identifying community needs, planning projects, and actively contributing to their implementation. In this way, employees become key drivers of socially responsible initiatives rather than passive participants.

In practice, employees engage in various activities:

- volunteer actions in social institutions, supporting vulnerable groups, improving facilities, and enhancing living conditions;
- environmental and sustainability initiatives such as environmental clean-ups, tree planting, and nature-protection activities;
- humanitarian efforts, including fundraising, participation in charity runs, and support for crisis-affected communities;
- assistance to colleagues and local families in crisis situations, demonstrating strong internal solidarity;
- participation in internal creative projects, such as photography competitions, which foster pride, identity, and a sense of belonging.

Such engagement strengthens team spirit, increases motivation, fosters loyalty and belonging, and creates a positive work environment. At the same time, employees directly contribute to the company's public reputation by representing its "human side" and the values it promotes, which enhances stakeholder perceptions. Employees thus emerge as a key resource for successful and sustainable corporate philanthropy.

#### *Philanthropic Activities Focused on Education and Long-Term Sustainability*

The company actively collaborates with local communities and non-profit organizations to ensure that its philanthropic activities align with community needs and generate long-term impact. Through various periodic calls and programs, it supports youth development, education, culture, environmental protection, and improvements to local infrastructure. Scholarship programs for pupils and students – especially in shortage occupations or fields relevant to the company's industry – mentorship and internship programs in cooperation with schools, universities, and research institutes, and co-funded lifelong learning programs for employees are among the company's key educational philanthropic activities. Furthermore, within its humanitarian efforts, the company provides assistance to vulnerable groups and supports crisis response, such as in cases of natural disasters. It also invests in projects that raise environmental awareness and encourage citizen participation, including climate-change education campaigns, environmental clean-ups, tree planting, restoration of degraded areas, and youth workshops on sustainability and climate challenges. These activities have strong social resonance and contribute to building an environmentally conscious community. Additionally, the company implements debt-relief measures for customers in earthquake-affected areas.

Long-term investments in educational infrastructure – such as donations of computers and IT equipment, renovation of school facilities, humanitarian initiatives, and other forms of community support – demonstrate that the company's activities are sustainable and socially relevant. Systematic and transparent cooperation with local stakeholders enables the company to better understand community needs and achieve greater social impact, forming the foundation of successful corporate philanthropy and long-term sustainability.

#### *Corporate Philanthropy and the Economic Development of the Community*

The company regularly monitors and evaluates the effects of its philanthropic activities through annual sustainability and business reports, analyzing their impact on the community, environment, and human rights. Impact is measured through the number of beneficiaries, improvements in quality of life, feedback received, and long-term outcomes such as community development, employability of scholarship recipients, and the sustainability of environmental projects. These investments demonstrate that corporate philanthropy can positively influence the economy by contributing to education, reducing energy poverty, and supporting the development of local markets. Transparency is ensured through public reporting, external audits, and cooperation with local stakeholders, confirming responsible resource management. Although results are positive, the company emphasizes the importance of continuous monitoring and program adaptation to remain effective and aligned with community needs.

Interviewees highlighted that philanthropic activities are systematically communicated through the company's official website, social media, and printed publications, with an emphasis on long-term cooperation with local communities and transparency of investments. This approach results in positive public reactions, as evidenced by media coverage and increased visibility of the company in the context of socially beneficial initiatives. Philanthropy is thus not perceived as an isolated activity but as part of the company's identity. Encouraged by positive results and feedback, the company plans to continue investing in digital development, educational and scientific programs, environmental initiatives, humanitarian activities, and support for technological innovation. Special emphasis remains on the development of local communities through cultural, sports, and social projects that improve quality of life in both urban and rural areas. Such investments contribute to economic development, employment, and long-term social progress. Continuous monitoring of community needs and directing resources to priority areas, along with transparent stakeholder communication, ensure the relevance, effectiveness, and long-term success of philanthropic initiatives.

## **5. CONCLUSION**

Corporate Social Responsibility today represents one of the fundamental pillars of sustainable and competitive business, and its importance continues to grow in the context of global economic, social, and environmental challenges. The development of the CSR theoretical framework, which encompasses economic, legal, ethical, and philanthropic dimensions (Carroll, 2016), shows that companies that successfully integrate these elements into their business processes achieve long-term benefits, both in terms of reputation and organizational stability and resilience. In this context, corporate philanthropy stands out as a particularly important instrument through which companies can generate positive social impact while simultaneously strengthening their market position. The case study of the selected Croatian company confirms that strategically oriented philanthropy can be a powerful driver of social and business change, as also noted by Porter & Kramer (2002) and Gautier & Pache (2013). The analysis showed that the company's philanthropic activities – focused on education, environmental protection, humanitarian work, and the development of local communities – significantly contribute to strengthening its social reputation and building trust among stakeholders. At the same time, employee involvement in volunteering and development

programs proved essential for strengthening corporate culture, motivation, and a sense of belonging, which translates into higher productivity and organizational cohesion. Investments in educational and development initiatives further confirm that philanthropy can have long-term effects on business sustainability by creating a skilled workforce and stable communities that support corporate growth. Positive economic effects are also visible through the stimulation of local development, job creation, and infrastructure improvements, demonstrating that philanthropic activities are an important factor in broader social progress. Thus, the company's philanthropic activities have a measurable impact on the economic advancement of the community. Donations to local associations, investments in cultural and sports projects, and support for social programs contribute to building local capacities and improving quality of life. Interviewees emphasized that the company does not view philanthropy merely as a moral obligation but as a way of strengthening the local environment in which it operates, which aligns with the concept of creating shared value. A comparison of the results with the theoretical framework shows that philanthropy in this case is not reduced to symbolic giving but represents an integrated part of the business strategy that benefits both the company and the community (Fisman *et al.*, 2008; Ricks & Peters, 2013). This confirms that corporate philanthropy can be a powerful instrument within CSR, with multiple positive effects on reputation, employees, sustainability, and local development. The theoretical contribution of this study lies in the systematic presentation and analysis of the concept of corporate philanthropy within the broader CSR framework, building on relevant theoretical models and contemporary stakeholder-management approaches. By linking theoretical foundations with empirical insights, the study contributes to a better understanding of the specificities of philanthropic practices in industries with high social and environmental impact. The practical contribution arises from the detailed analysis of the company's philanthropic activities, which may serve as guidance for other companies in designing effective and sustainable philanthropic strategies. Concrete mechanisms through which philanthropy contributes to reputation, organizational culture, sustainability, and economic development have been identified, representing a valuable contribution to business practice. Despite these contributions, the research has certain limitations. The analysis is based on publicly available documents and company reports, which may limit the depth of insight into internal decision-making and evaluation processes related to philanthropic activities. Furthermore, the research relies on secondary data and an in-depth semi-structured interview, without including, for example, the perspectives of employees who are beneficiaries of certain programs or participants in specific philanthropic activities, or other stakeholders, which could provide an additional dimension to understanding the effects of philanthropy. Another limitation is the focus on a single company, which reduces the possibility of generalizing the findings to other companies or sectors. Therefore, future research should incorporate primary data-collection methods – such as surveys, focus groups, or interviews – to gain deeper insight into the perceptions of employees and other stakeholders and to identify barriers and incentives for their participation in philanthropic activities.

**ACKNOWLEDGEMENT:** *This paper was developed within the project “Creative Industry and Social Transformation through Media and Innovation – KREATIV”, funded by the European Union – NextGenerationEU (581-UNIOS-02).*

## LITERATURE:

1. *12 famous philanthropists.* (n.d.). Retrieved: 10.6.2026. from: <https://www.tonyrobbins.com/giving-back/famous-philanthropists/>
2. Afrić Rakitovac, K. (2017). *Korporativna filantropija*. Pula: Zaklada za poticanje partnerstva i razvoja civilnog društva. Retrieved: 1.6.2026. from: [https://www.civilnodrustvo-istra.hr/images/uploads/files/KAR\\_Filantropija\\_brosura.pdf](https://www.civilnodrustvo-istra.hr/images/uploads/files/KAR_Filantropija_brosura.pdf)

3. Arco-Castro, L., López-Pérez, M. V., Pérez-López, M. C. & Rodríguez-Ariza, L. (2020). How market value relates to corporate philanthropy and its assurance. The moderating effect of the business sector. *Business Ethics: A European Review*. 00, 1-16.
4. Bežovan, G. & Matančević, J. (2019). *Philanthropy and foundations in Croatia: Forgotten past and unfolding innovative philanthropic culture*. In: 9th International ERNOP Conference: Philanthropy in the Spotlight? Resources, Reputation and Achievements. Basel, Switzerland.
5. Carroll, A. B. (2016). Carroll's pyramid of CSR: taking another look. *International Journal of Corporate Social Responsibility*. 1(3).
6. Cha, W. & Rajadhyaksha, U. (2021). What do we know about corporate philanthropy? A review and research directions. *Business Ethics, Environment & Responsibility*. 30(3), 262-286.
7. FASB. (1993). *Statement of financial accounting standards: Accounting for contributions received and contributions made*. Norwalk: Financial Accounting Standards Board, 116.
8. Fisman, R., Heal, G. & Nair, V. B. (2008). *A Model of Corporate Philanthropy*. New York: Columbia University and University of Pennsylvania. Retrieved: 11.6.2026. from: <https://knowledge.wharton.upenn.edu/wp-content/uploads/2013/09/13311.pdf>
9. Freeman, R. E. (1984). *Strategic Management: A Stakeholders Approach*, Pitman, Boston.
10. Freeman, R. E. & Reed, D. L. (1983). Stockholders and stakeholders: A new perspective on Corporate Governance. *California Management Review*, 25(3), 88-106.
11. Garcia-Rivas, M. I., Gálvez-Sánchez, F. J., Noguera-Vivo, J. M. & Meseguer-Sánchez, V. (2023). Corporate social responsibility reports: A review of the evolution, approaches and prospects, *Heliyon*. 9(7). e18348.
12. Gautier, A. & Pache, A. C. (2013). Research on Corporate Philanthropy: A Review and Assessment. *Journal of Business Ethics*. 126(3), 343-369.
13. Godfrey, P. (2005). The Relationship Between Corporate Philanthropy and Shareholder Wealth: A Risk Management Perspective, *Academy of Management Review*. 30(4), 777-798.
14. *Hrvatska enciklopedija*, mrežno izdanje. *Leksikografski zavod Miroslav Krleža* (2013. – 2026.). *Filantropija*. Retrieved: 3.6.2026. from: <https://www.enciklopedija.hr/clanak/filantropija>
15. Latif, K. F. & Sajjad, A. (2018). Measuring corporate social responsibility: A critical review of survey instruments. *Corporate Social Responsibility and Environmental Management*. 25 (6), 1174-1197.
16. Leisinger, K. M. (2007). *Corporate Philanthropy: The „Top of the Pyramid“*. *Business and Society Review*, 112 (3), 315–342.
17. MacGregor Pelikánová, R. & Hala, M. (2021). CSR Unconscious Consumption by Generation Z in the COVID-19 Era—Responsible Heretics Not Paying CSR Bonus? *JRFM*. 14(8), 1-19.
18. Matešić, M., Pavlović, D. & Bartoluci, D. (2015). *Društveno odgovorno poslovanje*. Zagreb: Libertas.
19. Mihaljević, M. & Tokić, I. (2015). *Ethics and philanthropy in the field of corporate social responsibility pyramid*. In: *Interdisciplinary Management Research XI*, 11, 799-807.
20. Mitchell, R. K., Agle, B. R. & Wood, D. J. (1997). Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts. *The Academy of Management Review*, 22(4), 853-886.
21. Nurul Fatma Aziz, Rosiati Ramli, Amizawati Mohd Amir & Hairunnizam Wahid. (2024). Charting the landscape of corporate philanthropy: a bibliometric exploration of trends and themes, *Journal of Nusantara Studies*. 9(2), 160-184.
22. Pedersen, E. R. (2010). *Modelling CSR: How managers understand the responsibilities of business towards society*. *Journal of Business Ethics*, 91(2), 155–166.

23. Porter M. E. & Kramer M. R. (2002). The competitive advantage of corporate philanthropy. *Harvard Business Review*. 80 (12), 56–68.
24. Rehman, Z., Khan, A. & Rahman, A. (2020). Corporate social responsibility's influence on firm risk and firm performance: the mediating role of firm reputation. *Corporate Social and Responsibility and Environmental Management*. 27(6), 2991-3005.
25. Ricks J. M. Jr. (2002). *The effects of strategic corporate philanthropy on consumer perceptions: An experimental assessment*. Louisiana State University and Agricultural and Mechanical College.
26. Ricks, J. M., Jr. & Peters, R. C. (2013). *Motives, Timing, and Targets of Corporate Philanthropy: A Tripartite Classification Scheme of Charitable Giving*. *Business and Society Review*. 118(3), 413–436.
27. Singh, K. & Misra, M. (2020). Linking Corporate Social Responsibility (CSR) and Organizational Performance: the moderating effect of corporate reputation. *European Research on Management and Business Economics*. 27(1).
28. Šain, M. (2025). *Korporativna filantropija u izvještavanju o održivosti: analiza trendova i praksi poduzeća u Republici Hrvatskoj*. In: Zbornik radova 6. Međunarodnog znanstvenog skupa Europski realiteti – Održivost. Baraban, B., Buljubašić, I., Barić-Šelmić, S. (Eds.). Osijek, Croatia: Akademija za umjetnost i kulturu u Osijeku, Hrvatska, Hrvatska akademija znanosti i umjetnosti, Centar za znanstveni rad u Vinkovcima, Hrvatska. 221-241.
29. *Što je to društveno odgovorno poslovanje* (2015). Retrieved: 5.6.2026. from: <https://odgovorno.hr/sto-je-to-drustveno-odgovorno-poslovanje/>
30. von Schnurbein, G. & Stühlinger, S. (2015). *Revisiting the Relationship of CSR and Corporate Philanthropy by Using Alignment Theory*. CEPS Working Paper Series No. 6. Basel: CEPS.
31. Vrdoljak-Raguž, I. & Hazdovac, K. (2014). Društveno odgovorno poslovanje i hrvatska gospodarska praksa. *Oeconomica Jadertina*. 4(1), 40-58.
32. Zanini Gavranić, T., Možé, H. & Afrić Rakitovac, K. (2021). *Strateški pristup korporativnoj filantropiji*. In: 22. Međunarodni simpozij o kvaliteti – kvaliteta: jučer, danas, sutra. Poreč.

# CRAFT PRODUCERS' AUTHENTICITY AND THE RISKS OF INFLUENCER MARKETING

Ivana First Komen

University of Rijeka, Faculty of Economics and Business, Rijeka, Croatia  
ivana.first.komen@efri.uniri.hr

## ABSTRACT

*Influencer marketing has become an increasingly prominent marketing strategy, offering brands opportunities to expand market reach, engage customers, and create customer value. However, its relevance for craft producers remains unclear as they often derive value and competitive advantage from being perceived as authentic, which in a nutshell can be defined as opposite from mass and mainstream production. Drawing on three theoretical perspectives on craft authenticity, the paper develops a conceptual framework explaining why influencer marketing may be particularly problematic for craft producers. It identifies four mechanisms through which influencer involvement can reduce consumers' perceptions of craft authenticity: conveying extrinsic commercial motives, disrupting direct consumer-producer relationship, introducing professionalized marketing which challenges the independent "underdog" identity, and expanding market reach in ways that signal production beyond small-scale. By grounding these mechanisms on existing theories of craft authenticity, the paper extends understanding of how marketing practices can shape authenticity perceptions in craft markets. The study contributes to the literature on both craft producer marketing and influencer marketing by questioning the appropriateness of influencer marketing for authenticity-dependent craft producers and by identifying the specific pathways through which influencer marketing can undermine authenticity.*

**Keywords:** Authenticity, Craft, Influencer, Risks

## 1. INTRODUCTION

Craft producers, i.e., makers of handcrafted, high-value, and culturally distinctive products (Thurnell-Read, 2019) are increasingly impactful, reconfiguring entire economic sectors, including beer, fashion, and agriculture (Ganzin et al., 2024). Their distinctiveness and competitive advantage are closely rooted in their authenticity (Dobrev & Verhaal, 2024), a trait particularly valued in a world increasingly shaped by mass production and corporate profit motives (Thurnell-Read, 2019). However, authenticity does not reside in the craft product itself; it has to be constructed through narration and the stories surrounding it (Thurnell-Read, 2019). Direct sales channels, e.g., producers' own workshops and craft or flea markets, as prevailing sales setting for craft producers (Molina et al., 2014; Makhitha, 2019), facilitate the needed storytelling and personal interaction. As craft businesses grow, though, they increasingly need to move online (Ganzin et al., 2024). Transferring relationships developed face-to-face to digital environments can be challenging, as online consumers do not get sensory cues such as touch, taste, and smell (McKee et al., 2025) nor the same level of interpersonal cues that contribute to perceptions of authenticity. Producers' own digital channels still allow direct contact with consumers and, despite the absence of a full sensory experience, can enhance marketing and distribution performance (Wondirad et al., 2022) as well as overall performance (Olanrewaju et al., 2020). Yet craft producers often lack the time and knowledge required to manage digital marketing effectively (First Komen & Mijatović, 2024), creating a need for external support. One increasingly accessible form of support is influencer marketing. It offers established channels and broad reach (Kim & Kim, 2021), allowing craft producers to access targeted audiences (Lou & Yuan, 2019) without having to develop their own channels, while influencers' relationships with followers facilitate credibility (Liu & Zheng, 2024) and

trustworthiness (Breves et al., 2021). However, the authenticity of influencer marketing remains debated. That is, influencer marketing emerged as established brands sought to leverage influencers' perceived authenticity to make their own commercial communication look more genuine. Yet, the commercial nature of these collaborations often undermines perceived authenticity (Duffek et al., 2025; Audrezet et al., 2020; Libai et al., 2025), making careful design of collaborations important. Research suggests that influencer-product fit (Pöyry et al., 2019; Wellman et al., 2020), influencers' intrinsic motivation to promote the product (Kapitan et al., 2022), and influencer's creative control over content (Borchers, 2023) generally help preserve authenticity of influencer recommendations. While one of the main motivations of established brands to use influencers is enhancing the perceived authenticity of their communication, craft producers may use them primarily to expand their reach and access expertise in managing online channels. Craft producers' own communication, mostly in person, is already highly authentic, meaning that influencer collaborations could compromise rather than enhance this authenticity. Yet, how influencer marketing affects authenticity in the craft context remains unexplored. Moreover, research on influencer marketing in the craft context in general is virtually absent. This paper develops a conceptual framework explaining how craft producers' pursuit of growth through influencer marketing may undermine the authenticity on which their distinctiveness and competitive advantage depend.

## 2. LITERATURE REVIEW

### 2.1. Craft producers and authenticity

The International Trade Centre UNCTAD/WTO (ITC) & World Intellectual Property Organization (WIPO) (2003), in their *Marketing Crafts and Visual Arts* guide, note that there is no universally accepted definition of *crafts* or *artisanal products*, terms which they use interchangeably. Drawing on the United Nations Educational, Scientific and Cultural Organisation (UNESCO) (1997) definition, they describe crafts as: goods produced by artisans entirely or primarily by hand; without restriction on production quantity, while ensuring that no two pieces are exactly alike; using sustainable raw materials; and distinguished by their utilitarian, aesthetic, creative, or other unique features. This definition remains referenced in academic research (e.g., Makhitha, 2019; Pagán et al., 2020) and in the UNESCO glossary (2026). Craft businesses are usually single person businesses or businesses employing one or two extra workers (Fillis, 2012) who are fully involved not only in production, but also in marketing of their products mainly through their own workshops and at craft or flea markets (Molina et al., 2014; Makhitha, 2019; Bergadaà, 2008). Accordingly, some craft producers see value of their products in the product's uniqueness, while others build value through personal relationships, networking, and word-of-mouth marketing (Fillis, 2012). Furthermore, craft is closely tied to sustainability as it contributes to the preservation of specialised tacit expertise, the use of local materials and indigenous knowledge, ethical and authentic production practices, and local culture (Wondirad et al., 2022). The appeal of craft products is closely tied to the consumer search for authenticity, embodied in small-scale, handmade production and a perceived return to simpler, more personal, and honest forms of commerce, making authenticity central to crafts identity (Dobrev & Verhaal, 2024). Authenticity is so intertwined with craft that Kovács et al. (2014) found *craftsmanship* among the 15 keywords most frequently associated with authenticity, alongside broader concepts such as *genuine*, *real*, and *original*. Moreover, authenticity grounded in distinctive, difficult-to-replicate features provides craft producers with a sustainable competitive advantage (Ganzin et al., 2024) and is therefore essential to their success (Shafi et al., 2021). Bergadaà (2008) extends understanding of craft authenticity and introduces the concept of *experience of authenticity* which consumers seek when it comes to crafts, and which a craftsperson produces through the process of construction of the object and the relationship with the consumer established through explaining or

demonstrating the craft production process. In recent years, three papers have conceptualised craft authenticity. First, Thurnell-Read (2019) argues that authenticity does not exist in the craft product itself, but is constructed through narratives. He identifies six modes of authenticity that craft producers communicate to their buyers: procedural (demonstrating involvement, control, and transparency throughout the production process), material (using high-quality, often pricy, materials), geographical (emphasising place of origin and building local customer base), temporal (drawing on tradition or modernity), oppositional (positioning against mainstream alternatives), and biographical (showing the producer's connection to and motivation for the craft). Second, Plüg & Collins (2022) identified three key constructions of craft authenticity: authentic materials (natural, high quality, rare, and long-lasting craft products), authentic artisans (enthusiastic, passionate and creative craft producers), and authentic individuality (one-of-a-kind products, small-run collections, consumer co-creation).

