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EDUCATION TOURISM SEEN AS TOURISM OPPORTUNITIES FOR FOREIGN STUDENTS IN ROMANIA, TÜRKİYE, AND CUBA

Rodolfo Pérez Lavandera¹, Andreea Marin-Pantelescu^{2*}, Georgică Gheorghe³, Ömer Kürşad Tüfekci⁴, Ferdi Akbiyik⁵, Teodora Monica Fulga⁶, Cezar Octavian Mihălcescu⁷

Abstract

The study's purpose is to investigate the tourism opportunities for international students when studying in Romania, Türkiye, and Cuba in order to offer the best tourism experiences that enrich their life. Furthermore, the paper offers new perspectives for the destinations tourism management organizations to promote tourism in university cities creating tourism strategies to interplay academic life with local communities. Education tourism can enhance the tourism cities' cultural attractions and foster social relations between residents and visitors, contributing to the international tourism economic boost. The paper methodology consists in qualitative research using in-deep interviews with foreign students studying in Romania, Türkiye and Cuba. The research followed the three counties in terms of affordability, tourism cultural attractions, infrastructure and the diversity of students' programs. The results have shown important insights for Romania, like the EU-wide powerful student access and a big appreciation for the traditional culture, for Türkiye, like the preferences for ecotourism and big appreciation for Istanbul being vibrant, and for Cuba, like viewing tourism through art, dance and music, but limited internet services.

Keywords: tourism, education, students, tourists' attractions

JEL Classification: A23, H52, I21, Z32

1. Introduction

According to Glossary of Tourism Terms created by The World Tourism Organization (UN Tourism, 2025), "Education tourism covers those types of tourism which have as a primary motivation the tourist's engagement and experience in learning, self-improvement, intellectual growth and skills development. Education Tourism represents a broad range of products and services related to academic studies, skill enhancement holidays, school trips,

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sports training, career development courses and language courses, among others (Glossary of tourism terms, 2025).”

Education tourism represents a global market valued at USD 466.85 billion in 2024. According to forecasts (IMARC Group, 2025), the education tourism market will reach USD 1,291.50 billion by 2033, with North America dominating, holding a 30% market share in 2024 (IMARC Group, 2025).

The exponential growth of educational tourism is due to government policies, the growth of the education industry, and the increase in disposable income of the population (European Travel Commission (ETC), 2025). Young people’s desire to learn foreign languages and experience different cultures are motivational factors for education tourism. Governments promote student exchanges and educational scholarships, making international education more accessible. Furthermore, the value of international certifications and intercultural skills are key drivers in the knowledge-based economy. Studying in a foreign country is seen as a “passport” to better-paid jobs, which favors the growth of education tourism (Bunghez, 2022).

Firstly, government support is the foundation for the growth of education tourism (OECD, 2025). For example, Erasmus+ (the EU’s education and training program) provided mobility opportunities for over 1.2 million students, educators, and young workers (), supported 26,000 projects, and benefited over 73,000 organizations in 2022 (OECD, 2025).

Secondly, students are eager to study abroad, with the aim of developing their professional skills and personal development. According to UNESCO, education tourism is extremely popular, with international student mobility exceeding 6 million in 2022. The most important players in the educational tourism market from the students’ perspective are the United States, Canada, the United Kingdom, and Australia, which have the best educational infrastructure with world-renowned institutions. Furthermore, figures from the Organization for Economic Cooperation and Development (OECD, 2025) show that 4.5% of higher education students globally study outside their country of origin. Students aspire to experience new cultures, learn something new, acquire new skills, and learn foreign languages.

The main companies in the global educational tourism market include AAI Edutourz Pvt. Ltd., ACE Cultural Tours, ACIS Educational Tours, Atlantis Erudition & Travel Services Pvt. Ltd., Capital Tours Inc., Educational Tours, Inc., EF Education First, Global Educational Travel, Goireland, Qadri International Education Consultancy, World Expeditions Travel Group Pty Ltd. (IMARC Group, 2025).