Finally, third, Dobrev & Verhaal (2024), in their theory of organisational authenticity, argue that authenticity is socially constructed. For a producer to be perceived as authentic, it must project an intrinsic motivation rather than an instrumental agenda, and this motivation should be visible (through external signals) and credible (through investments that support intrinsic motivation). Importantly for this paper, their theory is developed in the craft beer context, so they suggest a specific operationalisation of the three elements of authenticity. Intrinsic motivation is operationalised as independence from mass producers (not being sold-out), visibility as obtaining third-party awards, and credibility as investing in a variety of products including those not commercially attractive but interesting to the producer. Table 1 summarises the three theoretical perspectives on craft authenticity.

*Table ends on the next page*

| Reference            | Goal of the research                                                                                                                                                | Methods                                                                                                                                                                        | Authenticity dimensions                                                                                                        | Authentic craft producer is:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Thurnell-Read (2019) | To identify how small and independent brewers and distillers make 'authenticity claims' through the narratives they use to add meaning and worth to their products. | Primary:<br>-interviews with craft producers (breweries and gin distilleries)<br><br>Additional:<br>- production & consumption sites<br>- content analysis of crafts' websites | Modes of authenticity:<br>1. procedural<br>2. material<br>3. geographical<br>4. temporal<br>5. oppositional<br>6. biographical | Ad 1. demonstrating involvement, control, and transparency throughout the production process<br>Ad 2. using high-quality (and pricy) materials<br>Ad 3. drawing on a place of origin and build local customer base<br>Ad 4. drawing either on tradition or modernity<br>Ad 5. positioning against mainstream alternatives characterised by mass production, no visibility of producer, and financial power (the David-and-Goliath narrative)<br>Ad 6. showing producer's personal connection to and motivation for the craft |

|                         |                                                                                                                                                                |                                                                                                                                                                                                                           |                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Plüg & Collins (2022)   | To explore how brands themselves draw on similar and differing conceptualisations of authenticity to position themselves as desirable.                         | Primary:<br>- content analysis of craft brands' (furniture, food, leather, clothing beverages, jewellery, and homeware) websites and social media<br><br>Additional:<br>- interviews and online articles content analysis | Constructions of authenticity:<br>1. authentic materials<br>2. authentic artisans<br>3. authentic individuality                                                                                                         | Ad 1. using materials that are natural, high quality, rare, and make products long-lasting<br>Ad 2. demonstrating enthusiasm, love of the craft, passion, creativity, and personal expression through the craft<br>Ad 3. emphasising one-of-a-kind products, small-run collections, customisation, and consumer co-creation through authentic experiences |
| Dobrev & Verhaal (2024) | To develop a theory of organizational authenticity that explains how craft producers achieve success and audience appeal by projecting claims of authenticity. | Primary:<br>- online reviews by craft beer enthusiasts (consumer)<br><br>Additional:<br>- other websites                                                                                                                  | Organizational authenticity components:<br>1. meaning of intrinsic motivation<br>2. visibility of intrinsic motivation through external signals<br>3. credibility through investments that support intrinsic motivation | Ad 1. maintaining independent ownership without support from large producers (not being sold out)<br>Ad 2. having won third-party awards<br>Ad 3. keeping variety of styles of products including unpopular ones that generate losses, but keeps producer interested                                                                                      |

*Table 1. Theoretical perspectives on craft authenticity  
(Source: author)*

## **2.2. Influencer marketing and authenticity**

Influencer marketing is a strategy in which a firm incentivizes social media content creators with large follower base to engage their followers in an attempt to promote the firm's offerings, with the goal of enhancing firm performance (Leung et al., 2022). Research shows that influencer marketing can provide firms with numerous benefits, which Libai et al. (2025) synthesise by outlining that influencers create and exchange value across the marketing value chain, support firms' strategic and tactical decisions, and contribute to customer equity. The benefits of influencer marketing, however, depend on selecting an appropriate influencer and managing the collaboration effectively, with perceived influencer authenticity being particularly important. Research consistently identifies influencer authenticity as a key driver of consumer trust (Kim & Kim, 2021), value creation for endorsed brand's customers (Libai et al., 2025), and purchase intention toward an endorsed brand (Lee & Eastin, 2021; Liu & Zheng, 2024). Grgurić Čop et al. (2024) further identify authenticity as a single overarching expectation that followers seek from influencers. Finally, Wellman et al. (2020) identify authenticity as a guiding principle in influencers' decision-making about which brands to work with, what

content to produce, and how to disclose commercial relationships. They argue that influencers perceive their actions as ethical when they remain true to themselves (i.e., authentic) and to their audiences (i.e., credible). Consistent with this perspective, authenticity ranks among the four most studied concepts in recent research on ethics in influencer marketing (Mehra et al., 2026). Having acknowledged the importance of influencer authenticity, research has extensively examined how influencers can remain authentic when collaborating with brands. For example, Audrezet et al. (2020) identify two paths to influencer authenticity: passionate authenticity, rooted in intrinsic motivation to promote a product, and transparent authenticity, based on truthful product representation and disclosure of commercial relationships.

Similarly, Lee and Eastin (2021) identify five dimensions of influencer authenticity: sincerity as a general personal trait, truthful endorsements, visibility of private life, expertise, and uniqueness, with sincerity and truthful endorsements having the strongest effects on attitudes towards influencers, willingness to follow them, and purchase intentions. Finally, Duffek et al. (2025) argue that authenticity is not inherent to the influencer but emerges contextually from alignment between the influencer, audience, and brand. They identify five dimensions: transparency reflected in sharing both positive and negative impressions; connectedness with the audience; expertise; integrity reflected in intrinsic motivation to promote; and originality, reflected in sharing a personal story related to the product.

### 3. CONCEPTUAL FRAMEWORK

As prior research established, authenticity lies at the heart of both craft production (Dobrev & Verhaal, 2024) and successfully influencer marketing (Wellman et al., 2020). At first glance, this commonality makes influencers seemingly well suited to collaborate with craft producers. Yet this apparent compatibility overlooks a fundamental tension: the practices through which influencer marketing creates value for brands may conflict with what makes craft authentic. Existing research largely approaches authenticity preservation in influencer marketing through influencer selection, emphasising importance of influencer's fit to a product (Pöyry et al., 2019; Wellman et al., 2020), intrinsic motivation to promote the product (Kapitan et al., 2022), and creative control over content (Borchers, 2023). This research challenges the assumption that the right influencer is sufficient to preserve craft authenticity, arguing that the very nature of influencer marketing introduces practices and relationships that may alter the conditions through which craft authenticity is constructed and perceived. The resulting tension is therefore structural rather than simply relational. This perspective is largely absent from existing research.

Building on three existing theoretical perspectives on craft authenticity, the study develops four mechanisms through which influencer involvement may undermine consumers' perceptions of craft authenticity: (1) conveying extrinsic commercial motives, (2) disrupting direct consumer-producer relationships, (3) introducing professionalized marketing which challenges the independent "underdog" identity, and (4) expanding market reach in ways that signal production beyond small-scale. Table 2 summarises the conceptual framework by showing how the four mechanisms of influencer involvement may conflict with the characteristics in which craft authenticity is grounded. Each mechanism is explained in detail below the table.

*Table following on the next page*

| <b>Craft authenticity is grounded in</b>            | <b>Influencer marketing</b>                                                                | <b>How consumers question authenticity?</b>                             | <b>Undermined authenticity dimensions (T = Thurnell-Read, 2019; P = Plüg &amp; Collins, 2022; D = Dobrev &amp; Verhaal, 2024)</b> |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Intrinsic motivation to create (and preserve craft) | Conveys extrinsic commercial motives                                                       | - Is producer's motivation personal expression and love for the craft?  | T: biographical and oppositional authenticity<br>P: authentic artisan<br>D: meaning of intrinsic motivation and credibility       |
| Direct consumer-producer connection                 | Disrupts direct consumer-producer relationship                                             | - Is producer's personal connection to the product real and passionate? | T: biographical and procedural authenticity<br>P: authentic artisan and individuality                                             |
| Independent "underdog" identity                     | Introduces professionalised marketing which challenges the independent "underdog" identity | - Is craft producer involved enough to control the entire process?      | T: procedural and biographical authenticity<br>P: authentic artisan<br>D: meaning of intrinsic motivation and credibility         |
|                                                     |                                                                                            | - Is craft different from mainstream?                                   | T: oppositional authenticity<br>D: meaning of intrinsic motivation and credibility                                                |
| Small-scale and                                     | Expands market reach in ways that signal production beyond small-scale                     | - Is it still handmade and each piece unique?                           | T: oppositional authenticity<br>P: authentic individuality<br>D: credibility                                                      |
|                                                     |                                                                                            | - Is it from the same materials and of the same quality?                | T: material authenticity<br>P: authentic materials                                                                                |
|                                                     |                                                                                            | - Is production still made by the craft producer only?                  | T: oppositional and biographical authenticity<br>P: authentic artisan<br>D: meaning of intrinsic motivation                       |

*Table 2: Conceptual framework of influencer marketing risks to craft authenticity  
(Source: author)*

*Conveying extrinsic commercial motives.* Craft producers are commonly characterised by intrinsic motivation to create and preserve their craft, with financial rewards viewed as secondary to other concerns (Thurnell-Read, 2019). This creating “beer for beer’s sake” rather than pursuing profits motivation (Dobrev & Verhaal, 2024) is reflected in producers’ understanding of their work as “not work, ... passion” (Plüg & Collins, 2022), and as a desire to “do something creative that would give me a better lifestyle” (Thurnell-Read, 2019). As a craft producer explain, craft is “an exquisite expression of my deepest, most personal self... Each piece is part of my story” (Plüg & Collins, 2022), while another noted that “words may not come easily, so the best way for us to express ourselves is through our work” (Bergadaà, 2008). Influencer marketing, however, makes the commercial purpose of promotion apparent, potentially leading consumers to question whether the producer’s activities continue to reflect such intrinsic and personal motivations. Thus, while existing research suggests that influencer collaborations can diminish the perceived authenticity of influencers’ recommendations when promoting established brands (Audrezet et al., 2020; Duffek et al., 2025; Libai et al., 2025), we propose that in the context of craft producers, the concern extends beyond the authenticity of the endorsement itself to the potential erosion of the craft’s authenticity.

*Disrupting direct consumer-producer relationship.* Craft authenticity is also grounded in personal connections between producers and consumers, through which producers can demonstrate their commitment and personal connection to their craft (Thurnell-Read, 2019; Bergadaà, 2008). The open-door practices in their workspaces, allow consumers to “pop in and say hello [as they have] nothing to hide, [but allow] authenticity to be displayed” (Thurnell-Read, 2019). They believe that consumers should be shown and even involved in producing “pieces that are uniquely special to them” (Plüg & Collins, 2022). Bergadaà (2008) argues that the direct encounters of craftspeople and consumers is what creates an “experience of authenticity” that craftspeople share with their customers and what enhance the perceived value of craft products. As one of consumers in their research explains: “If they explain how they’ve made it, the object is more valuable to me.” Influencer marketing, however, introduces an intermediary into the communication between producer and consumer, disrupting these direct interactions and the authenticity-building processes they enable. This may lead consumers to question whether the producer’s personal connection to the product remains genuine and passionate, and ultimately whether the craft is authentic.

*Introducing professionalized marketing which challenges the independent “underdog” identity.* Craft producers often construct authenticity by positioning themselves in opposition to mainstream and mass-market producers, presenting themselves as autonomous (Plüg & Collins, 2022), independent (Thurnell-Read, 2019), and not “sold-out” (Dobrev & Verhaal, 2024). This “underdog” positioning against dominant market actors, reflected in what Thurnell-Read (2019) calls the “David and Goliath” narrative, is also expressed through producers’ emphasis on doing things on their own terms. For example, a craft producer says “if I didn’t like it I wouldn’t want to brew it” (Thurnell-Read, 2019), while others go even further to produce beers that “are served at room temperature, which many US consumers dislike” (Dobrev and Verhaal, 2024), demonstrating their willingness to resist prevailing market preferences. Influencer marketing, however, introduces an external partner and professionalised marketing practices into the representation of the craft, immediately making producers appear less independent and more aligned with mainstream, mass-market practices. Moreover, influencer marketing requires a “paradigm of letting go” on the brand’s side which allows influencers autonomy to create content perceived as authentic by their followers (Borchers, 2023). However, while such autonomy makes their positive endorsements of craft products appear more genuine, it simultaneously challenges perceptions of craft producers’ involvement and control over their businesses, which is central to craft authenticity and appeal.

*Expanding market reach in ways that signal production beyond small-scale.* While some craft producers point out that craft production is not necessarily small-scale (Voronov et al., 2023), and United Nations Educational, Scientific and Cultural Organisation (UNESCO) (1997) explicitly defines craft production “without restriction on production quantity”, Dobrev & Verhaal (2024) argue that large-scale is „intuitively perceived (correctly or not) as inauthentic by audiences in craft markets”. Since this research is concerned with risks to perceived authenticity, the fact that audiences associate small-scale production with authenticity is important, regardless of institutional or producer understandings of it. Small-scale production functions as a signal of craft authenticity, particularly as it implies handmade production, uniqueness, rare materials, and high quality (Thurnell-Read, 2019; Plüg & Collins, 2022; Dobrev & Verhaal, 2024). For example, a craft producer in prior research emphasises a commitment to “the very highest quality” and premium raw materials at the expense of “volume and profit” (Thurnell-Read, 2019), while others stress that “each piece is unique” and that products are “few of a kind and available only once-off” (Plüg & Collins, 2022).

Influencer marketing, however, expands market reach (Kim & Kim, 2021), potentially signalling a move beyond small-scale context and leading consumers to question whether products remain handmade, unique, and of the same quality, and whether production remains producer's personal.

#### 4. CONCLUSION

While research on influencer marketing has largely examined established brands, this study shifts attention to craft producers, for whom authenticity underpins value creation (Thurnell-Read, 2019) and competitive advantage (Ganzin et al., 2024). In doing so, the study theoretically contributes to the literature on craft producer marketing and influencer marketing in two ways. First, it draws attention to the specific characteristics of craft industry that conflict with the practices through which influencer marketing normally creates value for brands (Libai et al., 2025) and proposes that engaging in influencer marketing may put craft authenticity at risk. Second, the study identifies four mechanisms through which influencer involvement may reduce consumers' perceptions of craft authenticity. They are: conveying extrinsic commercial motives, disrupting direct consumer-producer relationships, introducing professionalized marketing which challenges the independent "underdog" identity, and expanding market reach in ways that signal production beyond small-scale. Each mechanism is grounded in and explained through three existing theoretical perspectives on craft authenticity, conceptualised by Thurnell-Read (2019), Plüg & Collins (2022), and Dobrev & Verhaal (2024). Together, these perspectives provide the conceptual basis for understanding why influencer involvement may undermine consumers' perceptions of authenticity. In terms of managerial implications, craft producers should recognise that influencer marketing requires careful consideration of its implications for craft authenticity. Should they choose to engage influencers, they should be particularly attentive to the mechanisms through which influencer involvement may undermine their authenticity. Accordingly, influencer collaborations should be carefully structured to mitigate these effects and limit the extent to which craft authenticity is compromised. This paper has several limitations. First, as a conceptual paper, the proposed framework remains to be empirically validated. Qualitative research, such as interviews with craft producers and consumers, could potentially reveal additional mechanisms or dimensions of authenticity at risk. Subsequent quantitative research could then test the proposed relationships. Second, the framework adopts a craft producer perspective, while examining influencers' perspectives on the risks they face when collaborating with craft producers may provide complementary insights. Third, by focusing on how influencer marketing may generally compromise authenticity, the framework does not address specific conditions under which influencer collaborations may instead preserve or enhance craft authenticity, which should be addressed in the future research. Fourth, while the proposed risks may extend beyond craft producers to other businesses whose authenticity is rooted in similar characteristics, further research is needed to determine which types of businesses are particularly vulnerable to authenticity loss from influencer engagement.

**ACKNOWLEDGEMENT:** *This paper has been written within the scope of the project „Influencer Marketing and Small Producers: Ethical Dilemmas and Collaboration Challenges“ (uniri-iz-25-277), funded by European Union – NextGenerationEU via the Croatian National Recovery and Resilience Plan 2021-2026, in conjunction with the University of Rijeka, Faculty of Economics and Business Programme Financing. The views and opinions expressed are solely those of the authors and do not necessarily reflect the official position of the European Union or the European Commission. Neither the European Union nor the European Commission can be held responsible for them.*

*In preparing this paper, the author used ChatGPT and Elicit for linguistic support and references retrieval. Following the use of this tool/service, the author has reviewed and edited the content as necessary and takes full responsibility for the content of the published article.*

## LITERATURE:

1. Audrezet, A., De Kerviler, G., Moulard, J. G. (2020). Authenticity under threat: When social media influencers need to go beyond self-presentation. *Journal of Business Research*, 117, 557-569.
2. Bergadaà, M. (2008). Craftsmen of art, and their craft: the experience of authenticity and its materialization in the places where craftspeople and enlightened clients meet. *Recherche et Applications en Marketing (English Edition)*, 23(3), 5-24.
3. Borchers, N. S. (2023). To eat the cake and have it, too: How marketers control influencer conduct within a paradigm of letting go. *Social Media+ Society*, 9(2), 20563051231167336.
4. Breves, P., Liebers, N., Motschenbacher, B., Reus, L. (2021). Reducing resistance: The impact of nonfollowers' and followers' parasocial relationships with social media influencers on persuasive resistance and advertising effectiveness. *Human Communication Research*, 47(4), 418-443.
5. Dobrev, S. D., Verhaal, J. C. (2024). Organizational authenticity: How craft-based ventures manage authentic identities and audience appeal. *Strategic Entrepreneurship Journal*, 18(4), 740-769.
6. Duffek, B., Eisingerich, A.B., Merlo, O., Lee, G. (2025). Authenticity in Influencer Marketing: How Can Influencers and Brands Work Together to Build and Maintain Influencer Authenticity? *Journal of Marketing*, 89(5), 21-46.
7. Fillis, I. (2012). An aesthetic understanding of the craft sector, *Creative Industries Journal*, 5(1-2), 23-41, DOI: 10.1386/cij.5.1-2.23\_1
8. First Komen, I., Mijatović, M. (2024). Marketing of craft producers: evaluation and implications for the future education. *Zbornik Veleučilišta u Rijeci*, 12(1), 181-199.
9. Ganzin, M., Chirico, F., Kroezen, J. J., Dacin, M. T., Sirmon, D. G., Suddaby, R. (2024). Craft and strategic entrepreneurship: Exploring and exploiting materiality, authenticity, and tradition in craft-based ventures. *Strategic Entrepreneurship Journal*, 18(4), 671-685.
10. Grgurić Čop, N., Culiberg, B., First Komen, I. (2024). Exploring social media influencers' moral dilemmas through role theory. *Journal of Marketing Management*, 40(1-2), 1-22.
11. International Trade Centre UNCTAD/WTO (ITC) and World Intellectual Property Organization (WIPO). (2003). *Marketing crafts and visual arts: The role of intellectual property: A practical guide*. Geneva: ITV/WIPO. Retrieved 28.08.2026. from [https://www.wipo.int/edocs/pubdocs/en/intproperty/itc\\_p159/wipo\\_pub\\_itc\\_p159.pdf](https://www.wipo.int/edocs/pubdocs/en/intproperty/itc_p159/wipo_pub_itc_p159.pdf).
12. Kapitan, S., Van Esch, P., Soma, V., Kietzmann, J. (2022). Influencer marketing and authenticity in content creation. *Australasian Marketing Journal*, 30(4), 342-351.
13. Kim, D. Y., Kim H.-Y. (2021). Trust me, trust me not: A nuanced view of influencer marketing on social media. *Journal of Business Research*, 134, 223-232. DOI: 10.1016/j.jbusres.2021.05.024
14. Kovács, B., Carroll, G. R., Lehman, D. W. (2014). Authenticity and consumer value ratings: Empirical tests from the restaurant domain. *Organization science*, 25(2), 458-478.
15. Lee, J.A., Eastin, M.S. (2021). Perceived authenticity of social media influencers: scale development and validation. *Journal of Research in Interactive Marketing*, 15(4), 822-841.
16. Leung, F. F., Gu, F. F., Palmatier, R. W. (2022). Online influencer marketing. *Journal of the Academy of Marketing Science*, 50, 226-245.
17. Libai, B. et al. (2025). Influencer marketing unlocked: Understanding the value chains driving the creator economy. *Journal of the Academy of Marketing Science*, 53(1), 4-28.