Students pursuing higher education abroad, resulting in bachelor’s and master’s degrees, accounted for 38% of the educational tourism market in 2024 (Statista, 2025). Foreign universities offer diverse specializations through research courses and language courses aimed at improving academic

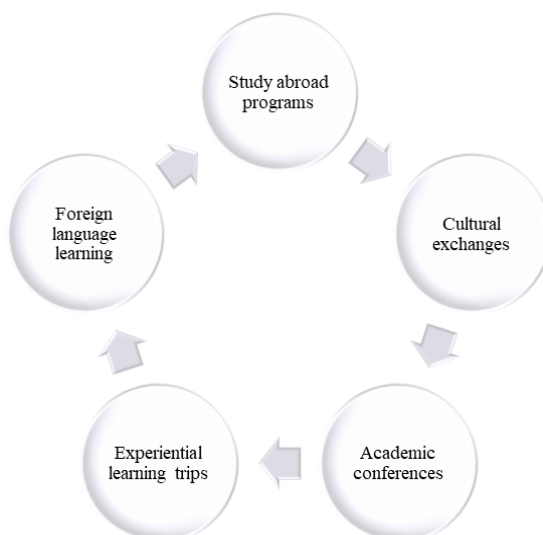
qualifications. In the United States, Europe, and Asia, students opt for exchange programs, internships, and study trips organized by colleges.

The present paper assesses the tourism opportunities for foreign students in Romania, Türkiye, and Cuba. It is based on qualitative research using in-deep interviews discussions with international students who studied in Romania, Türkiye and Cuba. The interview guide was based on education services' affordability in these three countries, the diversity of the tourism cultural attractions, the country's infrastructure and the variety of students' programs. The paper structures involved the analysis of the literature review, and presenting the qualitative research methodology, after continues with the results and discussions. At the end, the conclusions are presented including the research limitations and further research directions and perspectives.

2. Literature review

Education tourism is described as the pursuit of academic studies in a foreign country for a duration of less than one calendar year (Ritchie et al., 2003). The predominant motivation for education tourism is the quest of knowledge and learning (Buhalis, 2022). The development of education tourism has been pushed by three economic phenomena: globalization, the liberalization, and the internationalization of education (Iglesias, 2022).

According to Ritchie et al. (2003), an education tourist is a person who is away from their home town or country overnight, where education and learning are either the main reason for their trip or secondary reasons, but are perceived as an important way to spend their free time. Thus, educational tourism can be defined as: tourist activity undertaken by those taking an overnight vacation for which education and learning are a primary or secondary part of their trip. This can include general education tourism and study tours for adults, international and domestic travel by university students and schoolchildren, including language schools, school trips, and exchange programs (see Fig.no.1). Education tourism can be organized independently or formally and can be undertaken in a variety of natural or man-made environments (Ritchie et al., 2003; Zaroucha, 2022).

Figure no.1: The education tourism components

Source: created by authors after Tomasi et al. (2020)

Education tourists are actually the international students because they are characterized, on the one hand, by academic activities aimed at specializing in various fields of activity and, on the other hand, by leisure activities in the host country during the course of their studies (Unurlu, 2020).

Economic studies have been conducted to determine the economic impact of educational tourism, and investigations have revealed the significant contribution of educational tourism to the development of local communities, thanks to the spending of international students and their families and relatives whenever they come to visit them (McGladdery and Lubbe, 2017). Thus, money is spent on accommodation, meals, transportation, leisure, and language learning (Tigu, 2012).

Studies that have correlated educational tourism with local development have shown that universities play an important role in integrating international students into the local environment and culture (Kusumah et al., 2021). In addition, the sustainable behavior of educational tourists is prepared in the classrooms of host universities, and friendships with colleagues from abroad can last a lifetime.

Experiential tourism is best highlighted in educational tourism, as the encounter of different cultures creates a harmonious blend of practical and spiritual experiences (Suciu et al., 2022).

Last but not least, reference studies analyze the sustainability and well-being of tourist destinations when they come into contact with international students (Teach & Travel, 2025; Hall, 2025). Interculturality is a

key feature of educational tourism, which strengthens the technical and social skills of international students (Teach & Travel, 2025).

When the country of residence offers limited educational opportunities in terms of employment and when there are international programs that award scholarships and grants, students are attracted to educational services abroad, where they find up-to-date specializations that are in demand on the labor market. Hindered by limited educational resources and attracted by academic excellence outside their country of origin (push-pull theory), students seek the best solutions for their professional and personal development (Yang et.al. 2023).

Maturity comes with experiential travel, and educational tourism thus contributes to your ability to fend for yourself, to cope with life's difficulties on your own, to make the best decisions in an instant, to make new friends, to develop logical thinking, and to be a citizen with strong ethical values (transformative learning theory) (Bueddefeld and Duerden, 2022).

Education tourism in Europe is stimulated by the Erasmus+ program. Through this program, students' mobility has increased exponentially. According to the European Commission, in 2022, the program supported 26,000 projects and provided 1.2 million educational mobility opportunities. The Erasmus+ program is based on student and staff exchanges, research collaborations, and cultural experiences, making Europe an attractive destination for international students. Students are encouraged to choose an academic program in a European Union country. Thus, through the Erasmus+ program, Europe offers grants and scholarships, promotes intercultural dialogue and academic excellence, and helps forge international links between students and teachers (IMARC Group, 2025).

Tourism and education are essential for sustainable development. Thus, in 2023, the Global Forum on Education of the World Tourism Organization analyzed the importance of education in the development of tourism (World Economic Forum, 2025). Providing skills for tourism workers, with a focus on sustainability, digitization, and innovation, can be achieved through partnerships with universities (World Economic Forum, 2025).

According, to Tomasi et al. (2020) when learning is the primary goal and tourism is the secondary, it is considered education tourism. Education tourism services include university exchanges for students and teachers, learning foreign languages, learning new cultural customs and traditions, and professional and personal development programs through trips focused on learning new cognitive or practical skills. Tourism contents the wish to learn about the culture and the traditions of a destination (Pitman et al., 2011).

The expenditures of friends and relatives who visit the international students in the host country is significant, for example in the U.K. in 2014–2015, visitors spent about £520 million for transport, hotels, hospitality, and

cultural, recreational and sports attractions, generating an estimated £1 billion in gross output. Their presence supported a further 11,000 jobs and £100 million in tax revenues (HESA, 2025 and Universities UK, 2017).

According to Rehab (2021) VFR (Visiting Friends And Relatives) tourism arises naturally in host destinations, and so specialists in the field have not been involved in marketing it. Thus, VFR is not affected by conventional marketing campaigns, but rather by friends and relatives who help them decide to travel to visit them out of longing or for certain financial reasons.

According to Backer, 2015 and Shani & Uriely, 2012, VFR tourism encouraged by international students is of particular interest in terms of the financial gains it produces in the host university destination. There is significant evidence (Taylor et al., 2004) showing high participation in VFR tourism by international tourists, either as hosts or as travelers (Griffin, 2024), and this VFR tourism induced by international students follows the academic calendar, so the best times for host university destinations are to take advantage of the wealth created during those semesters of study.

The international students are able to connect education and tourism at the host university destination. The international students unify learning with traveling, enriching their abilities to better understand other cultures, customs, cuisine. With complex teaching and tourism services, Romania, Türkiye and Cuba are able to deliver high standards education services for international students.

Regarding Romania, the <https://studyinromania.gov.ro/> digital platform, administered by the Executive Agency for Higher Education, Research, Development and Innovation Funding (UEFISCDI) is beneficial for international students, as students from 121 countries are currently studying in Romania. The major cities offering international programs are Bucharest, Cluj-Napoca, Timișoara, Iași, Constanța, Craiova, and Brașov (UEFISCDI, 2025).

In the academic year 2023-2024, the total number of international students enrolled in bachelor programs in Romania was 32,092, representing a growth of 50% compared to 2014-2015 academic year (Ministerul Educației, 2023). Romania has made considerable efforts to ensure the international recognition of diplomas and periods of study. It has also implemented the Erasmus Without Papers and Erasmus Student Card Initiative programs to accelerate the digitization of Erasmus+ mobility administration; moreover, it has intensified the efforts of university sports clubs to make themselves attractive internationally. Offering education programs in English, French, Germany, Hungary, Romania is proficient to offer low cost of living and low tuition fees comparable to countries from European Union. Also, incommensurable UNESCO cultural attractions are in Romania: Horezu Monastery, Villages with Fortified Churches in Transylvania, Churches of Moldavia, Wooden Churches

of Maramureș, Historic Centre of Sighisoara, Dacian Fortresses of the Orăștie Mountains, Brâncuși Monumental Ensemble of Târgu Jiu (Tigu, 2012; European Union, 2025).