18. Liu, X. Zheng, X (2024). The persuasive power of social media influencers in brand credibility and purchase intention. *Humanities and Social Sciences Communications*, 11(1), 1-12.
19. Lou, C., Yuan, S. (2019). Influencer marketing: How message value and credibility affect consumer trust of branded content on social media. *Journal of Interactive Advertising*, 19(1), 58-73. <https://doi.org/10.1080/15252019.2018.1533501>
20. Makhitha, K. M. (2019). Marketing strategies for closing the market access gap experienced by small craft producers in South Africa. *Journal of Business and Retail Management Research*, 13(03), 147-159.
21. McKee, S., Sands, S., Cohen, J., Ferraro, C., Pallant, J. (2025). Crafting digital experiences: Relational strategies for SME brands in direct-to-consumer markets. *Australasian Marketing Journal*, 14413582251356706.
22. Mehra, D., Gupta, A., Gupta, S., Melewar, T. C., Gee, L. (2026). Ethics in influencer marketing: a review, synthesis and research directions. *International Journal of Advertising*, 1-35.
23. Molina, A., Aranda, E., Martín, V. J., Santos, J. (2014). Opportunities for craft consumption: analysis of the quality perceived by consumers. *International Journal of Globalisation and Small Business*, 6(1), 64-78.
24. Olanrewaju, A. S. T., Hossain, M. A., Whiteside, N., Mercieca, P. (2020). Social media and entrepreneurship research: A literature review. *International Journal of Information Management*, 50, 90-110.
25. Pagán, E. A. et al. (2020). From silk to digital technologies: A gateway to new opportunities for creative industries, traditional crafts and designers. The SILKNOW case. *Sustainability*, 12(19), 8279.
26. Plüg, S., Collins, A. (2022). The work of “authenticity” in the age of mechanical reproduction: Constructions of authenticity in South African artisanal brands. *Journal of Consumer Culture*, 22(2), 417-436.
27. Pöyry, E., Pelkonen, M., Naumanen, E., Laaksonen, S. M. (2019). A call for authenticity: Audience responses to social media influencer endorsements in strategic communication. *International Journal of Strategic Communication*, 13(4), 336-351.
28. Shafi, M. et al. (2021). Factors influencing the consumer acceptance of innovation in handicraft products. *SAGE Open*, 11(4), p.21582440211061528. <https://doi.org/10.1177/21582440211061528>.
29. Thurnell-Read, T. (2019). A thirst for the authentic: Craft drinks producers and the narration of authenticity. *The British Journal of Sociology*, 70(4), 1448-1468.
30. UNESCO glossary: Craft or artisanal products. (2026). Retrieved 28.8.2026. from <https://databrowser.uis.unesco.org/resources/glossary/2484?search=craft+produc>.
31. United Nations Educational, Scientific and Cultural Organisation (UNESCO). (1997). *International Symposium on Crafts and the International Markets: Trade and Customs Codification*. (Final report: CLT/CONF/604/7). Retrieved 28. 8. 2026. from <https://unesdoc.unesco.org/ark:/48223/pf0000111488>.
32. Voronov, M., Foster, W. M., Patriotta, G., Weber, K. (2023). Distilling authenticity: Materiality and narratives in Canadian distilleries’ authenticity work. *Academy of Management Journal*, 66(5), 1438-1468.
33. Wellman, M. L., Stoldt, R., Tully, M., Ekdale, B. (2020). Ethics of authenticity: Social media influencers and the production of sponsored content. *Journal of Media Ethics*, 35(2), 68-82.
34. Wondirad, A., Bogale, D., Li, Y. (2022). Practices and challenges of developing handicrafts as a core tourism product in Chenchä and Konso, southern Ethiopia. *International Journal of Cultural Policy*, 28(3), 306-326.

# SUSTAINABILITY AND ACCESS TO HEALTHCARE: MEDICINES PRICES REGULATION AS AN ASPECT OF SDG 11

**Maria do Rosario Anjos**

*Lusófona University, Porto, Portugal  
CEAD Francisco Suárez - Researcher Center  
IJP Portucalense Institute of Legal Researcher  
maria.rosario.anjos@ulusofona.pt*

**Imaculada da Costa Feio**

*Lusófona University, Porto, Portugal  
imaculada.feio@gmail.com*

## **ABSTRACT**

*This paper aims to demonstrate that access to medicines is an essential aspect of urban sustainability, one that is often overlooked in conventional approaches to the United Nation's Sustainable Development Goal 11 (SDG 11: Sustainable Cities and Communities). Urban sustainability is not limited to the environmental dimension or mobility; it also involves ensuring that citizens, regardless of their economic situation, have effective access to essential health goods, among which medicines play a fundamental role. Based on the Portuguese constitutional framework, specifically the right to health protection enshrined in Article 64 of the Constitution of the Portuguese Republic (CRP) and consumers' right to quality goods and services provided for in Article 60, this paper examines how the system for setting medicine prices in Portugal, regulated by Decree -Law No. 97/2015 and Ministerial Order No. 195-C/2015, serves or undermines the objective of an inclusive and socially sustainable city. The 'price cap' mechanism and the public co-payment system are examined as public health policy instruments. Three structural tensions are identified: the conflict between the economic interests of the pharmaceutical industry and universal access to medicines, the inadequacy of the generic medicines model in ensuring long-term sustainability, and the unequal impact of pharmaceutical prices on vulnerable populations. It is demonstrated that price regulation, far from being a mere economic decision, is a public policy instrument with direct effects on social cohesion and the sustainability of our communities.*

**Keywords:** *Access to medicines; Prices regulation; Right to health; SDG 11; Sustainable city*

## **1. INTRODUCTION**

Sustainable development is founded on the principle that economic growth, social equity, and environmental protection must be pursued in an integrated and balanced manner. Within this framework, access to healthcare is recognized as a fundamental component of sustainable societies because good health enables individuals to participate fully in economic, social, and civic life. Although Sustainable Development Goal (SDG) 3 specifically focuses on ensuring healthy lives and promoting well-being for all, the achievement of SDG 11—*Sustainable Cities and Communities*—also depends on equitable access to healthcare services, including affordable medicines. The research base of this paper is to understand how the access to medicines an essential aspect of urban sustainability is, one that is often overlooked in conventional approaches to the United Nation's Sustainable Development Goal 11 (SDG 11: Sustainable Cities and Communities). Urban sustainability is not limited to the environmental dimension or mobility; it also involves ensuring that citizens, regardless of their economic situation, have effective access to essential health services and goods, among which medicines play a fundamental role.

*The methodology adopted is based on a theoretical framework that included a revision of the state of art, legislation, reports and the contribution of the EU data and comparative analysis to the Portuguese situation. Based on the Portuguese constitutional framework, specifically the right to health protection enshrined in Article 64 of the Constitution of the Portuguese Republic (CRP) and consumers' right to quality goods and services provided for in Article 60, this paper examines how the system for setting medicine prices in Portugal, regulated by Decree -Law No. 97/2015 and Ministerial Order No. 195-C/2015, serves or undermines the objective of an inclusive and socially sustainable city. The research shows that 'price cap' mechanism and the public co-payment system are examined as public health policy instruments. Three structural tensions are identified: the conflict between the economic interests of the pharmaceutical industry and universal access to medicines, the inadequacy of the generic medicines model in ensuring long-term sustainability, and the unequal impact of pharmaceutical prices on vulnerable populations. It is demonstrated that price regulation, far from being a mere economic decision, is a public policy instrument with direct effects on social cohesion and the sustainability of our communities.*

## **2. CONCEPT OF SUSTAINABLE CITIES: THE STATE OF ART**

The concept of sustainable cities has become a central topic in urban planning and sustainable development. A sustainable city is designed and managed to meet the needs of its current population without compromising the ability of future generations to meet their own needs. It integrates environmental protection, economic development, and social inclusion to create resilient, healthy, and liveable urban environments. The state of the art in sustainable cities emphasizes the use of innovative technologies, efficient resource management, and participatory governance. Modern sustainable cities adopt smart technologies to improve energy efficiency, waste management, transportation systems, and public services. Renewable energy, green buildings, and circular economy practices are increasingly incorporated into urban development to reduce greenhouse gas emissions and minimize environmental impacts. Health care became a secondary issue and yet its importance is unquestionable (Jones, A. 2024). The COVID-19 crisis was a very difficult period, but it showed the importance of access to health and medical care for the sustainability of communities (Eurostat report; 2025 and PORDATA, 2025). Social sustainability is another essential dimension. Sustainable cities promote affordable housing, equal access to healthcare and education, safe public spaces, and inclusive decision-making processes (Ribeiro; Gullón et al. 2026). These measures help reduce social inequalities while improving the quality of life for all residents. Green spaces, parks, and sustainable mobility options such as cycling infrastructure and public transportation also contribute to physical and mental well-being, but the access to healthcare and medicines must come first (Ferreira da Silva, D.; 2025). Climate resilience has become a major focus of contemporary urban planning. Cities are developing strategies to adapt to climate change through flood protection, heat mitigation, water conservation, and disaster risk reduction. Nature-based solutions, such as urban forests, green roofs, and restored wetlands, are increasingly recognized as effective approaches to enhancing environmental sustainability and resilience. International frameworks, including the United Nations Sustainable Development Goals (SDGs)—particularly SDG 11: Sustainable Cities and Communities—provide guidance for governments and policymakers to develop more sustainable and healthy urban areas. The New Urban Agenda, adopted at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in 2016, further promotes integrated urban planning, social equity, physical and mental health, environmental stewardship, and economic prosperity. Despite significant progress, important challenges remain. Rapid urbanization, population growth, housing shortages, pollution, traffic congestion, and climate change continue to place pressure on cities worldwide. In this context, access to quality health services and medicines at

appropriate prices is an issue of great relevance for the citizens. The current state of the art recognizes that achieving urban sustainability requires collaboration among governments, businesses, researchers, and local communities, supported by evidence-based policies and continuous innovation. In conclusion, the state of art shows that sustainable cities represent a holistic approach to urban development that balances environmental protection, economic growth, and social well-being. Advances in technology, governance, and planning have expanded the possibilities for creating cities that are more resilient, inclusive, and environmentally responsible. However, long-term commitment and coordinated action remain essential to ensure that urban development contributes to a sustainable future for all.

### **2.1. Urban environment and right to health**

Urbanisation has a significant impact on people's access to healthcare by reshaping social, economic and environmental conditions in urban settings. In the field of urban health, the analysis of urbanisation requires a multidimensional and integrated approach, considering indicators such as urban mobility, the availability of green spaces, housing conditions, population density, air quality and the socio-economic circumstances of households. The World Health Organisation, through the Commission on Social Determinants of Health (WHO report; 2008), emphasises that health inequalities are shaped by the conditions in which people are born, grow up, live, work and grow old. In the last 20 years we have seen some improvements in the quality of health services but many difficulties and limitations in access to medicines, given their high price and the low contribution of the States (WHO report 2025). The European Commission identifies key areas for policy action aimed at addressing the structural determinants of health inequalities, emphasising the central role of social, economic and environmental conditions in shaping the health outcomes of populations. In this regard, the relationship between urbanisation and access to healthcare can be understood as an interdependent process, in which urban organisation influences health determinants and, at the same time, health patterns influence urban planning and development. The right to health is a fundamental human right that ensures every person has access to quality healthcare, clean water, sanitation, nutritious food, and a safe environment. Good health is influenced not only by medical services but also by the conditions in which people live, work, and interact. Sustainable Development Goal 11 (SDG 11), Sustainable Cities and Communities, aims to make cities inclusive, safe, resilient, and sustainable. Healthy cities contribute to the realization of the right to health by reducing pollution, improving housing, expanding green spaces, promoting safe transportation, and ensuring access to essential services. Urban environments have a direct impact on physical and mental health. Poor air quality, overcrowded housing, lack of sanitation, and limited healthcare facilities can increase the risk of disease and reduce quality of life. In contrast, well-planned cities with parks, clean public transport, and affordable healthcare create healthier communities and improve overall well-being. Achieving SDG 11 supports the right to health by addressing the social and environmental factors that influence health outcomes. Governments, communities, and individuals all have a role in creating sustainable cities where everyone can live in a healthy, safe, and dignified environment. By investing in sustainable urban development, societies can improve public health, reduce inequalities, and build a better future for all.

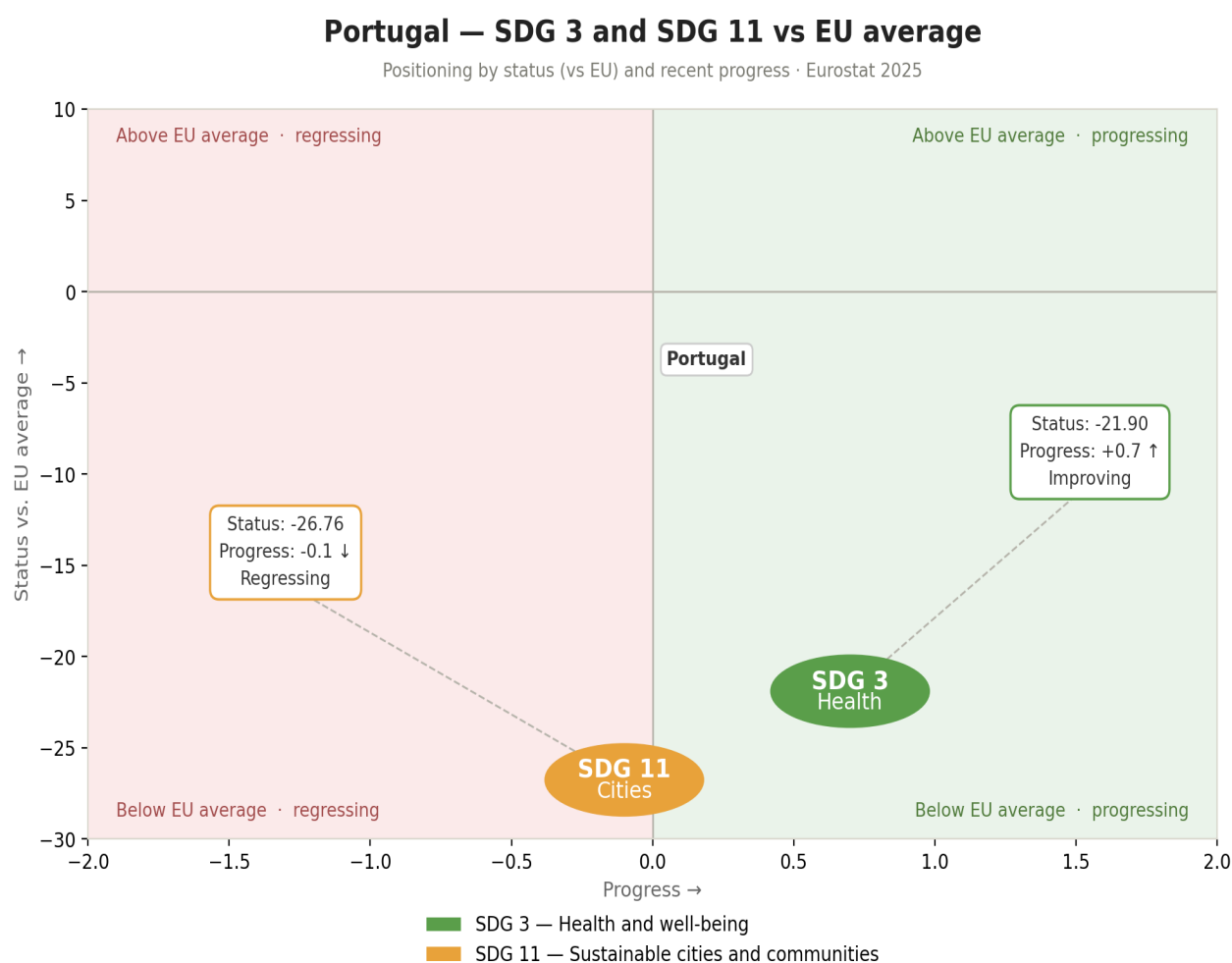
### **2.2 Sustainability and Access to Healthcare: Medicines Prices Regulation as an Aspect of SDG 3 and 11**

Sustainable cities must be focused on the social progress of population. So, they cannot be achieved if significant portions of the population are excluded from essential health services due to financial barriers (Németh, B. et al; 2022).

Medicines are essential components of healthcare systems, yet their increasing costs present a significant challenge to public health and social sustainability. High medicine prices can limit access to treatment, increase health inequalities, and place considerable financial pressure on households and public healthcare systems (Teixeira and Gouveia, 2002). Vulnerable populations, including low-income families, older adults, and individuals with chronic diseases, are particularly affected by the inability to afford necessary medications. As a result, ensuring affordable access to medicines is not only a health policy objective but also a social justice and sustainable development priority. Both are present on the goals to be achieved under SDG 3 and 11. Medicines price regulation plays an important role in promoting equitable access to healthcare while maintaining the financial sustainability of health systems. Governments use various regulatory mechanisms to balance the interests of patients, healthcare providers, pharmaceutical companies, and public budgets. These mechanisms include external and internal reference pricing, price negotiations, reimbursement policies, generic substitution, value-based pricing, and the promotion of competition using generic and biosimilar medicines. Effective regulation seeks to ensure that medicines remain affordable for patients while providing sufficient incentives for pharmaceutical innovation and investment (Barata et al, 2022). From the perspective of SDG 11, affordable medicines contribute to more inclusive and resilient communities. Urban populations depend on accessible healthcare infrastructure and reliable pharmaceutical supply chains to maintain public health and respond to emergencies. When medicines are unaffordable, preventable diseases may worsen, hospital admissions may increase, and productivity may decline, generating broader economic and social costs. Conversely, equitable pharmaceutical policies strengthen community resilience, reduce health disparities, and support the long-term sustainability of urban health systems. The COVID-19 pandemic further highlighted the importance of equitable access to medicines and medical technologies. It demonstrated that resilient healthcare systems require effective governance, international cooperation, transparent pricing mechanisms, and reliable supply chains. The pandemic also reinforced the need for policies that ensure essential medicines remain available and affordable during periods of increased demand and market disruption (Anjos, MR & Martins, M, H 2022). Nevertheless, medicines price regulation presents complex policy challenges. Excessively strict price controls may discourage pharmaceutical research and development or reduce the availability of innovative treatments in certain markets. On the other hand, insufficient regulation may allow excessive pricing that limits patient access and increases public healthcare expenditure. Consequently, policymakers must seek a balanced regulatory framework that promotes both affordability and continued pharmaceutical innovation. Achieving this balance requires evidence-based decision-making, transparency in pricing, international collaboration, and regular assessment of the effectiveness of regulatory measures. In conclusion, medicines price regulation is a key instrument for promoting sustainable access to healthcare and supporting the broader objectives of sustainable urban development. By improving the affordability of essential medicines, governments can reduce health inequalities, strengthen public health systems, and enhance the resilience of cities and communities. Although medicines price regulation is closely linked to SDG 3 on health, it also contributes to the achievement of SDG 11 by fostering inclusive, equitable, and sustainable urban environments in which all people can live healthy and productive lives. SDG11 supports an idea of social and economic progress (Anjos & Mimoso 2018).

### **2.3. Data analysis of the Portuguese situation in the EU context**

The Table below shows the Portuguese situation compared to the European average with regard to compliance with SDGs 3 (health and welfare) and 11 (sustainable cities).