Regarding Türkiye, the culture influence between Europe and Asia plays a key role in attracting international students (Agudaru and Taran, 2023). Türkiye Scholarships is a government-funded higher education scholarship program run by the Republic of Türkiye for international students (Türkiye Scholarships, 2025). In 2024, there were 121,000 application from 170 countries. It is worth to mention, Antalya playing for an outstanding chance for international students looking for a high-quality, globally known schooling in tourism and hospitality (Türkiye Scholarships, 2025).

The most popular tourist destinations for international students in Türkiye are Istanbul (Hagia Sophia and the Grand Bazaar), Cappadocia (hot air balloons), Izmir (Ephesus ruins), Ankara (history and Mausoleum Atatürk), Antalya (Mediterranean seaside resorts), Muğla and Bodrum (for the coast and sea), Trabzon, Uludağ, Palandöken, and Erzurum (for ski resorts), and Mardin (for its magical architecture) (Daxow, 2025; Tourism Higher Education in Türkiye, 2012). Türkiye is also renowned for its gastronomy and cultural arts (Koc et al., 2014). As an international student, it is recommended to try the cuisine of Gaziantep, Hatay, Afyonkarahisar, and Kayseri, which are UNESCO gastronomic cities. One of the best places to enjoy traditional delicacies is the UNESCO Gastronomic House in Hatay (Yeşiltaş et.al., 2010).

Regarding Cuba, one of the top programs for international students is The Cuba Fellowship, the programs are carried out in English and Spanish (Go Overseas, 2025). Cuba is a mixture of African, Spanish, and Caribbean cultures, which gives it a special charm for foreigners (Spencer, 2020). The University of Havana and the University of Cienfuegos are leaders in the fields of economics and tourism.

The best tourist destinations for foreign students in Cuba are Havana, with its vibrant nightlife and colonial architecture; Santiago, rich in Afro-Cuban culture; Trinidad, with its colorful streets and museums full of history, traditions, and ancient customs; Viñales, with its tobacco factories; and Cienfuegos, with its French colonial flavor (Go Overseas, 2025). Of course, all these cities are important university hubs, and also vibrant and dynamic in cultural discoveries for international students (Rutty and Richardson, 2019).

3. Methodology

The research methodology consisted of conducting in-depth interviews using qualitative research based on an interview guide. Specifically, five in-depth interviews were conducted online using the Google Meet platform between July 29 and August 29, 2025. The description of the respondents is based on confidentiality, which does not allow the identification of the names

of the international students interviewed. Therefore, we will refer to them using only their given names. The in-depth interviews with each participating student lasted 45 minutes. The research was extremely time-consuming, both in terms of discussion and transcription, but it was worth doing in this way, through in-depth interviews, because the respondent's attention is heightened, attention to detail is increased, and the experience is lived and expressed intensely. The respondents were chosen for convenience because the research team had access to them and their availability was extremely important in collecting the data for analysis (see Table no.1).

Table no.1 Characteristics of research respondents

	Characteristics		Mobility program
	Country of origin	Country of the host university	
International student one Razvan	Romania	Türkiye	Erasmus+
International student two Luca	Romania	Türkiye	Erasmus+
International student three Yusuf	Türkiye	Romania	Erasmus+
International student four Ecrin	Türkiye	Romania	Erasmus+
International student five Carlos	Cuba	Romania	Government Scholarship of Ministry of Higher Education of Cuba

Source: authors research

Respondents were asked to answer questions in accordance with the interview guide regarding affordability to study in their chosen country, tourist attractions in their country that they would recommend to other international students, university student and transportation infrastructure, and the diversity of student programs.

Following interviews with international students, they were extremely concerned about how affordable the country is in terms of the cost of living, whether they could afford to live there during their studies, being concerned about the cost of rent, the cost of food, how much a meal in a restaurant costs, the cost of public transport, and especially the cost of transport passes and their timetables. Concerns regarding the availability of the destinations were assessed from the perspective of the associated expenses for both them, as students, and for their families and relatives who visit them during their studies.

4. Results and discussions

Romania is perceived by the students interviewed from Türkiye and Cuba as a country with a low cost of living, where services are affordable in terms of

living expenses. Türkiye is perceived by the students interviewed from Romania as a country with a medium to high standard of living. According to the student from Cuba, his country is restrictive and it is very difficult to find essential and basic items there.

Learning through tourism is a recommendation of respondents; the chemistry that emerges between groups of international tourists can only be felt if you take part in such unique learning experiences. Study trips, learning camps, and volunteer programs involving learning new languages are useful for personal and professional growth. Respondents consider the effects to be beneficial in the long run in shaping personal character, precisely those soft skills that companies are seeking.

During the interviews, certain similarities were discovered, notably that Romania and Cuba share a period known as communism, during which products and services were scarce and inaccessible to the general population. Romania, Türkiye, and Cuba also share a gastronomic culture, refined cuisine, and, moreover, many dishes based on eggplant, minced meat, and beef rolls were borrowed by Romanians from Turkish cuisine. Furthermore, the characteristic of exceptional hospitality on the part of the locals is evident in all three countries to the same degree. Everyone is welcoming, happy to interact with foreigners, and eager to share their local culture and traditions. Things in common such as hospitality, music, dance, eco-agriculture, lavender plantations, tobacco, wine, and fruit trees are found in all three countries, which are concerned with agriculture and ecotourism.

Medieval cities and ruins included in the UNESCO heritage (UNESCO World Heritage Centre, 2025) (Sighisoara (Romania), Pergamon (Türkiye), Trinidad and Camagüey (Cuba)) are once-in-a-lifetime attractions, definitely worth visiting and exploring by international tourists who are studying abroad. A good example, pointed out by Carlos, is this: "Camagüey is special to me, full of buildings preserved from colonial times with large clay pots (tinajones) standing at the entrance to the inner courtyards. The pots were used to collect rainwater, as the city has always suffered from a lack of water."

The data regarding the four components analyzed: affordability, tourism cultural attractions, infrastructure and the diversity of students' programs, has been summarized in Table no.2.

Table no.2 Summarizing the main opinions of respondents

Countries	Comparative characteristics			
	Affordability	Tourism cultural attractions	Infrastructure	Diversity of students' programs
Romania	low, budget-friendly, safe location, high-speed internet, inexpensive and widely available	Full of history, rich culture, unique traditions, vibrant nightlife, renowned festivals. Recommendation for visiting the Black Sea coast, the Danube Delta, and the Carpathian Mountains, Bran Castle and Peles Castle, as well as Transfăgărășan and Tranalpina for unforgettable experiences.	Discounted travel passes for transport, metro, buses, discounts on tourist attractions for students.	Educational summer schools, the Erasmus+ program, scholarships offered by universities, a strong focus on internationalization, and numerous volunteer programs. Strong academic reputation.
Türkiye	Medium, budget-high, stronger in cities, fairly good internet access	Renowned food festivals, ruins steeped in history, but also modern attractions, slow tourism experiences, refined cuisine, lavender tourism occupies a special place. Recommendations for visiting the Black Sea and Mediterranean resorts, the Grand Bazaar in Istanbul, and the hot air balloons in Cappadocia.	Developed, subscriptions with medium to high price levels, especially in Istanbul	Camps, excursions, tours to learn about history, integration of locals into tourist tours, vibrant stories, exceptional negotiation, conferences and events supported by universities, internships. Solid academic reputation.
Cuba	restrictive, high tourists' costs, limited internet services	Wine and tobacco farms, unique music and dances, impressive colonial architecture, highly recommended are themed tourism: art and ballet, or organic farms and eco-agriculture. Recommendations for visiting Havana and the colonial cities of Trinidad and Cienfuegos with their distinctive colorful buildings, stone-paved streets, local dances, and vibrant music.	moderate development with safe environment, scooters are suggested	Exceptional cultural programs and workshops as part of the learning curriculum. Art, culture, ballet, and music are highly valued in Cuban education. Compacted academic reputation.

Source: authors research

Razvan and Luca mentioned the Palace of Parliament, the Athenaeum, Herastrau Park, and the Village Museum as must-see tourist attractions in Bucharest, Romania, along with the old town center and its vibrant nightlife. "The old town center of Bucharest is where the fun is at its peak" (Luca). Yusuf and Ecrin mentioned the Grand Bazaar, Hagia Sophia, Topkapi Palace, and Galata Tower as enchanting tourist attractions for foreign students in Istanbul. "To saving money and time, it is most useful to buy the Istanbul Museums Pass online" (Ecrin). Carlos recommended visiting the Gran Teatro de La Habana, the Capitol as Havana's majestic monument, the Havana Club Rum Museum, and admiring the architecture of the houses on Prado Boulevard in Havana. "Old cars and Cuban salsa music are a cool experience for young foreigners."