*Figure 1: Portugal's positioning on SDG 3 (Good Health and Well-Being) and SDG 11 (Sustainable Cities and Communities) relative to the European Union average.  
(Source: <https://ec.europa.eu/eurostat/cache/visualisations/sdg-country-overview/>)*

### 3. REGULATING HEALTH MEDICINES PRICES: THE ‘PRICE CAP’ MECHANISM

In the pharmaceutical market, regulation serves as a mechanism that seeks to strike a balance between consumer protection and safeguarding the economic interests of the actors operating in this sector (Lachlan; O et al; 2025). In a perfectly competitive market, these two forces would tend to converge at a point of equilibrium without the need for external regulatory intervention. However, underlying these two positions are certain interests that appear to be conflicting: on the one hand, companies are driven by the desire to maximize their profits. On the other hand, consumers seek pharmaceutical products that are effective, reliable, and priced in line with their budgetary constraints as well as other social and economic factors. In this context, there is a need for regulatory intervention by public authorities to correct market failures in the pharmaceutical sector, namely information asymmetry and the high market power resulting from patent protection. It is a sector of activity that constitutes a service of general economic interest, which justifies the regulatory intervention of the State to guarantee conditions of accessibility to its citizens (Anjos, M.R; 2016). One of the most used tools in this regard is the price cap mechanism, which involves setting a maximum permitted price for the sale of certain medications. This mechanism seeks to limit excessive pricing practices by pharmaceutical companies, while ensuring greater access to essential treatments for the public.

However, its implementation requires a delicate balance between reducing costs for consumers and maintaining incentives for innovation and investment in research and development, which are fundamental to the sector's progress.

### **3.1. Analyse of the Portuguese legal framework**

Under the Portuguese regulatory framework, Article 103 of Decree-Law No. 176/2006 establishes the general legal framework for the pricing of medicines, referring the implementation of the respective regime to supplementary legislation. This regime is further elaborated in Decree-Law No. 97/2015, which establishes the National Health Technology Assessment System, thereby defining the mechanisms for determining, reviewing, and controlling the prices of medicines. In particular, article 8 enshrines the possibility of subjecting medicines to a maximum price (price ceiling), and it is up to the Board of Directors of INFARMED to set them, and it is also established that the definition of the retail price is a prerequisite and indispensable condition for the introduction of the medicine on the market. The maximum price regime for medicines is further supplemented by Administrative Order No. 195-C/2015, which sets out in greater detail the technical procedures for establishing, amending, and reviewing prices, including the definition of the markup margins applicable to the various stakeholders in the pharmaceutical supply chain. Structurally, the Portuguese drug pricing system is based on a three-part regulatory framework consisting of a maximum price regime, a notified price regime, and a free-market price regime. Prescription drugs are generally subject to the first two systems, while over-the-counter drugs that are not covered by health insurance are, in principle, subject to a free-market pricing system, although they are subject to general competitive restrictions. Finally, it is important to note that the maximum price is determined based on an external reference pricing mechanism, through which prices are compared with those in reference countries—currently including Spain, France, Italy, and Slovenia—and the average of those values is used as the criterion for setting the price. This model aims to ensure relative price convergence within the European Union, while simultaneously promoting the financial sustainability of the healthcare system and controlling public spending on medicines.

## **4. THE IMPACT OF PHARMACEUTICAL PRICES ON VULNERABLE POPULATIONS**

The price of medications is one of the main factors determining effective access to health care, and it is particularly important for the most vulnerable populations, namely low-income households, the elderly, and people with chronic conditions (Damdas, I. 2020). Despite the existence of universal health care systems in several European countries, a significant portion of health care spending continues to be borne directly by individuals through out-of-pocket payments, with medications playing a central role. According to the OECD, a significant portion of health care spending in European countries are from out-of-pocket payments by households, with medications accounting for about 40% of this spending in various contexts. This data shows that the financial burden associated with medications is not merely incidental in household budgets; on the contrary, it represents a very substantial portion of household spending (World Health Organization Europe Report, 2025). Lower-income households and individuals requiring long-term treatment are more likely to face financial difficulties and more likely to reduce or postpone their use of health care for economic reasons. In Portugal, PORDATA data on medication costs within the National Health Service highlight the shared nature of pharmaceutical expenditure financing, which is borne simultaneously by the government and by patients. There has been a significant increase in total spending over time, both on the public side and on the household side, which points to growing pressure on the health care system (Brekke, K., Königbauer; 2007).

This reality is particularly relevant in that it demonstrates that, despite the existence of a universal system, out-of-pocket payments continue to be a structural component of access to medicines, with a more pronounced impact on the most socio-economically vulnerable groups. Thus, the impact of spending on medications constitutes a significant constraint on household well-being and, consequently, an obstacle to the effective achievement of SDG 3 (health and well-being). Therefore, the attention of regulatory agencies and the Government is crucial to improving outcomes in this area and bridging the gap between Portugal and the EU average.

#### **4.1 A new model on public policy on access to medicines**

Despite the regulatory mechanisms currently in place, the pharmaceutical market continues to face two structural challenges that jeopardize the full realization of the right to health care: on the one hand, persistently high prices in certain market segments, particularly with regard to innovative medicines; on the other hand, ongoing inequalities in access to medicines, which affect socioeconomically vulnerable groups most severely. The proposal presented as result of this research is based on five structural measures, namely:

1. The first measure consists of replacing fixed price caps with a more flexible mechanism that sets the maximum price for each medication based on its actual therapeutic value and proven clinical efficacy.
2. The second measure focuses on promoting generic drugs by encouraging their prescription and creating conditions for effective market competition.
3. The third measure provides for the establishment of a maximum annual spending limit on medicines per household, with co-payments that are progressive based on income and full exemption for the most vulnerable groups, such as low-income seniors and patients with chronic conditions.
4. The fourth measure concerns strengthening the government's negotiating power in public procurement of medicines.
5. Introduction of contracts with the pharmaceutical industry that tie payment to the clinical outcomes achieved.

Implementing this model requires that regulatory agencies, notably INFARMED, I.P., have adequate technical resources to monitor the market and base their decisions on solid evidence. Data analysis tools can be useful in this process, provided that final decisions continue to be made by the government, with full transparency and public accountability.

The goal is to ensure that access to essential medicines no longer depends on each citizen's economic means, thereby establishing it as an effective right rather than merely a formal one. Only then will we be able to say that SDG 3 will be achieved.

#### **5. CONCLUSION**

The analysis presented in this article demonstrates that access to medicines is not a peripheral issue in the context of urban sustainability, but rather a structural dimension of what it means for a city to be genuinely inclusive and socially cohesive. When citizens are unable to afford essential medicines, the right to health protection enshrined in Article 64 of the Constitution of the Portuguese Republic is reduced to a merely formal guarantee, incompatible with the substantive vision of sustainability that underlies SDGs 3 and 11. Urban populations are also more severely affected by the enormous cost of health care, given the urban living conditions that impact the most vulnerable. It is therefore argued that a truly sustainable city requires a reorientation of public pharmaceutical policy toward a model that combines dynamic price regulation based on therapeutic value, structural support for generic drugs, and social protection mechanisms targeted at the most vulnerable groups.

The proposal put forward as a result of this research, based on five structural measures as set out in point 4 of this document, would promote a solution with a very positive impact on prices, which justifies the necessary regulatory intervention in the context of good governance, with a view to achieving the SDGs defined by the United Nations. Above all, the concept of a sustainable city presupposes a developed society that is aware of its needs, and in which access to healthcare and medicines, as essential goods, is guaranteed on the basis of universality, accessibility and equity. The proposed new model would help make the market fairer and more consistent with the SDGs set by the United Nations, with particular emphasis on SDGs 3 and 11.

## LITERATURE:

1. Anjos, M. R. (2016) *Serviços de Interesse Económico Geral, Concorrência e Garantias dos Cidadãos Usuários – Um estudo à luz do Direito Comunitário*. Ed. ISMAI. – ISBN: 978-972-9048-91-3. PT
2. Anjos, M. R. & Mimoso, M. J (2018) *Por uma «Cláusula de Progresso» nos contratos de Investimento estrangeiro*. III SINDA – IBEROJUR & FDCP – ULP. Ed. Lusófonas. Lisboa
3. Anjos, M. R. & Martins, M. H (2022) COVID-19, POLICE STOPS MEASURES AND VACCINATION, THE IMPERATIVE OF PROPORTIONALITY BETWEEN HUMAN RIGHTS. In ESD Porto 2022- Economic and Social Development: Book of Proceedings; Varazdin. Croatia.
4. Brekke, K., Königbauer, I. and Straume, O.R. (2007). *Reference pricing of pharmaceuticals*. *Journal of Health Economics*, 26(3), pp. 613–642.
5. Barata, M., Costa, E.M., Costa, N.M. and Louro, A. (s.d.).(2022) *Geografias do acesso dos idosos aos cuidados de saúde primários na Área Metropolitana de Lisboa, Portugal – um território de diferenças*. Lisboa: Universidade de Lisboa, Instituto de Geografia e Ordenamento do Território, Centro de Estudos Geográficos.
6. Damdas, I. (2020). *An overview of the pharmaceutical market: Structure, behavior, returns, and government intervention*. Retrieved 20.06.2026 from <https://dspace.lib.uom.gr/bitstream/2159/24380/1/DamdasioannisPe2020.pdf>.
7. Decreto-Lei n.º 176/2006, de 30 de Agosto. *Estatuto do Medicamento*. Diário da República, 1.ª Série, n.º 167.
8. Decreto-Lei n.º 97/2015, de 1 de junho. *Sistema Nacional de Avaliação de Tecnologias de Saúde (SiNATS)*. Diário da República, 1.ª Série, n.º 106.
9. Eurostat (2025). *SDG Country Overview — Portugal*. Retrieved 20.06.2026 from <https://ec.europa.eu/eurostat/cache/visualisations/sdg-country-overview/>
10. Ferreira da Silva, D. (2025). *Entre a eficiência do mercado e a regulação do Estado: Crítica à abordagem teórico-metodológica da Escola de Chicago*. *Eleutheria – Revista do Mestrado Profissional em Filosofia da UFMS*, 9(16), pp. 103–122. <https://doi.org/10.55028/eleu.v9i16.22500>
11. Jones, A. (2024). *The effect of drug pricing policies on healthcare equity and affordability*. *Journal of Basic and Clinical Pharmacology*, 15(6). Retrieved 20.06.2026 from <https://www.jbclinpharm.org/articles/the-effect-of-drug-pricing-policies-on-healthcare-equity-and-affordability-13081.html>
12. Lachlan, O; Jonhatan Penm; Ardalan Mirzaei and Rebekah Moles 2025. *Prices, availability, and affordability of adult medicines in 54 low-income and middle-income countries*. Vol.13. Issue 1. in *The Lancet Global Health*. Retrieved 20.06.2026 from [https://www.thelancet.com/journals/langlo/article/PIIS2214-109X\(24\)00442-X/fulltext](https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(24)00442-X/fulltext)
13. Németh, B. et al. (2022). *Access to high-priced medicines in lower-income countries in the WHO European Region*. Retrieved 20.06.2026 from <https://www.ncbi.nlm.nih.gov/books/NBK587819>

14. Portaria n.º 195-C/2015, de 1 de julho. *Diário da República*, 1.ª Série, n.º 126.
15. PORDATA (2025). *SNS: encargos com medicamentos — Continente*. Retrieved 20.06.2026 from <https://www.pordata.pt/portugal/sns+encargos+com+medicamentos+++continente-327-3607>
16. Ribeiro, A.I., Gullón, P. and Murray, E.T. (s.d.). *Neighbourhood influences on population health: Time to unpack the black box*. Retrieved 20.06.2026 from <https://doi.org/10.3389/fpubh.2022.890593>
17. Teixeira, I. and Gouveia Pinto, C. (2002). *Pricing and reimbursement of pharmaceuticals in Portugal*. *European Journal of Health Economics*, 3, pp. 267–270. Retrieved 20.06.2026 from <https://link.springer.com/article/10.1007/s10198-002-0146-1>
18. World Health Organization Europe (2025). *Can people afford to pay for health care? New evidence on financial protection in Portugal*. Retrieved 20.06.2026 from <https://www.who.int/europe/news/item/04-12-2025-new-evidence-from-who-europe-identifies-policy-options-to-make-health-care-more-affordable-in-portugal>

# THE IMPACT OF TECHNOLOGIES ON CONSTITUTIONAL HUMAN RIGHTS – THE SERBIAN CASE

**Aleksandar S. Djordjevic**

*Institute of Comparative Law, Belgrade, Republic of Serbia*

*Terazije 41., 11102 Belgrade, Serbia*

*aleksandar.djordjevic@advokatdjordjevic.com*

## **ABSTRACT**

*Digitalization has shifted to the core centre in everyday life, thus transforming the conditions of exercising human rights, guaranteed by constitution of a country. This research paper focuses on analyzing that impact in the case of Republic of Serbia, where appropriate foundations for digitalization exist for quite some time. This research is focusing on ambivalency of technology, same tools and applications are both democratizing access for the public, and also create capacity for total surveillance, profiling, manipulation. Our analysis identifies three specific dimensions – privacy of data and personalities, freedom of public speech in digital space, right for a fair legal process in the age of AI supported decision making. Research has been conducted through a survey including 146 respondents, that were selected from universities, IT professionals, who rated perceived technological risks versus eight constitutional rights. Findings suggest that right to privacy and protection of personal data were perceived as the most exposed, followed by individual dignity and protection from monitoring. Research analysis has also revealed lack of awareness for existing tools for data protection. Future work can expand on this research by including effective tools for implementation of safeguards, rather than having expectations on the text of constitutional rights alone.*

**Keywords:** *constitutional rights, digitalization, individual privacy, data protection*

## **1. INTRODUCTION**

For a long time in history, constitutional human rights were the only guarantee against the government power, and also through commitment that all interference by others shall be protected at all cost. Right for every human being were drafted in each country with a set of predefined threats in mind – censorship of speech, interception of calls and letters, arbitrary arrests, discrimination of any kind. The digital revolution is going on for two decades, and these threats have not vanished, but on the other side, new threats multiplied several times and transformed in new ways, where the constitution has remained the same. The definition of technology in digital space predicts ambivalence, at least from constitutional point of view. Digital communications have extensively changed access to information, lowered the cost of public expression, therefore created new space for associating and assembling. Meanwhile, infrastructure for these benefits is creating new flows of personal data that can be processed, and analyzed for the purpose of commercial goals. The scale at which all of this is happening is unimaginable, allowing opinions to be influenced through some targeted means, exposing individuals to automated systems. One constitutional value can endanger another, and it is also to endanger something else at the same time (Djordjević, 2022). This paper will focus on the ambivalence occurring when protecting human rights in the case of Serbia. Catalogue of all rights protected by the constitution are modern, legislative framework is up to date regarding protection of personal data, but the practical environment is shaped by digitalization happening very swiftly, private data collection is enormous, and digital rights are still evolving. Section 2 of this paper continues through conceptual framework by examining three clusters of tension between technology and constitutional rights.

Section 3 describes the methodology of an exploratory pilot survey. Section 4 presents and discusses the empirical findings, and Section 5 concludes.

## **2. HUMAN RIGHTS PROTECTION IN A TECHNOLOGY WORLD**

Since human rights Acts in nations across the world guarantee a wide range of support that is directly implicated by digitalization nowadays, including human dignity, personal data protection and protecting confidentiality of conversations, freedom of speech and opinion.

The analysis below clusters the most evident tensions into groups.

### **2.1. Privacy, personal data and monitoring**

Processes connected to protecting personal data opened up a significant gap between promise given by the constitution, and the reality deepened by technology development. The legal authorities guarantee protection of individuals and their data, therefore collection, storage, processing and usage of personal data is strictly regulated by law and it is due to judicial protection (Djordjević & Jevtić, 2025; Djordjević, Dedjanski., & Jevtić, 2024). Detailed framework on this topic guarantee the principles of lawfulness, impose limits, minimize the need for data, and define accountability, together with access rights, and erasure in case of condition breach. While these frameworks exist, technology is moving very fast so the principles are under constant attack. All of the mobile devices, applications, systems and online services (quite often provisioned in a cloud environment) generate detailed logs about customer activity, behavior and communications. The deployment of video monitoring and biometric and fingerprint recognition, raises constitutional concerns, because such systems can destroy anonymity and underpin other freedoms. It is not even a question any longer, whether the state authorities can intercept some communication, but only if the data and AI architecture are even compatible with protection of individual rights within private life.

### **2.2. Freedom of speech in the digital first world**

Since ambivalence of technology is clearly present nowadays, it is important to learn that digital platforms are giving citizens the illusion of the capacity to have a channel to communicate everything openly, and also to access diverse sources of truth. This strengthens the feeling of participation, inclusion and the right to be informed and to learn from onsite reports. Meanwhile, the platform itself is concentrating enormous power over what is seen and heard in private hands, and governance of the whole process is under heavy questioning of constitutional level standards. Through AI algorithms, a lot of information is determining visibility, processing different information that could not be put into actionable flows before, and it affects conditions where the public judges some events, and where free speech can be shut down in a second, if the state decides to censor. Additionally, integrity of the democratic process is also under question. Micropersonalized political messages and misinformation with a political agenda can produce public distorted view, and through high level technology, manipulations are possible on a much higher scale and success rate. Phenomena of free elections is under heavy threat here, since technology can be effectively used to jeopardize democratic process and to effect in legitimate elections, in a manipulated ecosystem of information and a distorted public truth.

## **3. RESEARCH METHODOLOGY**

This study includes an exploratory analysis, designed in a format to explain how different groups of people perceive technology risks imposed against human rights, in the case of Serbia. The goal was to define comparable measures of risk, across human rights in a quantitative way, avoiding national estimations.

Research questionnaire has been defined and shared electronically over a period of one month, where 146 people have responded to the survey. The sample included three groups – members from the general public, students of law, IT professionals. Through survey questions we asked respondents to rate with a five-point scale (1 = negligible risk, 5 = severe risk), the level of technological risk to each of human rights protected by the Serbian Constitution. Also, this research quantified the level of awareness of the Law on Personal Data protection. Since all of the respondents ranked each constitutional rights dimension on a five point scale, the responses created a repeated measures design, not adjusted to benchmarking against all mean values. The analysis has been depending on non parametric Friedman test, assessing perception of risk level that is changing through eight measures (constitutional rights). Respondents agreed on the resulting order using Kendall coefficient of concordance, and afterwards it was paired with Wilcoxon signed rank test with Bonferroni correction. All mean values were reported with its 95% confidence interval, so the presented values are not values alone, but those measures present explicit measures of estimating uncertainty. The research design was limited to pilot environment, but the conclusions were not meant to be representative, the main purpose was to express the perception for the first time, of people with higher than average familiarity with the topic. Also, it is important to have in mind that our instrument measured perceptions rather than objectively measured harm of any kind. So, these constraints are acceptable given the study's nature and overall cause.

## 4. RESULTS AND DISCUSSION

### 4.1. Research sample description

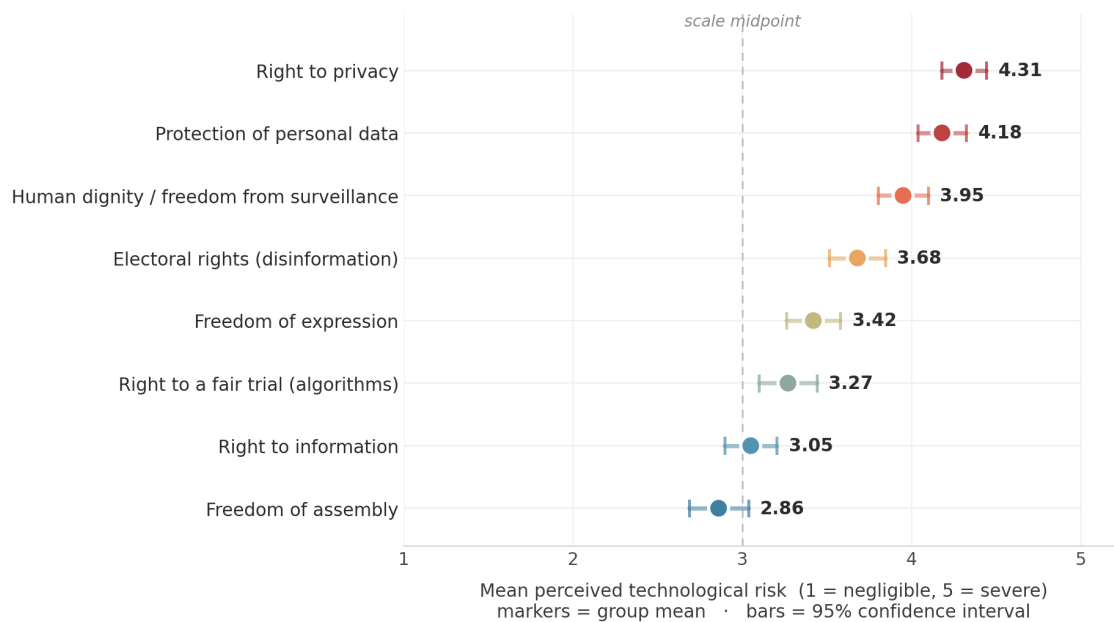
The sample was distributed in three groups of respondents, so it is important to note that general public was the largest share, law students was the second group and IT professionals was the third group. This structure of the sample allowed a basic comparison through different specializations, and kept the instrument short and usable.

| Respondent group | Respondents (n) | Share (%) |
|------------------|-----------------|-----------|
| General public   | 70              | 48.6      |
| Law students     | 45              | 30.1      |
| IT professionals | 31              | 21.2      |
| Total            | 146             | 100.0     |

*Table 1: Sample structure*  
(Source: authors' survey, 2026)

### 4.2. Perception of respondents - findings

Key finding is displayed in Figure 1, where respondents have ranked technological risk and its impact on constitutional rights guaranteed in Republic of Serbia, since 2006. It is important to notice that the right to privacy and protection of personal data is essential and human dignity is the third in line, measured through freedom from being monitored all the time.