Regarding the academic infrastructure, more precisely the endowment of libraries with recent generation volumes, is equally highlighted in the three countries investigated. Regarding the accommodation of students in university dormitories, in Türkiye the greatest comfort is found, decent in Romania and precarious endowment in Cuba, with outmoded furniture. Modern classrooms in Türkiye and Romania, and in Cuba auditoriums with traditional architecture. Internet access in Cuba is precarious in university centers, power outages are frequent, which can cause discomfort for international students. On the other hand, internet access is fastest and free via wi-fi in Romania and good in Türkiye.

One bad thing Ecrin mentions is that when she had lunch in restaurants in Romania, the waiters, seeing that she was from abroad, tried to ask her to pay more than she should have. She was dissatisfied with the way the service was done in restaurants in Bucharest. For Carlos, dining in restaurants seemed very expensive. On the other hand, the freebies offered by all three countries to students to visit cultural attractions was a strong point of the discussion and greatly appreciated.

The need to have tutors in the host universities was expressed to help them adapt more easily to the lifestyle and integrate quickly into the academic community. The need for tours and tourist circuits in the host country was loudly expressed, the need to taste and try the culinary dishes specific to the host country was also loudly expressed. Moreover, the desire to visit emblematic tourist attractions that they read about in the guides on social media was brought to the forefront.

Taking into considerations all these important aspects, the involvement of host universities in creating organized group visit packages with tutors is beneficial for accelerating the process of learning about the tourist attractions of destinations. Respondents noted the desire of universities to offer programs in English for international students. A profound openness to internationalization and an awareness of the economic benefits for local communities resulting from interaction between student tourists and the local community were also

emphasized. It was observed that students wanted to have friends in the host country who would take them to visit destinations near the university, and especially wanted to go to concerts, festivals, parties, and shows, especially live shows, for free.

Conclusions

Tourism is an economic and social factor that promotes the professional and personal development of international students during their university studies abroad.

The limitations of the research stem from the limited number of in-depth interviews, as this can be seen as a pilot study, and increasing the number of in-depth interviews to ten would be comfortable in order to study the tourism options of international students in greater depth.

For the future, it would be interesting to study the long-term impact of international students on local host communities, in the context of sustainable development, digital innovation, and professional ethics.

In conclusion, international students focus on destinations that offer a solid combination of quality education, affordable prices, and tourist opportunities, combining tourism and education in a very beautiful way. It is a win-win situation between international students and the university destination that hosts them. On the one hand, educational tourism creates sustainable and one-of-a-kind travel experiences, and on the other hand, the host destination gets a steady flow of money, notoriety, and vibrancy.

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COMPARATIVE ANALYSIS OF INVESTMENT EFFICIENCY IN AZERBAIJAN AND ROMANIA BASED ON ICOR: A MACROECONOMIC PROPORTIONAL APPROACH

Aslan Azimzadeh, Rauf Hasanzade*

Abstract

In the research, the efficiency of investments directed to the economies of Azerbaijan and Romania was carried out using ICOR, which is considered a classical macroeconomic proportional analysis indicator. Using the quantitative research method, certain answers were found to the research questions posed. Thus, it was determined that investments play an important role in economic growth in both countries. Efficiency was recorded in investments directed to the economies of both Azerbaijan and Romania. However, for a more systematic analysis, it is necessary to take into account the lagged effects of investments, which can act as an important research question for future research. The main limitation of the study is that it requires a wider information base.

Keywords: macroeconomic proportions, investment, efficiency, Azerbaijan, Romania, ICOR

JEL Classification: E00, E22, E6

1. Introduction

Investment is a factor in a country's economic progress which benefits both developing and developed nations. When a country invests, its infrastructure gets stronger, the production capacity increases, and the country advances technologically. All of these benefits help the economy to get better in the run [Égert, Koźluk & Sutherland, (2009); Du, Zhang & Han, (2022)]. People conducted rigorous research which confirms that both public and private investment have a significant positive impact on the economy in countries that are still growing. Investments is key to making the economy strong. The money invested by the public and private companies plays a huge role in a country's economic performance which shows that investment is crucial for a country's development [Ahamed, (2021)]. When investment levels go down economic growth slows down. This shows how closely investment and growth are linked.

For countries like Azerbaijan investment is very important for their strategy. As a developing country that depends strongly on the energy sector, Azerbaijan has relied on investment inflows to improve its infrastructure and to expand its economy beyond oil and gas production. According to research,

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good management of investment is needed for economic growth. It also helps to reduce the country's vulnerability to economic shocks [Azimzadeh, (2025)]. In addition, studies on foreign direct investment in Azerbaijan indicate that the quality of institutions and legal regulations plays a major role in attracting investments and increasing their effectiveness [Salayev et al., (2025)]. Therefore, the importance of investment in Azerbaijan is not only about how much money is invested, but also about how efficiently these investments contribute to economic growth.

Similarly, in Romania investment plays a role in its growth. Investing money directly and building up capital really helps make businesses more productive and makes the economy of Azerbaijan and Romania grow faster. Direct investment is very important, for Azerbaijan and Romania. Empirical studies conducted using time-series methods show that FDI inflows are positively associated with economic expansion and sustainable development in Romania [Drob et al., (2025)]. However, as highlighted in comparative investment studies, the effectiveness of capital utilization may vary across countries depending on structural conditions and economic policies [Taguchi & Lowhachai, (2014)].

Even though investment is good for the economy, countries use their money differently which affects how much economic growth they get from it. A country's economic growth from investment depends on its policies, institutions and economic structure. The quality of institutions and policies, in place also matters. Looking at Azerbaijan and Romania is a way to understand how different things affect how well money is invested in each country. Azerbaijan and Romania are examples of this. Governments and researchers can use the information from Azerbaijan and Romania to make plans so that the money they invest actually does some good and helps the economy in the long.

The research will be directed towards answering the following research questions.

Research Question 1: Are investments made in the economy of Azerbaijan efficient? **Research Question 2:** Are investments made in the economy of Romania efficient?

2. Literature review

In the past many people who study economics have looked at how investments are used and how this affects the economy. One of the commonly used approaches in this area is the Incremental Capital Output Ratio (ICOR), which allows researchers to evaluate how efficiently investment contributes to economic output. Some studies have used a measure to see how capital formation and economic growth are connected in both rich and poor countries. These studies generally focus on identifying how effectively countries transform investment into economic growth and what factors influence this efficiency.

A time ago, Ranadev Banerji (1969) did some research on how capital and output are related. He looked at how the ICOR measure works in countries and

if the usefulness of capital changes over time. Nicholas V. Gianaris (1970) also conducted a study. He found that countries use capital differently depending on their economy and how developed they are. U Tun Wai (1985) conducted another study that showed investment efficiency in countries depends on more than just the amount of money invested. It also depends on the state of the economy. The following table lists some studies that have looked at how well investments are used, capital formation and economic growth.

Table no.1 Previous Studies on Investment Efficiency and ICOR Analysis

Author(s)	Research name	Who/What Was Analysed	Main Findings	Year
Hiroyuki Taguchi and Suphannada Lowhachai	A revisit to the incremental capital-output ratio	Asian economies and Thailand	Lower ICOR values indicate more efficient investment and higher growth	2014
Anna Yulianita et al.	Analysis of Investment Efficiency by Using ICOR Approach to Economic Growth in All Provinces of Sumatera Island	Provinces of Sumatera Island, Indonesia	The study found that investment efficiency differs between provinces, indicating that the ability of regions to transform investment into economic growth varies significantly	2019
Jeton Mazllami	The Investments Efficiency Toward Economic Growth: ICOR of the Republic of Croatia and Slovenia – Comparative Analysis	Croatia and Slovenia	The results show that ICOR values differ between the two countries, indicating variations in investment efficiency and capital productivity	2021
Zhang Jun	Investment Efficiency and Economic Growth in China	Chinese economy during economic reforms	The results showed that improvements in investment efficiency contributed to China's rapid economic growth	2003
Samia Amin et al.	Does Capital Efficiency Influence Economic Growth in Bangladesh? Application of the Harrod–Domar Model	Bangladesh economy	The study found that higher ICOR values are associated with lower economic growth, reflecting inefficient capital use	2024
Rafid Ahamed	Impact of Public and Private Investments on Economic Growth	39 developing countries	The results indicate that capital formation and investment significantly contribute to economic development	2021

Source: (Amin et al, 2024; Ahamed, 2021; Mazllami, 2021; Yulianita, 2019; Taguchi and Lowhachai, 2014; Jun, 2003; WAI, 1985; Gianaris, 1970; Banerji, 1969).