*Figure 1: Mean perceived technological risk to constitutional rights (n = 146)*  
(Source: authors' pilot survey, 2026)

The Friedman test has been executed and it was discovered that perception of risk across eight constitutional rights was statistically significant ( $\chi^2(7, N = 146) = 316.8, p < .001$ ).

Additionally, there was also discovered a moderate level of agreement also through pairwise post hoc comparisons, where significance level for the right to privacy and protection of personal data was higher than every other human rights dimension measured in the analysis, with non overlapping intervals (95% confidence). Figure 1 confirms the leading clusters are separated from other dimensions. Constitutional rights that were perceived as highest at risk are exactly those rights that are highly influenced by data generating aspect of digitalization. Everything else regarding freedom and tools for informing and assembling is perceived as ambivalent, because of the technology that both enables and endangers them.

#### 4.3. Perception of framework for data protection

Since data protection emerged as the highest perceived risk, research study analyzed awareness of the legal framework that has a mission to mitigate that risk. In table 2 is displayed what level of awareness of the law on personal data protection is present across respondents. Large portion of respondents shared that they are fully aware of the law and their own rights, but a significant portion indicated that they are partially or not aware at all, and that is a big risk for practicality of the law.

| Level of awareness of the Law on Personal Data Protection | Respondents (n) | Share (%) |
|-----------------------------------------------------------|-----------------|-----------|
| Fully aware of the law and of own rights                  | 85              | 58.2      |
| Partially / vaguely aware                                 | 39              | 26.7      |
| Not aware                                                 | 22              | 15.1      |
| Total                                                     | 146             | 100.0     |

*Table 2: Perception of the legal framework for data protection*  
(Source: authors' survey, 2026)

#### 4.4. Discussion

Several implications were determined, the first one suggests the argument that constitutional protection of rights in a technological environment depends less on guarantees and highly on design and enforcing those rights in practical life. When we combine highly perceived risk with partial or inexistent awareness about the legal framework for protection, creates a gap that should be further explored and analyzed. Next, freedom of expression public opinion confirmed its ambivalency, so this should be something to expand on in future research. Its directly exposing public speakers to manipulation and enables concentration of private control. Perception of algorithmic decision making is lower than data privacy control, this is in practical life unfamiliar to the public. Emerging awareness about fair trials and treatment of people is at pressure since equal treatment is under jeopardy of automation, reactive standards for transparency and human review.

#### 5. CONCLUSION

This research study has clearly focused the impact of technology on practice of constitutional rights, while awareness of data protection law has been analyzed through a special lens (Djordjević, Jevtić, & Dedjanski, 2024). Conceptual analysis discovered three clusters of tension, and all of this has been seen through a pilot survey with 146 respondents. Survey results confirmed that data generating logic was perceived as the most at risk. The most important practical message of the study is that the Serbian Constitution's modern catalogue of rights and the country's European-style data-protection law provide a sound formal foundation, but that the real level of protection depends on implementation, oversight and public awareness, the last of which the survey found to be incomplete. Future research involves more dimension and a practical measurement of objective data through a larger research instrument.

#### LITERATURE:

1. Acquisti, A., Brandimarte, L., & Loewenstein, G. (2015). Privacy and human behavior in the age of information. *Science*, 347(6221), 509–514.
2. Bignami, F. (2007). Privacy and law enforcement in the European Union: The data retention directive. *Chicago Journal of International Law*, 8(1), 233–255.
3. Brayne, S. (2020). *Predict and surveil: Data, discretion, and the future of policing*. Oxford University Press.
4. Bygrave, L. A. (2014). *Data privacy law: An international perspective*. Oxford University Press.
5. Cobbe, J., & Singh, J. (2021). Artificial intelligence as a service: Legal responsibilities, liabilities, and policy challenges. *Computer Law & Security Review*, 41, 105573.
6. Diakopoulos, N. (2016). Accountability in algorithmic decision making. *Communications of the ACM*, 59(2), 56–62.
7. Djordjević, A. (2022). Odnos Ustavnog suda i redovnih sudova u Republici Srbiji u oblasti zaštite prava na slobodu i bezbednost, Doktorska disertacija, Pravni fakultet Univerziteta u Beogradu, (Available on: <http://m.eteze.bg.ac.rs/application/showtheses?thesesId=8855>).
8. Djordjević, A., & Jevtić, B. (2025). Shaping A Digital Future That Safeguards Human Rights – Generational Perspectives From Serbia, *Pravo - teorija i praksa*: 42 ( 1), 19-37. <https://doi.org/10.5937/ptp2501019D>. (available on: <https://casopis.pravni-fakultet.edu.rs/index.php/ltip/issue/view/91/20>).

9. Djordjević, A., Jevtić, B., Dedjanski, S. (2024). Interactions Between Regulations, Law, New Technologies, And Organizational Policies In Financial Fraud Detection—A Case Study of Serbia, *Pravo-teorija i praksa*, ISSN: 0352-3713; 41(4), 48–68, <https://doi.org/10.5937/ptp2404048D>. (Available on: <https://casopis.pravni-fakultet.edu.rs/index.php/ltp/article/view/845/726>).
10. Djordjević, A., Dedjanski, S., & Jevtić, B. (2024). Challenges of human rights protection and security in the age of artificial intelligence, *Limes-plus* 20(2-3), 149-170, HESPERIAedu. <https://doi.org/10.69899/limes-plus-en-24212-3149d>. (Available on: Archives | Limes-plus; Vol. 20 No. 2-3 (2024): EXPANSION OF ARTIFICIAL INTELLIGENCE | Limes-plus; <https://limes-plus.com/index.php/lp/article/view/136/82>).
11. Edwards, L. (2022). *Law, policy and the internet*. Hart Publishing.
12. European Union Agency for Fundamental Rights. (2022). *Facial recognition technology: Fundamental rights considerations in the context of law enforcement*. Publications Office of the European Union.
13. Floridi, L. (2014). *The fourth revolution: How the infosphere is reshaping human reality*. Oxford University Press.
14. Gerards, J., & Xenidis, R. (2021). *Algorithmic discrimination in Europe: Challenges and opportunities for gender equality and non-discrimination law*. European Commission.
15. Helberger, N., Diakopoulos, N., & Karppinen, K. (2022). *Governing AI in media: Policy frameworks and democratic challenges*. Reuters Institute for the Study of Journalism.
16. Kazim, E., & Koshiyama, A. (2021). A high-level overview of AI ethics. *Patterns*, 2(9), 100314.
17. Lyon, D. (2015). *Surveillance after Snowden*. Polity Press.
18. Mittelstadt, B. D., Allo, P., Taddeo, M., Wachter, S., & Floridi, L. (2016). The ethics of algorithms: Mapping the debate. *Big Data & Society*, 3(2), 1–21.
19. Nissenbaum, H. (2010). *Privacy in context: Technology, policy, and the integrity of social life*. Stanford University Press.
20. Raso, F. A., Hilligoss, H., Krishnamurthy, V., Bavitz, C., & Kim, L. (2018). *Artificial intelligence and human rights: Opportunities and risks*. Berkman Klein Center for Internet & Society.
21. Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data. (2016). *Official Journal of the European Union*, L 119, 1–88.
22. Taddeo, M., & Floridi, L. (2016). The debate on the moral responsibilities of online service providers. *Science and Engineering Ethics*, 22(6), 1575–1603.
23. Wachter, S., Mittelstadt, B., & Russell, C. (2021). Why fairness cannot be automated: Bridging the gap between EU non-discrimination law and AI. *Computer Law & Security Review*, 41, 105567.
24. Yeung, K. (2020). Algorithmic regulation: A critical interrogation. *Regulation & Governance*, 14(4), 505–523.

# PUBLIC EXPENDITURES AS INDICATORS OF NATIONAL PRIORITIES: THE CASE OF CROATIA

**Lorena Vokic Kvesic**

*Libertas International University, Zagreb  
lvokic@libertas.hr*

**Gabrijela Smoljanovic**

*Libertas International University, Zagreb  
gsmoljanovic@student.libertas.hr*

## **ABSTRACT**

*This paper explores the role of public expenditures as key instruments of economic policy and indicators of national priorities in the Republic of Croatia. By analyzing the structure and dynamics of Croatia's public spending between 2021 and 2024, the study examines how fiscal decisions reflect strategic, social, and developmental objectives during a period marked by global and domestic crises. Using official data from the Ministry of Finance and applying functional (COFOG) and economic classifications, the research identifies main budgetary priorities, such as social protection, healthcare, economic affairs, and public administration. The findings reveal that Social Protection consistently dominates Croatia's budget, accounting for over one-third of total expenditures. This structure indicates the government's commitment to maintaining social stability and economic resilience amid challenges like the COVID-19 pandemic, inflationary pressures, and post-earthquake recovery. However, the limited share of capital and developmental spending highlights persistent constraints on long-term growth and innovation. The paper concludes by discussing how Croatia's fiscal strategy balances immediate social needs with the pursuit of sustainable development, emphasizing the need for transparent and strategic public spending as a foundation for strengthening economic resilience and promoting sustainable national development.*

**Keywords:** *Public expenditures, Fiscal policy, National priorities, Economic resilience, Sustainable development*

## **1. INTRODUCTION**

Public expenditures are a central instrument through which governments pursue strategic, social, and developmental objectives. In Croatia, fiscal policy reflects both domestic challenges and international obligations, particularly within the European Union and OECD frameworks. According to the OECD Economic Survey (2023), Croatia combines expansionary social spending with fiscal discipline under the EU's Stability and Growth Pact. Between 2021 and 2024, Croatia faced multiple overlapping crises—including the COVID-19 pandemic, inflation, energy volatility, geopolitical instability, and post-earthquake reconstruction—which placed extraordinary demands on the state budget. Public expenditures became a key tool for maintaining social cohesion, supporting economic resilience, and advancing reforms. This paper analyzes the evolution of Croatia's public spending from 2021 to the first half of 2025, focusing on aggregate expenditure levels and their functional distribution. The study assesses alignment with national goals, particularly those outlined in the National Development Strategy 2030 and EU fiscal frameworks. The analysis is structured in two chapters: the first examines expenditure growth and composition, while the second explores functional classification and sectoral priorities. Methodologically, the study uses official budget execution data (2021–2025), COFOG classification, and macroeconomic indicators from national institutions. International benchmarks and OECD TaxBEN profiles are referenced where relevant.

## 2. QUANTITATIVE OVERVIEW OF PUBLIC EXPENDITURES IN CROATIA (2021–2025)

Public expenditures represent the operational expression of a government's strategic intent. Their level, structure, and dynamics reflect not only economic conditions but also political choices and societal priorities. In the case of Croatia, the period from 2021 to 2025 was marked by intensified fiscal activity, shaped by both external shocks and internal reforms. To understand how these expenditures evolved and what they reveal about national priorities, it is first necessary to examine the macroeconomic and fiscal context in which they were formulated and executed.

### 2.1. Macroeconomic Context and Budgetary Expansion

Between 2021 and 2025, Croatia's public expenditures expanded significantly in response to overlapping crises, structural reforms, and strategic fiscal objectives. Crucially, the COVID-19 pandemic, inflationary pressures, energy market disruptions, and post-earthquake reconstruction all shaped the expenditure trajectory. Croatia's accession to the euro area in 2023 and the implementation of the National Recovery and Resilience Plan (NRRP) under the EU's Recovery and Resilience Facility (RRF) introduced new fiscal instruments and external funding sources.

Real GDP growth remained positive, ranging from 3.1% in 2023 to 3.9% in 2024, before settling at 3.2% in the first half of 2025. Inflation moderated from 10.8% in 2022 to 3.0% in 2024, only to slightly increase to 3.5% in H1 2025. These macroeconomic conditions shaped both the revenue base and the expenditure needs of the state. Comparative data from Government at a Glance 2025 show that Croatia's general government spending remains above the OECD average, reflecting the nation's relatively large public commitments compared to peers (OECD, 2025a). The European Commission's country assessments also highlight that EU Recovery & Resilience funds and the transition to the euro area influenced the fiscal instruments available to the government in 2023–2025 (European Commission, 2024a).

### 2.2. Growth and Composition of Total Expenditures

Croatia's total state budget expenditures increased from €22.4 billion in 2021 to €32.7 billion in 2024, with a projected €37.0 billion for 2025. Furthermore, in the first half of 2025, €16.9 billion was executed, representing 45.7% of the annual plan. Taken together, this trajectory confirms a sustained fiscal expansion, driven by wage reforms, pension indexation, social transfers, and EU-funded investments.

| Year             | Total Expenditures (€) | Operating Expenditures (€) | Capital Expenditures (€) | Total Growth (%) | Operating Growth (%) | Capital Growth (%) |
|------------------|------------------------|----------------------------|--------------------------|------------------|----------------------|--------------------|
| 2021             | 22,434,189,710         | 21,447,655,581             | 986,534,128              | —                | —                    | —                  |
| 2022             | 23,233,740,263         | 22,163,372,862             | 1,070,367,401            | +3.6             | +3.3                 | +8.5               |
| 2023             | 28,095,373,152         | 26,579,295,470             | 1,516,077,682            | +20.9            | +19.9                | +41.6              |
| 2024             | 32,720,157,843         | 31,122,056,868             | 1,598,100,975            | +16.4            | +17.1                | +5.4               |
| <b>2025 (H1)</b> | <b>16,900,000,000</b>  | <b>16,300,000,000</b>      | <b>628,000,000</b>       | <b>+11.8</b>     | <b>+12.4</b>         | <b>+12.0</b>       |

*Table 1: Croatia – Total, Operating and Capital Expenditures (2021–2025))*  
*(Source: Ministarstvo financija (2025.) <https://mfin.gov.hr/proracun-86/86>)*

The most significant nominal increase occurred in 2023, driven by the full implementation of the Public Sector Wage Reform Act and the integration of 22 regional hospitals into the central budget. In 2024, expenditures continued to grow, albeit at a slightly slower pace, reflecting the ongoing costs of social transfers, energy-related measures, and capital investments. Looking ahead to H1 2025, expenditure dynamics remained expansionary, reflecting the continuous adjustments in wage policy, social protection, and EU-funded project execution.

### 2.3. Economic Classification of Expenditure

Throughout the period, the structure of expenditures remained heavily weighted toward current (operating) expenditures, which consistently accounted for over 94% of the total. Conversely, capital expenditures, although increasing in absolute terms, remained below 6% of total spending, thereby indicating limited fiscal space for long-term investment. This predominance of current spending is a common post-crisis phenomenon noted in World Bank and EU reviews of Croatia's public finances. Specifically, these assessments warn that high recurrent spending reduces room for public investment unless offset by revenue measures or improved spending efficiency (World Bank, 2021; European Commission, 2025b).

| Category                            | 2021 | 2022 | 2023 | 2024 | 2025 (H1)   |
|-------------------------------------|------|------|------|------|-------------|
| Employee compensation               | 21.8 | 22.4 | 22.8 | 23.4 | <b>24.3</b> |
| Social benefits (pensions, welfare) | 33.1 | 33.6 | 34.1 | 34.7 | <b>34.3</b> |
| Material expenditures               | 9.7  | 9.5  | 9.3  | 9.1  | <b>9.5</b>  |
| Interest payments                   | 5.0  | 4.8  | 4.7  | 4.6  | <b>4.8</b>  |
| Subsidies                           | 6.7  | 5.8  | 5.3  | 4.9  | <b>4.2</b>  |
| Grants and transfers                | 16.2 | 16.7 | 17.1 | 18.3 | <b>20.7</b> |
| Capital expenditures                | 7.5  | 7.2  | 6.7  | 5.0  | <b>3.6</b>  |

*Table 2: Structure of Budget Expenditures, 2021–2025 (share in total, %)*  
(Source: Ministarstvo financija (2025.) <https://mfin.gov.hr/proracun-86/86>)

Specifically, employee compensation and social benefits together accounted for over 58% of total expenditures in H1 2025, underscoring Croatia's welfare-oriented fiscal model. Conversely, the declining share of capital expenditures illustrates the growing dominance of current spending and the resulting reduced fiscal flexibility.

### 2.4 Strategic Drivers and Policy Orientation

The expansion of public spending was shaped by several strategic drivers:

- Wage reform and hospital integration: €4.1 billion spent on employee compensation in H1 2025 (+13.7% YoY)
- Pension indexation and demographic pressures: €4.3 billion in H1 2025 (+11.1%)
- Inclusive social benefits: €336.7 million increase in H1 2025
- Energy and inflation mitigation: €318.8 million in H1 2025
- Post-earthquake reconstruction: €412.5 million in H1 2025
- EU-funded projects: €1.3 billion executed from EU sources, plus €213.7 million from NRRP loans

These allocations reflect the three core functions of public finance—allocation, distribution, and stabilization—as defined in the theoretical framework. They also confirm the predominance of transfer and consumption-based expenditures over investment-oriented spending, raising questions about long-term fiscal sustainability.

The mid-year deficit of €1.9 billion ( $\approx 2.1\%$  of GDP) in H1 2025 further highlights the need for careful balancing between revenue generation and expenditure commitments, especially in the context of rising pension and wage obligations. While economic classification provides insight into the nature and structure of expenditures, it is the functional classification—based on the COFOG framework—that most clearly reveals the policy intent and national priorities of the government. By analyzing how resources are distributed across functions such as social protection, health, education, and economic affairs, we gain a direct view into the strategic choices and political commitments embedded in the budget. Functional classification thus serves as the most transparent and policy-relevant lens for understanding how public expenditures reflect the values, goals, and priorities of the Republic of Croatia. In the following chapter, we examine the functional distribution of expenditures from 2021 to 2025, identifying dominant sectors, shifts in allocation, and their alignment with declared national strategies. The OECD Economic Outlook 2025 projects Croatia’s general government deficit at 2.4% of GDP in 2024, remaining slightly expansionary in 2025 (OECD, 2025b). While this level is compliant with EU fiscal rules, the continued predominance of current spending underscores the importance of expenditure reviews and efficiency reforms, as also recommended in the European Semester Spring Package 2025 (European Commission, 2025b).

### **3. FUNCTIONAL CLASSIFICATION OF PUBLIC EXPENDITURES: SECTORAL PRIORITIES AND STRATEGIC ALIGNMENT (2021–2025)**

Having examined the level, structure, and economic composition of Croatia’s public expenditures, the next step is to analyze how these resources are distributed across government functions. The functional classification, based on the COFOG methodology, enables a policy-oriented interpretation of fiscal decisions by identifying which sectors—such as social protection, health, education, and economic affairs—receive the greatest priority in budgetary allocations.

This classification does not merely describe spending; rather, it reveals the strategic intent behind it. By observing the functional distribution of expenditures, we gain insight into the political commitments, societal values, and developmental goals that shape Croatia’s fiscal landscape.

#### **3.1. Introduction: From Structure to Purpose**

While economic classification reveals the nature of expenditures—whether they are current or capital, productive or redistributive—it is the functional classification that most clearly reflects the strategic intent of fiscal policy. By analyzing how public funds are allocated across key government functions, such as social protection, health, education, and economic affairs, we gain insight into the political priorities and societal values embedded in the budget.

Functional classification, based on the COFOG (Classification of the Functions of Government) framework, enables a policy-oriented interpretation of budgetary decisions. Crucially, it answers the question: not just how much is spent, but on what and why.

#### **3.2. Sectoral Distribution of Expenditures**

The following table presents the share of total expenditures allocated to major government functions between 2021 and the first half of 2025

| Function                | 2021 | 2022 | 2023 | 2024 | 2025 (H1)   |
|-------------------------|------|------|------|------|-------------|
| Social protection       | 34.6 | 35.2 | 35.5 | 35.7 | <b>35.9</b> |
| General public services | 16.0 | 16.5 | 17.0 | 17.2 | <b>17.4</b> |
| Economic affairs        | 13.5 | 13.2 | 13.1 | 13.0 | <b>13.2</b> |
| Health                  | 10.7 | 10.8 | 10.9 | 10.9 | <b>11.0</b> |
| Education               | 9.1  | 9.3  | 9.2  | 9.3  | <b>9.4</b>  |
| Public order & safety   | 6.7  | 6.8  | 6.8  | 6.8  | <b>6.8</b>  |
| Defense                 | 4.2  | 4.3  | 4.4  | 4.5  | <b>4.5</b>  |
| Others                  | 5.2  | 3.9  | 3.1  | 2.6  | <b>1.8</b>  |

*Table 3: Structure of Budget Expenditures, 2021–2025 (share in total, %)*  
*(Source: Ministarstvo financija (2025.) <https://mfin.gov.hr/proracun-86/86>)*

The data confirm that Social Protection consistently accounts for more than one-third of total public expenditures, confirming the redistributive nature of Croatia’s fiscal policy. This function encompasses pensions, social assistance, inclusive allowances, and other forms of income transfers. The dominance of social protection (approximately 36% of total expenditure) should be interpreted alongside Croatia’s tax-benefit structure. EUROMOD simulations indicate that family and pension benefits, together with the payroll contribution system, produce significant redistribution but also create trade-offs for labour incentives (Urban & Bezeredi, 2025).

Moreover, the OECD TaxBEN profile highlights that the tax wedge on labour and the composition of social benefits have a measurable impact on disposable income and employment incentives — signaling that high social-protection spending is not only redistributive but also interacts with labour market outcomes (OECD, 2024). According to the theory of the distribution function of public finance, such a structure reflects the state’s effort to mitigate social inequalities and ensure demographic stability. However, a high level of transfer spending may constrain fiscal space for development-oriented investments if not accompanied by structural reforms.

General Public Services have shown a gradual increase, encompassing administrative costs, public debt servicing, and contributions to the EU budget. This trend indicates growing institutional obligations and international fiscal responsibilities, particularly following Croatia’s accession to the euro area in 2023.

Economic Affairs have maintained a stable share, though with internal shifts. The reduction in energy subsidies in 2025 signals market stabilization and a transition from emergency measures to targeted support. Within the allocative function of public finance, this category also includes investments in transport, agriculture, and regional development.

Healthcare expenditures have recorded a modest increase, driven by hospital system reforms and rising costs of pharmaceuticals and medical supplies. The integration of 22 county hospitals into the central budget in 2024 significantly impacted this function. Although allocations have increased, they remain below the EU average, indicating the need for further capacity strengthening. Education remains stable, with increased spending on school staff salaries, preschool development, and student nutrition programs.

Nevertheless, the 9.4% share in total expenditures in the first half of 2025 remains below the level required to meet the objectives of the National Development Strategy 2030, which emphasizes investment in human capital, digital skills, and lifelong learning. EUROMOD and OECD evidence provide complementary insights into these drivers. EUROMOD documents the scale and incidence of family and unemployment benefits, illustrating how changes in benefit rates can alter disposable incomes across household types (Urban & Bezeredi, 2025). OECD TaxBEN data further quantify the tax wedge and replacement rates relevant for wage and pension policy: for instance, OECD estimates indicate that the tax wedge on a single worker at average wages in Croatia has remained relatively high (OECD, 2024), reinforcing the need to consider labour-market effects when evaluating budgetary priorities.

Other functions—including environmental protection, culture, housing, and science—have declined sharply from 5.2% in 2021 to just 1.8% in the first half of 2025. This marginalization of developmental and innovation-related functions may have long-term negative effects on competitiveness and sustainability.

### **3.3. Strategic Alignment and Policy Implications**

The functional classification of expenditures provides a critical lens for evaluating the alignment of fiscal policy with Croatia’s long-term strategic goals. The National Development Strategy of the Republic of Croatia until 2030 (NDS 2030) outlines twelve strategic objectives across four development pillars: sustainable economy, resilient society, green and digital transition, and balanced regional development. While the strategy does not prescribe fixed budgetary amounts, its implementation implicitly demands a substantial increase in public spending across several key functions.

According to associated implementation frameworks—such as the National Recovery and Resilience Plan (NRRP) and the EU Multiannual Financial Framework (MFF)—Croatia is expected to mobilize over €30 billion in public and EU co-financed investments between 2021 and 2027. Specifically:

- The NRRP allocates €6.3 billion (2021–2026), including:
  - 20% for green transition (~€1.26 billion)
  - 20% for digital transformation (~€1.26 billion)
  - 15% for education and labor market (~€945 million)
  - 11% for healthcare (~€693 million)
- The MFF 2021–2027 provides access to over €24 billion in EU funds, targeting cohesion, competitiveness, and sustainability.

Despite these strategic commitments, current budget execution data reveal a significant gap between declared priorities and actual allocations:

- Education and health together account for only ~20% of total expenditures, falling below the EU average of 25–30%.
- Capital expenditures remain below 4% of total spending in 2025 H1.
- Innovation, environmental protection, and science are grouped under “Others,” which has fallen sharply to just 1.8% in 2025 H1.

This distribution suggests that while Croatia’s fiscal policy effectively supports social stability, it underfunds transformative sectors essential for long-term competitiveness and resilience.

To bridge this gap, Croatia must pursue functional rebalancing by:

- Increasing the share of education and health to at least 12–15% each.
- Raising capital expenditures to 8–10% of total spending.
- Establishing dedicated budgetary programs for innovation, climate resilience, and digital infrastructure.
- Enhancing inter-ministerial coordination and outcome-based budgeting.

In conclusion, the functional classification of expenditures not only reveals current priorities but also starkly exposes the strategic distance between fiscal behavior and developmental ambition. Aligning budgetary allocations with the NDS 2030 is essential for ensuring that public spending becomes a true instrument of transformation rather than a mechanism of inertia.

### **3.4. Comparative Functional Expenditure Analysis: Croatia vs. EU and OECD (2024)**

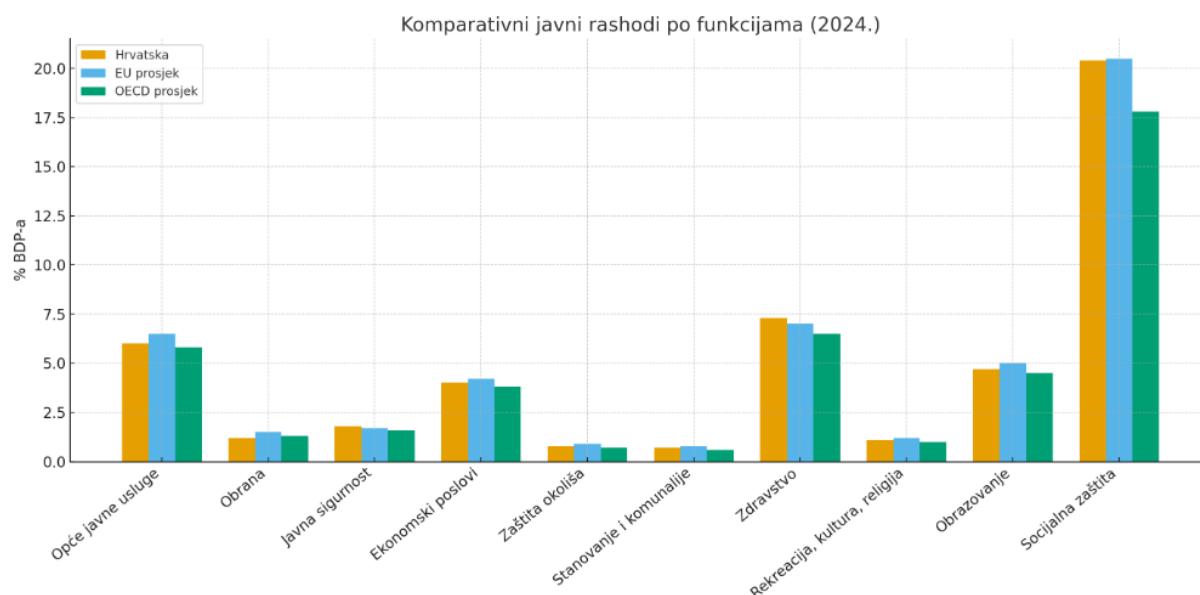
To complement the national analysis of functional expenditures, this section presents a comparative overview of Croatia's public spending structure relative to the European Union (EU) and OECD averages for 2024. The comparison utilizes harmonized COFOG data, expressed as a share of GDP, sourced from Eurostat, the OECD TaxBEN database, and the Croatian Ministry of Finance.

According to the latest available data, Croatia allocates approximately:

- 20% of GDP to Social Protection, compared to the EU average of 18.7% and the OECD average of 16.9%.
- 7.5% of GDP to Healthcare, which exceeds the OECD average of 6.8% and aligns closely with the EU average of 7.6%.
- 4.1% of GDP to Education, falling below the EU average of 4.6% and the OECD average of 5.1%.
- 0.6% of GDP to Environmental Protection, representing a significant lag behind the OECD average of 1.3%.
- 1.2% of GDP to Defense, compared to 1.5% in the EU and 2.0% in the OECD.

These figures confirm Croatia's strong fiscal orientation toward social security and public health, while highlighting underinvestment in education, environmental sustainability, and defense. The share of expenditures for General Public Services (6.2% of GDP) and Economic Affairs (4.8% of GDP) remains broadly aligned with EU and OECD benchmarks. This comparative structure is illustrated in Figure 4, which shows the functional distribution of public expenditures across selected categories for Croatia, the EU, and the OECD in 2024.

*Figure following on the next page*



*Figure 4. Functional Public Expenditures (% of GDP), Croatia vs. EU and OECD, 2024 (Source: Author's calculation based on data from the Croatian Ministry of Finance (2025), Eurostat COFOG database (2024), and OECD TaxBEN Country Profile: Croatia (2024))*

The elevated share of Social Protection spending reflects Croatia's redistributive fiscal model, as confirmed by OECD TaxBEN simulations, which show that family and pension benefits—combined with a relatively high tax wedge—produce strong income redistribution but may reduce labour market incentives. EUROMOD analyses further indicate that Croatia's benefit system significantly impacts disposable income, especially for low-income households. At the same time, the limited share of capital expenditures (3.6% of total spending in H1 2025) and underfunding of developmental functions raise concerns about long-term growth capacity. This imbalance between consumption-based and investment-oriented spending is also noted in the European Commission's Country Report for Croatia (2024), which recommends a gradual reallocation of resources toward education, innovation, and climate resilience. In summary, Croatia's functional expenditure profile demonstrates a strong commitment to social stability but reveals strategic gaps in developmental investment. Aligning fiscal allocations with the goals of the National Development Strategy 2030 (NDS 2030) will require a deliberate shift toward sectors that support long-term competitiveness and economic resilience.

#### 4. CONCLUSION

This paper has examined public expenditures in the Republic of Croatia as indicators of national priorities, focusing on the period from 2021 to the first half of 2025. Through a detailed analysis of budget execution data and functional classifications, the study has identified key trends in fiscal allocation and assessed their alignment with Croatia's strategic objectives. The findings confirm that Social Protection remains the dominant function of public spending, consistently absorbing over one-third of the total budget. This reflects the redistributive orientation of Croatia's fiscal policy and its commitment to social stability. General public services and economic affairs also maintain significant shares, driven by administrative obligations, debt servicing, and infrastructure investments. However, the relatively low share of capital expenditures and the underfunding of key developmental functions—such as education, healthcare, innovation, and environmental protection—highlight structural limitations in Croatia's fiscal strategy.

Comparative data from the EU and OECD further underscore these gaps: while Croatia exceeds international averages in social protection and health spending, it lags behind in education, environmental sustainability, and defense. This imbalance suggests a fiscal model focused on short-term consumption rather than long-term investment. To ensure resilience and competitiveness, Croatia must pursue a determined functional rebalancing. This includes increasing investment in human capital, digital infrastructure, and climate-related programs, while enhancing the efficiency and transparency of public spending. Functional classification should serve not only as a reporting tool but as a strategic instrument for guiding fiscal decisions in line with the National Development Strategy 2030. Ultimately, public expenditures are more than financial outputs—they are reflections of societal values and political choices. By aligning fiscal policy with strategic priorities and international benchmarks, Croatia can strengthen its capacity to respond to future challenges and promote inclusive, sustainable development..

## **LITERATURE:**

1. European Commission. (2024a). Country Report – Croatia 2024. Brussels: European Commission.
2. European Commission. (2025b). European Semester Spring Package – Croatia. Brussels: European Commission.
3. European Commission. (2021). Regulation (EU) 2021/241 establishing the Recovery and Resilience Facility. Official Journal of the EU, L 57/17.
4. European Union. (2013). European System of Accounts – ESA 2010. Luxembourg: Publications Office of the European Union.
5. Ministarstvo financija Republike Hrvatske. (2025). Izvršenje državnog proračuna 2021–2025. Available at: <https://mfin.gov.hr/proracun-86/86>
6. Ministarstvo financija Republike Hrvatske. (2024). Zakon o izvršavanju Državnog proračuna Republike Hrvatske za 2024. godinu. NN 149/2023, izmjene NN 125/2024. Available at: <https://narodne-novine.nn.hr>
7. Narodne novine. (2024). Zakon o doplatku za djecu. NN 36/2024. Available at: [https://narodne-novine.nn.hr/clanci/sluzbeni/2024\\_03\\_36\\_580.html](https://narodne-novine.nn.hr/clanci/sluzbeni/2024_03_36_580.html)
8. Narodne novine. (2018). Zakon o fiskalnoj odgovornosti. NN 111/2018.
9. Narodne novine. (2021). Nacionalna razvojna strategija Republike Hrvatske do 2030. godine. NN 13/2021.
10. OECD. (2023). OECD Economic Survey: Croatia 2023. Paris: OECD Publishing.
11. OECD. (2024). TaxBEN Country Profile: Croatia. Paris: OECD Publishing. Available at: <https://www.oecd.org>
12. OECD. (2025a). Government at a Glance 2025. Paris: OECD Publishing.
13. OECD. (2025b). OECD Economic Outlook 2025. Paris: OECD Publishing.
14. United Nations. (2019). Classification of the Functions of Government (COFOG). New York: UN Statistics Division.
15. Urban, I. & Bezeredi, S. (2025). EUROMOD Country Report: Croatia. Zagreb: Institute of Public Finance.
16. Vlada Republike Hrvatske. (2024). Child Allowance Overview. Available at: <https://gov.hr/en/child-allowance/702>
17. World Bank. (2021). Croatia Public Finance Review. Washington, DC: World Bank Group.
18. World Bank. (2023). Public Expenditure Review – Strengthening Efficiency in Social Spending. Washington, DC: World Bank Group.
19. Zoričić, D. & Tkalec, M. (2022). Public Expenditure Efficiency in EU Member States: The Case of Croatia. Zagreb: Croatian National Bank Working Paper No. 67.
20. European Commission. (2020). Country-Specific Recommendations for Croatia – Fiscal Policy and Public Investment. Brussels: European Commission.

# THE ROLE OF FOREIGN WORKERS IN CROATIA'S LABOR MARKET AND TAX SYSTEM

**Lorena Vokic Kvesic**

*Libertas International University, Zagreb  
lvokic@libertas.hr*

**Manuela Rijic**

*Libertas International University, Zagreb  
mrijic@student.libertas.hr*

## **ABSTRACT**

*Labour migration has become a significant topic in Croatia's economic and demographic discourse, particularly in light of persistent workforce shortages across key sectors. These shortages are largely attributed to long-term demographic decline, emigration of young professionals, and structural mismatches between labour supply and demand. In response, foreign workers have been increasingly employed to fill gaps in industries such as tourism, construction, and manufacturing. This paper explores the fiscal and legal dimensions of foreign employment, focusing on the contribution of foreign workers to Croatia's tax system through income taxation and social security contributions. The research applies a multidimensional methodology, combining statistical analysis, legal interpretation, and policy evaluation. It examines employment trends, sectoral imbalances, and the regulatory framework governing foreign labour, including relevant labour and tax legislation. Findings suggest that foreign workers play a supplementary role in stabilizing the labour market and contributing to public revenues. However, their presence also raises questions about long-term sustainability, integration, and the adequacy of existing legal protections. The analysis emphasizes that the observed reliance on foreign labour is not a strategic choice, but rather a consequence of domestic demographic and economic pressures. The paper concludes by advocating for a balanced and forward-looking policy approach. Strengthening domestic human capital, improving retention of local workers, and aligning labour market needs with fiscal policy are essential for Croatia's sustainable development. A fair and transparent framework for foreign employment should support—but not replace—efforts to revitalize the national workforce and reinforce Croatia's economic resilience.*

**Keywords:** Croatia, Fiscal Sustainability, Foreign Workers, Migration, Tax System

## **1. INTRODUCTION**

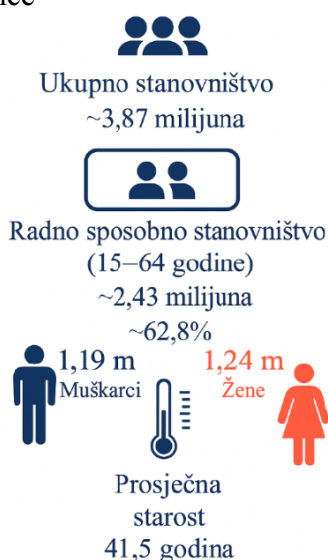
Croatia faces persistent challenges stemming from demographic decline, emigration of skilled workers, and labour market imbalances. These trends have intensified workforce shortages in key sectors such as tourism, construction, hospitality, and manufacturing, threatening long-term fiscal and economic stability. To mitigate these pressures, Croatia has increasingly turned to foreign workers, primarily from third countries and neighbouring regions. While this approach offers short-term relief, it also raises concerns about integration, legal protection, and the sustainability of a labour model reliant on external human resources. This paper examines the role of foreign workers in Croatia's labour market and tax system, focusing on their fiscal contributions through income taxation and social security. By combining statistical analysis, legal interpretation, and policy review, the study contributes to the broader discourse on resilience in an unsustainable world—highlighting how Croatia's institutions adapt to demographic decline and what strategic adjustments are needed for long-term sustainability.

## 2. LABOUR MARKET STRUCTURE AND DEMOGRAPHIC PRESSURES

Croatia's labour market is increasingly shaped by long-term demographic shifts that constrain the availability of domestic workers. To understand the structural roots of current labour shortages, it is essential to first examine the country's demographic profile and its implications for workforce dynamics

### 2.1 Demographic Trends and Workforce Decline

Croatia's labour market is increasingly shaped by long-term demographic shifts that constrain the availability of domestic workers. The working-age population (15–89 years) in Q1 2024 totalled approximately 3.59 million, of which 1.739 million were economically active and 1.511 million inactive (DZS, 2025). This imbalance reflects persistent demographic challenges, including population ageing, low fertility, and emigration of younger cohorts. Between 2015 and 2024, Croatia recorded a net migration loss of 10,675 individuals, with 386,828 emigrants and 376,153 immigrants (DZS, 2025). The majority of emigrants were aged 20–39, further weakening the domestic labour pool. Simultaneously, the birth rate declined from 9.9 to 8.19 births per 1,000 inhabitants (Macrotrends, 2025), marking a 17% drop in a decade. These trends compound the pressure on the labour market and threaten the long-term sustainability of public finances. Since 2021, Croatia has adopted Eurostat's employment methodology, which defines employment based on actual work performed rather than formal contracts. This shift has improved labour market monitoring and highlighted the urgency of structural reforms. Without targeted activation policies and demographic renewal, Croatia risks further erosion of its productive base and fiscal resilience

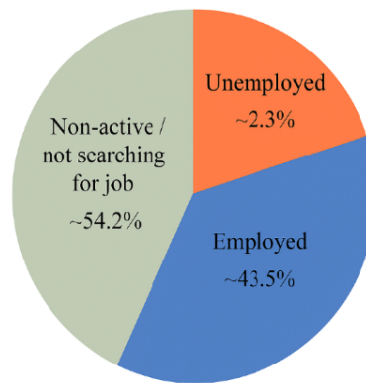


Picture 1: Labour Force Age Profile in Croatia 2024.

(Source; Author's own compilation based on data from the Croatian Bureau of Statistics (2025), <https://podaci.dzs.hr/2025/hr/96921>)

### 2.2 Employment Indicators

According to the Labour Force Survey for Q1 2024, Croatia continues to show improvement in key employment metrics. The employment rate for individuals aged 15–64 reached 68.0%, the activity rate stood at 54.1%, and the unemployment rate declined to 5.0%—the lowest level recorded since harmonized measurement began (DZS, 2025). However, despite these positive trends, the structural gap between active and inactive populations remains substantial. Over 1.5 million individuals are still outside the labour force, primarily due to age, education status, health limitations, or caregiving responsibilities. This imbalance poses long-term challenges for economic growth and the sustainability of Croatia's pension and healthcare systems.



*Graph 1: Labour force status breakdown (2025)*  
 (Source; Labour Force Survey (2025) <https://podaci.dzs.hr/2025/hr/96921>)

As illustrated in Graph 1., only 43.5% of the total working-age population is employed, while 54.2% remains economically inactive. These figures highlight the urgency of implementing targeted activation policies aimed at increasing participation among underrepresented groups. To address these challenges, Croatia must invest in adult education, reskilling programmes, and inclusive employment strategies that support older workers, women, and youth. Expanding access to flexible work arrangements and reducing barriers to entry can help mobilize untapped labour potential and strengthen the country's economic resilience.

### **2.3 Gender-Based Labour Activity**

According to 2024 data from the Croatian Bureau of Statistics, gender disparities in labour market participation remain pronounced. Men recorded an activity rate of 58.8% and an employment rate of 55.8%, while women lagged behind with 49.3% and 46.8%, respectively. Women also accounted for the majority of the inactive population, with 860,000 individuals compared to 656,000 men.

This gap reflects enduring structural and social factors, including caregiving responsibilities, part-time employment patterns, and limited access to flexible work arrangements. Although female employment is gradually increasing, targeted measures are needed to support work-life balance and expand women's access to full-time, stable employment.

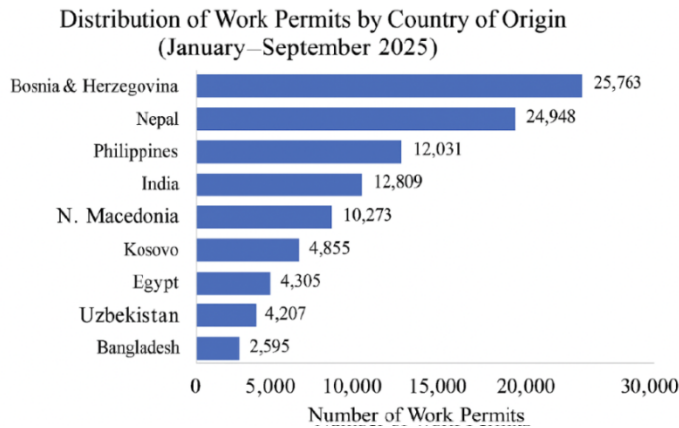
## **3. MIGRATION TRENDS AND LABOUR MARKET IMPACT**

Migration has become a defining factor in Croatia's labour market transformation, particularly in response to domestic workforce shortages. To understand the scope and drivers of this phenomenon, it is necessary to examine the patterns of intra-EU and third-country migration that shape current employment dynamics.

### **3.1 Intra-EU and Third-Country Migration**

Croatia's accession to the European Union marked a turning point in its migration dynamics. While Croatian citizens gained the right to seek employment across the EU, the domestic labour market experienced a parallel outflow of skilled workers, particularly among younger and highly educated individuals. This emigration trend has contributed to persistent labour shortages in several key sectors, including construction, tourism, and manufacturing. To address these deficits, Croatia has increasingly relied on foreign workers, primarily from third countries such as Nepal, India, Bangladesh, and the Philippines, as well as from neighbouring states in the Western Balkans.

These migration flows are shaped by both push factors in the countries of origin (e.g., limited employment opportunities, wage disparities) and pull factors in Croatia, including geographic proximity, simplified visa procedures, and rising demand in labour-intensive industries.

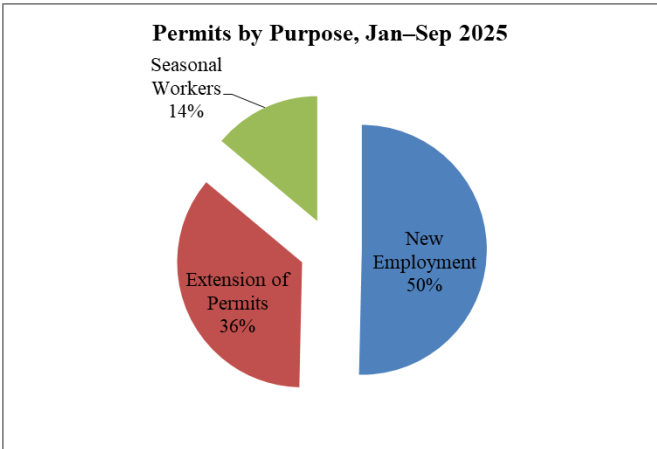


*Table 1: Distribution of Work and Residence Permits in Croatia (Jan–Sep 2025)*  
 (Source: Ministry of Interior (2025)  
<https://mup.gov.hr/UserDocsImages/statistika/2025/1/Mjese%C4%8Dne%20statistike%20prosinac%202024.pdf?utm>)

Between January and September 2025, a total of 136,194 work and residence permits were issued to foreign nationals.

### 3.2 Legal Framework for Foreign Employment

The employment of foreign nationals in Croatia is governed by the Aliens Act (Zakon o strancima, NN 133/20, 114/22, 151/22, 40/25) and the Labour Act (Zakon o radu, NN 93/14, 127/17, 98/19, 151/22, 64/23), alongside relevant bylaws and implementing regulations. These legal instruments define the conditions for residence and work permits, the rights and obligations of foreign workers, and the responsibilities of employers. In recent years, legislative amendments have aimed to simplify administrative procedures, reduce processing times, and align national regulations with EU standards. The quota system for work permits has been replaced by a labour market test mechanism, which assesses the availability of domestic workers before approving foreign employment. This shift reflects a policy orientation toward balancing labour market needs with the protection of domestic employment.



*Chart 2: Overview of Issued Residence and Work Permits Jan–Sep 2025*  
<https://mup.gov.hr/UserDocsImages/statistika/2025/1/Mjese%C4%8Dne%20statistike%20prosinac%202024.pdf?utm>)

As shown in the chart 2., the majority of issued residence and work permits are for new employment, with 68,587 permits granted. Furthermore, 48,656 permits were issued for the extension of existing permits, while 18,951 permits were issued for seasonal workers. An analysis of the distribution of issued permits shows that new employment accounts for approximately 47.6% of the total permits, extensions represent 33.8%, and seasonal work accounts for 13.1%. These figures indicate that the primary purpose of issuing permits is to facilitate the employment of new workers, reflecting the increased demand for labor in sectors experiencing workforce shortages.

### 3.3 Sectoral Labour Deficits and Foreign Worker Distribution

Foreign workers are predominantly employed in sectors with chronic labour shortages. Construction, tourism, hospitality, and manufacturing have emerged as the most affected industries, often offering wages and working conditions that are less attractive to the domestic workforce.

The seasonal nature of some sectors, particularly tourism, further complicates recruitment and retention. The distribution of foreign workers is also regionally uneven, with coastal and urban areas absorbing the majority due to higher economic activity. While foreign labour has alleviated some immediate pressures, it has not resolved the underlying structural issues driving domestic labour shortages.

| Sector        | Share of Foreign Workers | Key Characteristics                       |
|---------------|--------------------------|-------------------------------------------|
| Construction  | High                     | Labour-intensive, low average wages       |
| Tourism       | High (seasonal)          | Peak demand in summer months              |
| Manufacturing | Moderate                 | Stable demand, lower wage competitiveness |
| Hospitality   | High                     | High turnover, urban and coastal regions  |
| Agriculture   | Low                      | Seasonal, limited formal employment       |

*Table 2: Sectoral Distribution of Foreign Workers in Croatia*  
 (Source: European Employment Services. (2024). *Labour shortages and surpluses in Europe*. EURES. Retrieved October 26, 2025, from [https://eures.europa.eu/living-and-working/labour-shortages-and-surpluses-europe\\_en#paragraph\\_5172](https://eures.europa.eu/living-and-working/labour-shortages-and-surpluses-europe_en#paragraph_5172))

Table 2. illustrates the concentration of foreign workers in sectors with persistent labour shortages. Construction and tourism dominate due to their seasonal or project-based nature, while manufacturing and hospitality show steady but regionally uneven demand.

| Sector                       | Number of Permits | Share of Total (%) |
|------------------------------|-------------------|--------------------|
| Construction                 | 75,071            | 55.13 %            |
| Tourism and Hospitality      | 56,228            | 41.29 %            |
| Industry                     | 28,486            | 20.92 %            |
| Transport and Communications | 16,149            | 11.86 %            |
| Trade                        | 7,925             | 5.82 %             |
| Total                        | 136,194           | 100.00 %           |

*Table 3: Number of Issued Residence and Work Permits by Sector*

*(Source; Ministry of Interior (2025)*

*<https://mup.gov.hr/UserDocsImages/statistika/2025/1/Mjese%C4%8Dne%20statistike%20prosinac%202024.pdf?utm>*

As shown in Table 3, the construction sector accounts for more than half of all residence and work permits issued to foreign nationals in Croatia (55.13 %), followed by tourism and hospitality with an additional 41.29 %. Other sectors, such as industry, transport and communications, and trade, represent significantly smaller shares. This distribution indicates a strong reliance of the Croatian labour market on foreign workers in labour-intensive and seasonally sensitive sectors.

#### **4. FISCAL CONTRIBUTIONS OF FOREIGN WORKERS**

The fiscal impact of foreign workers in Croatia extends beyond labour market stabilization, encompassing measurable contributions to public revenues. To assess this dimension, it is necessary to examine how income tax and social security obligations apply to foreign nationals employed in the country.

##### **4.1 Income Tax and Social Contributions**

Foreign workers employed in Croatia are subject to the same income tax and social security obligations as domestic employees, in accordance with the Income Tax Act (Zakon o porezu na dohodak, NN 115/16, 106/18, 121/19, 32/20, 138/20, 151/22, 114/23, 152/24) and the Contributions Act (Zakon o doprinosima, NN 84/08, 152/08, 94/09, 18/12, 22/13, 148/13, 157/13, 151/14, 33/15, 115/16, 106/18, 58/20, 151/22, 114/23). Their rights and obligations depend on residency status, but once legally employed, they contribute to the fiscal system through progressive taxation and mandatory pension and health insurance contributions. This ensures equal treatment under Croatian law and reinforces the integrity of the public finance system. The inclusion of foreign workers in the tax base has a measurable impact on public revenues, particularly at the level of local self-government units, which benefit from income tax allocations. Given that many foreign workers are employed in sectors with high labour intensity, such as construction and hospitality, their cumulative contributions—though individually modest—represent a growing fiscal input.

| Year | Immigrants | Income tax revenues (salary) | Index  |
|------|------------|------------------------------|--------|
| 2020 | 24954      | 3.300.869.616,42             | -11,59 |
| 2021 | 25290      | 3.774.850.070,10             | 14,36  |
| 2022 | 47632      | 4.415.884.371,21             | 16,98  |
| 2023 | 58544      | 5.268.343.035,03             | 19,30  |
| 2024 | 57101      | 5.474.000.000,00             | 3,90   |

*Table 4: Annual Immigration and Income Tax Revenue Trends in Croatia (2020–2024)*

*(Source; Vokić Kvesić, Lorena, Povratničke politike Republike Hrvatske i predviđeni učinci // Međunarodno znanstveno-stručna konferencija Migracije i identitet; Kultura, ekonomija, država (3) Zagreb, Hrvatska, 11.11.2024-12.11.2024*

The data from 2020 to 2024 reveals a strong positive correlation between foreign worker inflows and income tax revenues, with an R-value of 0.9622. This suggests that increased migration has significantly contributed to fiscal growth. However, tax reforms in 2024—such as surtax abolition and expanded deductions—tempered revenue gains despite continued high immigration. While foreign labour supports short-term economic stability, it does not resolve Croatia’s deeper structural issues, including demographic decline, regional disparities, and labour market inactivity.

#### 4.2 Wage Structures and Taxable Bases

Although foreign workers are formally included in the tax system, the sectors in which they are predominantly employed tend to have different wage structures compared to other areas of the economy. As a result, while individual taxable amounts may vary, the overall contributions of foreign workers remain substantial due to the growing number of employees. Importantly, the formalisation of their employment ensures transparency and compliance, helping to reduce undeclared work and strengthen the integrity of the tax system. This transition from informal to formal employment has also enhanced the traceability of contributions and supported more accurate fiscal planning.

| Items                                                          | 2025.           |
|----------------------------------------------------------------|-----------------|
| <b>Gross salary:</b>                                           | <b>970</b>      |
| <b>Contributions from gross salary:</b>                        |                 |
| Reduction of the base for calculating contributions for MO I.: | 165             |
| Base for calculating contributions for MO I.:                  | 805             |
| Pension insurance 1st pillar:                                  | 161             |
| Pension insurance 2nd pillar:                                  | 0               |
| <b>Income:</b>                                                 | <b>809</b>      |
| Personal deduction:                                            | 600             |
| Tax base:                                                      | 209             |
| <b>Total tax:</b>                                              |                 |
| Tax:                                                           | 48,07           |
| - rate 23%: 209.00                                             | 48,07           |
| - rate 33%: 0.00                                               | 0,00            |
| <b>Net salary:</b>                                             | <b>760,93</b>   |
| Contributions on gross salary:                                 |                 |
| - health insurance 16.5%:                                      | 160,05          |
| <b>Total employer cost:</b>                                    | <b>1.130,05</b> |

*Table 5: Income Tax Contribution of an Employed Worker in Croatia (2025)*  
 (Source; Author’s calculation based on statutory rates and contribution rules (*Zakon o doprinosima, Zakon o porezu na dohodak*, 2025)).

This table illustrates the fiscal impact of permanently employed foreign workers earning a gross monthly salary of €970. Based solely on income tax, their collective annual contribution amounts to approximately €67.6 million. This figure excludes mandatory pension and health insurance contributions, which substantially increase their overall fiscal footprint. The example highlights how even modest individual wages, when aggregated across a large foreign workforce, generate significant public revenue. Such contributions enhance fiscal stability, support the sustainability of social systems, and reduce the prevalence of undeclared labour. Moreover, they improve budgetary predictability, particularly in sectors facing chronic labour shortages.

### **4.3 Public Revenue Implications**

The fiscal role of foreign workers must be viewed within the broader context of Croatia's public finance system. As income tax constitutes a key source of revenue for local budgets, the growing number of foreign employees helps offset the decline in contributions resulting from domestic emigration and population ageing. Their presence thus provides short-term fiscal relief, particularly in municipalities with high seasonal employment. However, reliance on foreign labour as a revenue source is not without limitations. The sustainability of such contributions depends on continued demand in key sectors, the stability of migration flows, and the effectiveness of enforcement mechanisms. Long-term fiscal planning must therefore consider both the benefits and vulnerabilities associated with this model.

## **5. POLICY CHALLENGES AND STRATEGIC CONSIDERATIONS**

As Croatia increasingly relies on foreign labour to address domestic workforce shortages, new policy challenges emerge beyond the economic sphere. Among the most pressing are issues of integration and social cohesion, which require coordinated responses at both national and local levels.

### **5.1 Integration and Social Cohesion**

The growing presence of foreign workers in Croatia offers economic relief but introduces social and administrative complexities. Language barriers, uneven access to integration services, and regional disparities in support mechanisms hinder full inclusion. While legal protections exist, implementation varies. Ensuring cohesion requires coordinated efforts among employers, local authorities, and civil society to foster inclusive environments that respect national identity while embracing diversity.

### **5.2 Balancing Domestic and Foreign Labour Supply**

Croatia's reliance on foreign labour reflects deeper structural issues: emigration, ageing population, and skill mismatches. According to HNB (2024), the activity rate remains among the lowest in the EU, and projections suggest a potential loss of 400,000 working-age individuals over the next two decades. While foreign employment mitigates short-term shortages, sustainable labour policy must prioritize domestic workforce revitalization through vocational training, youth retention, and flexible employment models.

### **5.3. Strategic Directions for Sustainable Labour Management in Croatia**

Data from the 2024 Labour Force Survey (DZS) show 1.684 million employed and 89,000 unemployed, yet a large segment remains inactive. HNB estimates that raising the activity rate to the EU average (75%) could mobilize an additional 120,000 workers. However, the rising number of foreign workers and retirees suggests that activation potential is limited but not exhausted. Key strategic priorities:

- Mobilizing Inactive Populations: Enable participation through part-time, remote, and flexible work arrangements, especially for students, caregivers, and older adults.
- Engaging Reluctant Workers: Address barriers through re-skilling, social support, and incentivized re-entry programs.
- Workforce Alignment: Match education and training with market needs to improve employability and retention.
- Integrated Policy Framework: Combine labour activation, fiscal planning, and demographic policy into a coherent strategy that reduces over-reliance on foreign labour.

By implementing these evidence-based measures, Croatia can strengthen labour force participation and ensure long-term fiscal and demographic sustainability.

## **6. CONCLUSION**

Croatia's labour market has undergone significant transformations in recent years, shaped by demographic decline, emigration, and sectoral imbalances. These challenges have led to a growing reliance on foreign workers, whose employment has helped alleviate immediate workforce shortages and contributed to public revenues through income tax and social contributions. However, this reliance must be understood as a reactive measure to structural deficiencies rather than a strategic orientation. The analysis presented in this paper highlights the complex interplay between labour migration, fiscal policy, and legal regulation. While foreign workers play a supplementary role in stabilizing the labour market, their presence also raises important questions regarding integration, legal protection, and long-term sustainability. The fiscal contributions they generate are valuable, but should not overshadow the need to strengthen domestic human capital and address the root causes of labour shortages. Policy makers are therefore encouraged to adopt a balanced and forward-looking approach. This includes investing in education and vocational training, improving retention of domestic workers, and aligning migration policies with national development goals. A fair and transparent framework for foreign employment should support—not replace—efforts to revitalize Croatia's workforce and reinforce its economic resilience. Ultimately, Croatia's sustainable development will depend on its ability to harmonize demographic, economic, and fiscal strategies. By placing domestic interests at the core of policy-making while responsibly managing foreign labour, the country can build a more resilient and inclusive labour market for the future. In navigating demographic and economic uncertainty, Croatia's ability to build a resilient labour market will depend not only on managing foreign employment, but on revitalizing domestic human capital through coordinated fiscal, legal, and social strategies.

## **LITERATURE:**

1. Croatian Bureau of Statistics. (2024). Labour Force Survey – Q1 2024. Retrieved 26.10.2025 from <https://podaci.dzs.hr/2024/hr/76770>
2. Croatian Bureau of Statistics. (2024). Construction – August 2024. Retrieved 26.10.2025 from <https://podaci.dzs.hr/2024/hr/10234>
3. Croatian Bureau of Statistics. (2024). Business Entities in Croatia. Retrieved 26.10.2025 from <https://podaci.dzs.hr/2024/hr/10045>
4. Croatian Bureau of Statistics. (2024). Average Monthly Net Wages by Activity. Retrieved 26.10.2025 from <https://podaci.dzs.hr/2024/hr/10112>
5. Croatian Bureau of Statistics. (2024). Construction Price Indices. Retrieved 26.10.2025 from <https://podaci.dzs.hr/2024/hr/10185>
6. Croatian Bureau of Statistics. (2024). Tourism Traffic – September 2024. Retrieved 26.10.2025 from <https://podaci.dzs.hr/2024/hr/10321>
7. Croatian Bureau of Statistics. (2025). Migration of Population of the Republic of Croatia in 2024. Retrieved 26.10.2025 from <https://podaci.dzs.hr/2025/hr/97255>
8. Croatian National Bank. (2024). Hrvatsko tržište rada – ograničenja, izazovi i mogućnosti (Presentation, 9 May 2024). Retrieved 26.10.2025 from [https://www.hnb.hr/documents/20182/4880882/hn10052024\\_prezentacija.pdf](https://www.hnb.hr/documents/20182/4880882/hn10052024_prezentacija.pdf)
9. Croatian National Bank. (2024). Tourism Revenues – Balance of Payments. Retrieved 26.10.2025 from <https://www.hnb.hr/statistika/devizni-prihodi>

10. Eurostat. (2024). Migration and Migrant Population Statistics – 2024 Edition. Retrieved 26.10.2025 from [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Migration\\_and\\_migrant\\_population\\_statistics](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Migration_and_migrant_population_statistics)
11. Eurostat. (2024). Construction Sector – Statistics Explained. Retrieved 26.10.2025 from [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Construction\\_sector\\_statistics](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Construction_sector_statistics)
12. Macrotrends. (2025). Croatia Birth Rate 1950–2025. Retrieved 26.10.2025 from <https://www.macrotrends.net/global-metrics/countries/hrv/croatia/birth-rate>
13. Ministry of the Interior of the Republic of Croatia. (2024). Work Permits for Foreign Nationals. Retrieved 26.10.2025 from <https://mup.gov.hr/radne-dozvole/286764>
14. Ministry of Tourism and Sport. (2020). Satellite Tourism Account of the Republic of Croatia – 2019. Retrieved 26.10.2025 from <https://mint.gov.hr/UserDocsImages/dokumenti/Turizam-statistika/SRT-2019.pdf>
15. Vokić Kvesić, L. (2024). Povratničke politike Republike Hrvatske i predviđeni učinci. In Migration and Identity – Culture, Economy, State (3): Proceedings of the International Scientific-Professional Conference (pp. 11–12). Zagreb: Libertas International University.

#### Legislation

1. Zakon o porezu na dohodak, NN 115/16, 106/18, 121/19, 32/20, 138/20, 151/22, 114/23, 152/24.
2. Pravilnik o porezu na dohodak, NN 10/17, 128/17, 106/18, 1/19, 80/19, 1/20, 74/20, 1/21, 102/22, 112/22, 156/22, 1/23, 56/23, 143/23, 16/25.
3. Zakon o radu, NN 93/14, 127/17, 98/19, 151/22, 46/23, 64/23.
4. Zakon o strancima, NN 133/20, 114/22, 151/22, 40/25.

# THE IMPACT OF THE UKRAINE ENERGY CRISIS ON GERMANY'S ELECTRICITY MARKET

**Rok Klun**

*University of Ljubljana, School of Economics and Business, Slovenia*

**Matej Svigelj**

*University of Ljubljana, School of Economics and Business, Slovenia*

*matej.svigelj@ef.uni-lj.si*

## **ABSTRACT**

*Germany is a leading European country with a strong and technologically advanced energy sector that has undergone significant transformation in recent decades. The transition from the dominance of fossil fuels and nuclear energy to renewable energy sources represents a fundamental pillar of German energy policy, which is focused on sustainable development and the reduction of greenhouse gas emissions. An important aspect of German energy policy is its active role in shaping the integrated European energy market, which is crucial for the stability, competitiveness, and reliability of electricity supply. Geopolitical disruptions, particularly the Russian invasion of Ukraine, have severely affected the German energy market, causing sharp increases and volatility in energy prices and thereby affecting the stability of energy supply. The aim of this article is therefore to examine the impact of the Ukraine energy crisis on Germany's electricity market.*

**Keywords:** *electricity market, energy crisis, sustainable energy transition*

## **1. INTRODUCTION**

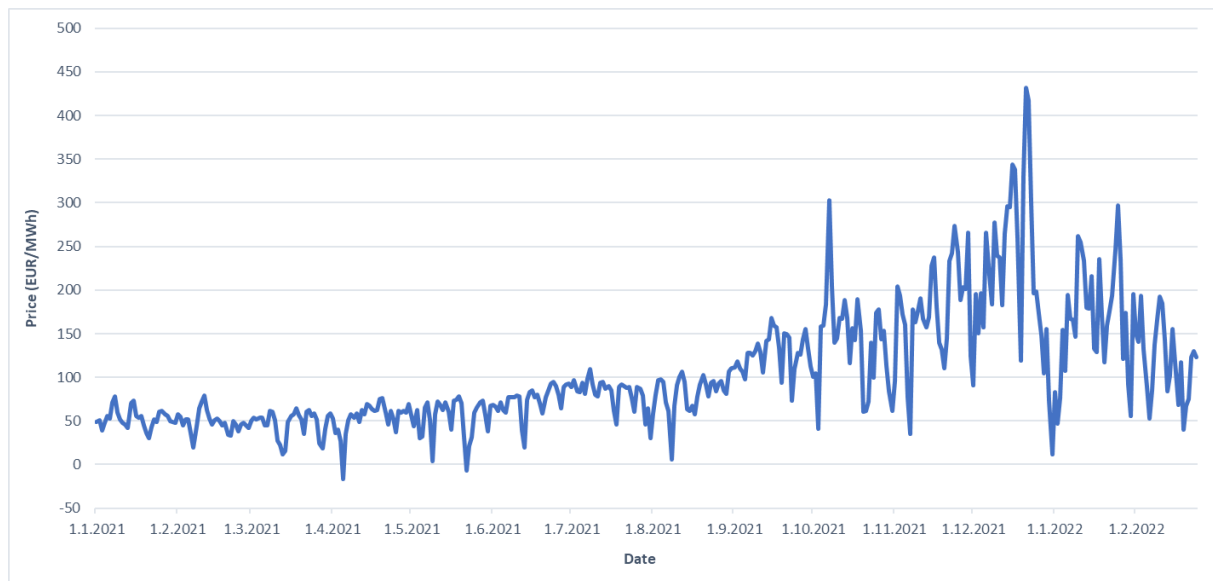
Germany is one of the European Union's leading countries with a highly developed and technologically advanced energy sector that has undergone profound changes in recent decades. The transition from a system traditionally based on fossil fuels and nuclear energy toward renewable energy sources has become a central pillar of German energy policy, aimed at promoting sustainable development and reducing greenhouse gas emissions. In addition to its domestic energy transformation, Germany plays a key role in shaping the integrated European energy market, which is essential for ensuring the stability, competitiveness, and security of electricity supply across Europe. However, recent geopolitical disruptions, particularly the Russian invasion of Ukraine, have exposed the vulnerability of the energy sector by causing significant increases and volatility in energy prices, thereby challenging the stability and reliability of energy supply. The aim of this article is therefore to examine the impact of the Ukraine energy crisis on Germany's electricity market. The paper is structured as follows. Section 2 analyses electricity price developments in Germany before and after the Russian invasion of Ukraine. Section 3 examines the impact of natural gas and coal prices on the German electricity market. Finally, the main findings are summarized in the conclusion.

## **2. ELECTRICITY PRICE DEVELOPMENTS IN GERMANY**

### **2.1 Electricity price developments before the start of the invasion**

Figure 1 illustrates the development of day-ahead electricity prices in Germany from the beginning of 2021 until the Russian invasion of Ukraine on 24 February 2022. Day-ahead market prices were used in the analysis because they best reflect actual market conditions and electricity prices without speculative trading positions.

During the first months of 2021, electricity prices remained relatively stable, fluctuating within a range of up to approximately EUR 50/MWh, without any pronounced upward or downward trends. This period was characterized by a gradual normalization following the initial shock of the COVID-19 pandemic, when electricity prices had been low due to reduced economic activity and lower energy demand. In the first quarter of 2021, the average day-ahead electricity price in Germany reached EUR 49.57/MWh, while the difference between the minimum and maximum price, indicating market volatility, amounted to EUR 67.37/MWh (Energy Agency, 2022).



*Figure 1: Development of day-ahead electricity prices in Germany from the beginning of 2021 until the Russian invasion of Ukraine on 24 February 2022  
(Source: EPEX Spot)*

With the arrival of summer 2021, electricity prices began to rise gradually, coinciding with the rapid post-pandemic economic recovery, increasing fossil fuel prices, and the onset of the European energy crisis. The renewed growth in industrial production and transportation created additional pressure on the energy market, while the first signs of natural gas supply constraints also emerged. In the second quarter of 2021, price fluctuations became more pronounced, with increasingly frequent spikes above EUR 100/MWh. This trend was mainly driven by higher demand during colder periods, less favorable conditions for electricity generation from renewable energy sources, and the general shortage of natural gas, which is a key energy source for electricity generation in Germany.

Average prices reached EUR 60.27/MWh, while the difference between the minimum and maximum price increased to EUR 111.83/MWh. In the third quarter of 2021, price volatility accelerated further due to several factors. Europe entered the winter season with historically low gas storage levels, raising additional concerns regarding the security of supply. During the same period, the prices of EU emission allowances increased significantly, further raising the cost of electricity generation from fossil fuels. Consequently, electricity prices on energy markets began to reach record levels. The average price in the third quarter amounted to EUR 97.14/MWh, while the difference between the minimum and maximum price reached EUR 162.58/MWh (Energy Agency, 2022).

The price peak shown in Figure 1 occurred during the fourth quarter of 2021, when electricity prices exceeded EUR 400/MWh. The surge in prices resulted from a combination of all the aforementioned factors: low gas storage levels, reduced Russian gas supplies, high emission allowance prices, and increased energy demand. The average quarterly price amounted to EUR 178.97/MWh, while the high level of volatility was reflected in the difference between the minimum and maximum price, which reached EUR 419.84/MWh. High electricity prices caused considerable concern among both industry and households, as energy costs for end users increased substantially. At the beginning of 2022, prices declined slightly but remained highly volatile. This reflected the continued uncertainty on the energy market, as Europe was still facing natural gas shortages and high electricity generation costs. During this period, market attention was also focused on the growing geopolitical tensions between Russia and the West, which culminated on 24 February 2022 with the Russian invasion of Ukraine (Energy Agency, 2023).

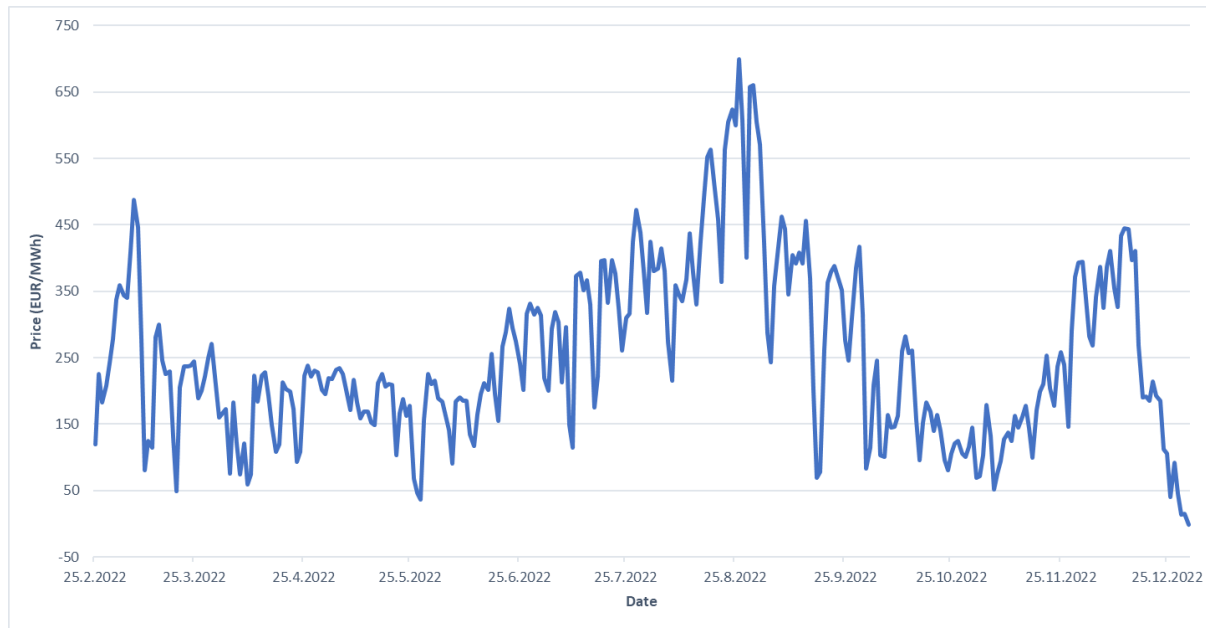
## **2.2 Electricity price developments after the start of the invasion**

Figure 2 illustrates the development of day-ahead electricity prices in Germany during 2022, following the Russian invasion of Ukraine. The figure reflects periods of significant price fluctuations caused by geopolitical instability, the energy crisis, and market reactions to changes in energy supply and demand. During this period, electricity prices reached record levels, primarily due to energy shortages and uncertainty regarding future energy supply (Energy Agency, 2023).

At the end of February and during March 2022, a sharp increase in electricity prices can be observed, coinciding with the outbreak of the war in Ukraine. The average electricity price during this period amounted to EUR 217.98/MWh. Before the invasion, Russia had been one of Europe's key suppliers of energy resources, particularly natural gas, which plays a crucial role in electricity generation. Following the introduction of sanctions against Russia and the resulting disruptions in energy supply, energy markets reacted with a rapid increase in prices. In the first months after the outbreak of the war, electricity prices fluctuated within a very wide range, reflecting market instability and uncertainty.

The difference between the highest and lowest price reached EUR 438.53/MWh. In the second quarter of 2022, market conditions on the day-ahead market stabilized somewhat due to favorable weather conditions. The average electricity price during this period was EUR 187.08/MWh, while the difference between the minimum and maximum price amounted to EUR 294.67/MWh (Energy Agency, 2023; EPEX Spot). The peak was reached in August 2022, when electricity prices in Europe exceeded EUR 700/MWh.

The average electricity price in the third quarter reached EUR 375.43/MWh, while volatility increased significantly, with the difference between the minimum and maximum price amounting to EUR 404.48/MWh. The main drivers behind this record price increase were limited Russian gas supplies, extremely high gas prices on energy exchanges, and increased electricity demand caused by heatwaves and droughts, which negatively affected hydroelectric and nuclear power generation across Europe. In addition, several nuclear power plants in France, one of Europe's major electricity producers, were temporarily shut down due to maintenance work, which further intensified the energy crisis (Energy Agency, 2023).



*Figure 2: Development of day-ahead electricity prices in Germany in 2022 following the Russian invasion of Ukraine (Source: EPEX Spot)*

After reaching the peak in August, electricity prices continued to fluctuate considerably, although the overall trend gradually started to decline. European countries began implementing extensive measures aimed at limiting energy prices and increasing energy self-sufficiency. Key measures included the introduction of gas price caps, increased imports of liquefied natural gas (LNG) from countries such as the United States and Qatar, increased electricity generation from renewable energy sources, and commitments to reduce energy consumption in both industry and households (Energy Agency, 2023). Towards the end of 2022, electricity prices declined significantly. One of the key factors contributing to this decline was the successful filling of natural gas storage facilities across Europe, which reached high storage levels before the winter season. In addition, the winter was relatively mild, reducing the need for intensive heating and consequently lowering electricity demand. All these factors contributed to market stabilization and the gradual decline in electricity prices towards the end of the year. Although prices decreased by the end of 2022, developments on the energy market clearly demonstrated how vulnerable the European energy sector is to external shocks and highlighted the importance of energy source diversification and strengthening energy independence. In the fourth quarter of 2022, the average electricity price amounted to EUR 192.63/MWh (Energy Agency, 2023).

### **3. THE IMPACT OF FOSSIL FUELS ON THE ELECTRICITY MARKET**

The following section presents an analysis of the impact of natural gas and coal prices on the electricity market in Germany. The Clean Spark Spread (CSS) represents one of the key economic indicators of the profitability of electricity generation in natural gas-fired power plants. The indicator expresses the difference between the market price of electricity and the costs of natural gas and CO<sub>2</sub> emission allowances required for electricity generation. CSS is widely used to assess the economic feasibility of gas-fired power plant operations and to evaluate the impact of fluctuations in fuel and emission allowance prices on electricity markets.

A positive CSS indicates that a power plant operates profitably and that electricity generation is economically viable, whereas a negative CSS suggests that production is unprofitable, which may lead to reduced output or temporary shutdowns of power plants. Since gas-fired power plants frequently determine the marginal electricity price on wholesale electricity markets, CSS significantly influences the broader dynamics of electricity pricing. During periods of high natural gas prices or elevated emission allowance prices, CSS may decrease or become negative, leading to lower electricity generation and additional pressure on the energy system. Consequently, CSS serves as an important indicator of market conditions and strongly influences both energy companies' operational decisions and regulatory policies (EIA, 2013). As shown in Figure 3, the high volatility of electricity and natural gas prices was also strongly reflected in the CSS. The calculation is based on electricity, emission allowance, and natural gas product prices obtained from the European Energy Exchange AG and the international fossil fuel exchange Intercontinental Exchange, Inc.. In March 2022, following the Russian invasion of Ukraine, CSS reached negative values, indicating that natural gas prices exceeded electricity prices. During this period, the operation of gas-fired power plants became unprofitable, as revenues from electricity sales were insufficient to cover fuel and emission allowance costs. The average CSS value in the first quarter of 2022 amounted to -3.4 EUR/MWh. Throughout the remainder of the year, CSS gradually increased and returned to positive values, indicating that electricity market prices exceeded production costs. This increase was further supported by factors such as droughts and reduced hydroelectric generation, which increased demand for alternative generation sources, including gas-fired power plants. In the second quarter of 2022, the average CSS value amounted to 23.83 EUR/MWh. The highest CSS values were recorded in August and September, when extreme conditions on the energy market caused record-high electricity prices. In the third quarter, CSS reached an average value of 70.85 EUR/MWh. Following the stabilization of prices in the final quarter of 2022, CSS remained positive, indicating that gas-fired power plants were still able to operate with positive profit margins. The average CSS value during this period amounted to 54.56 EUR/MWh. A positive CSS indicates a relative stabilization of the market and the establishment of a balance between electricity and natural gas prices, while electricity generation from gas-fired power plants remained profitable on average. The annual average CSS amounted to 37.11 EUR/MWh.



*Figure 3: Clean Spark Spread in 2022*  
(Source: Author's own work)

To assess the profitability of coal-fired power plants, a similar indicator to that used for natural gas-fired power plants is applied, namely the Clean Dark Spread (CDS). CDS represents the difference between the market price of electricity and the production costs associated with coal-fired electricity generation, taking into account both coal costs and the costs of CO<sub>2</sub> emission allowances (Glowacki, 2024). Figure 4 illustrates the development of CDS in Germany during 2022. At the beginning of the year, CDS values were low or close to zero, with the average value in the first quarter amounting to 8.68 EUR/MWh, indicating that the profitability of coal-fired power plants was only slightly positive. Throughout the year, CDS values gradually increased as a result of rising electricity prices and relatively stable coal costs. The average CDS value in the second quarter reached 46.91 EUR/MWh. The highest CDS values were recorded in August and September, coinciding with the peak of the energy crisis and extremely high electricity prices, which made coal-fired power plants highly profitable. In the third quarter of 2022, CDS reached an average value of 262.71 EUR/MWh. Towards the end of the year, CDS values declined and stabilized, although they remained positive, indicating that coal-fired power plants continued to operate with positive profit margins on average. In the fourth quarter, CDS recorded an average value of 175.69 EUR/MWh. The annual average CDS value for 2022 amounted to 125.80 EUR/MWh.



*Figure 4: Clean Dark Spread in 2022*  
(Source: Author's own work)

#### 4. CONCLUSION

Energy commodity prices on German exchanges have experienced significant fluctuations in recent years, with the Russian invasion of Ukraine representing a major turning point. Even before the outbreak of the war, prices had already been influenced by the post-COVID-19 economic recovery, rising demand, and constrained energy supply. Following the Russian invasion of Ukraine, disruptions in supply chains, particularly in the markets for natural gas and oil, led to a sharp increase in prices and extreme volatility across energy markets. This was reflected in record-high electricity prices in Germany and further intensified discussions regarding the appropriateness and effectiveness of previous electricity market reforms.

**ACKNOWLEDGEMENT:** *This research was supported by the Slovenian Research and Innovation Agency (Research Programme P5-0117)*

**LITERATURE:**

1. Energy Information Administration (2013). *An introduction to spark spreads*. <https://www.eia.gov/todayinenergy/detail.php?id=9911>
2. Energy Agency. (2022). *Poročilo o stanju na področju energetike v Sloveniji 2021*. Agencija za energijo. [https://www.energetika-portal.si/fileadmin/dokumenti/publikacije/agen\\_e/porae\\_2021.pdf](https://www.energetika-portal.si/fileadmin/dokumenti/publikacije/agen_e/porae_2021.pdf)
3. Energy Agency. (2023). *Poročilo o stanju na področju energetike v Sloveniji 2022*. Agencija za energijo. [https://www.energetika-portal.si/fileadmin/dokumenti/publikacije/agen\\_e/porae\\_2022.pdf](https://www.energetika-portal.si/fileadmin/dokumenti/publikacije/agen_e/porae_2022.pdf)
4. EPEX Spot. *Basics of the Power Market*. <https://www.epexspot.com/en/basicspowermarket>
5. European Energy Exchange AG. *EEX German power futures*. <https://www.eex.com/en/market-data/market-data-hub/power/futures#%7B%22snippetpicker%22%3A%2228%22%7D>
6. Glowacki, M. (2024). Clean dark spread (CDS). <https://emissions-euets.com/internal-electricity-market-glossary/1137>
7. Intercontinental Exchange. <https://www.ice.com/index>



UNIVERSIDADE  
LUSÓFONA



CENTRO  
UNIVERSITÁRIO  
PORTO