From all these studies it is clear that investment efficiency is very important for growth. Investment efficiency really matters for growth. It actually helps make the economy grow. The ICOR or Incremental Capital Output Ratio, is one way to see how well countries use investment to get results. A lower ICOR value usually means a country is using investment efficiently. Research has found that investment efficiency can be different from country to country and even within regions. This is because things like the structure and policies it has in place can affect it. Countries with the mix of economic structure and policies tend to have more efficient investment. Investment efficiency is key to making the most of investment. It helps countries get output from their investment. Overall, improving how investments are used can help boost growth, which makes understanding and managing investment efficiency really important for any economy.

3. Material and Methods

This study will employ a quantitative research approach. It should be noted that the study will utilize the statistical software packages GRETL 2026a and IBM SPSS Statistics 27 for data analysis. At the initial stage, it should be noted that the efficiency of investments will be assessed using the Incremental Capital–Output Ratio (ICOR), which is considered a classical macroeconomic proportional indicator for measuring capital productivity and investment efficiency.

$$ICOR = \frac{\Delta K}{\Delta Y} \quad 1]$$

The methodological framework of the study will be based on indicators obtained from the World Bank database. The principal variables include Gross Domestic Product for Azerbaijan and Romania (GDP_AZE and GDP_RO), as well as Gross Fixed Capital Formation for Azerbaijan and Romania (INV_AZE and INV_RO).

Prior to conducting the ICOR analysis, we intend to perform a correlation analysis between the variables. However, before selecting the appropriate correlation method, it is necessary to conduct a normality test. The results of the normality test will determine which type of correlation analysis (e.g., Pearson or Spearman) is most appropriate for the dataset.

Table no.2 Normality test of variables

Tests for GDP_AZE	Result	p value	Tests for INV_AZE	Result	p value
Doornik-Hansen test	10.8071	0.004501	Doornik-Hansen test	3.67083	0.159547
Shapiro-Wilk W	0.858892	0.000369	Shapiro-Wilk W	0.912091	0.008494
Lilliefors test	0.225366	≈ 0	Lilliefors test	0.172562	≈ 0.01
Jarque-Bera test	3.57497	0.16738	Jarque-Bera test	2.12899	0.344901

Source: Authors' calculating

Table no.3 Normality test of variables

Tests for GDP_RO	Result	p value	Tests for INV_RO	Result	p value
Doornik-Hansen test	4.60902	0.099808	Doornik-Hansen test	5.00655	0.081817
Shapiro-Wilk W	0.888395	0.001956	Shapiro-Wilk W	0.886305	0.001729
Lilliefors test	0.191541	≈ 0	Lilliefors test	0.191552	≈ 0
Jarque-Bera test	2.31429	0.314383	Jarque-Bera test	2.4049	0.300457

Source: Authors' calculating

The study covers the period 1990–2024 (sample size = 35). Given the relatively small sample size, the Shapiro–Wilk test will be employed as the primary normality test [Mishra et al., (2019)]. An examination of Table 2 and Table 3 indicates that normality is not observed for any of the variables in either Azerbaijan or Romania [Field, (2013)].

Accordingly, the Spearman's rank correlation, the formula of which will be presented below, will be used for the correlation analysis [Song and Park, (2020)].

$$r_s = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)} \quad 2]$$

The Spearman rank correlation coefficient ranges between +1 and -1. A coefficient value closer to 0 indicates a weak association between the variables, whereas a value closer to ± 1 reflects a strong monotonic relationship [Li et al., (2022)].

Within the framework of this study, it should also be noted that a key limitation concerns the unavailability of monthly data for some of the variables. This constraint restricts the possibility of conducting an analysis with a larger sample size and, consequently, limits the scope of the empirical investigation.

4. Result and Discussion

Since normality was not detected for the variables of Azerbaijan and Romania, the Spearman rank correlation coefficients are presented in the tables below.

Table no.4 Spearman's rank correlation matrix for GDP_AZE and INV_AZE

			GDP_AZE	INV_AZE
Spearman's rho	GDP_AZE	Correlation Coefficient	1.000	.929**
		Sig. (2-tailed)	.	.000
		N	35	35
	INV_AZE	Correlation Coefficient	.929**	1.000
		Sig. (2-tailed)	.000	.
		N	35	35

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors' calculating

As shown in Table 4, there is a very strong correlation between GDP and GFCF in the case of Azerbaijan. Specifically, the correlation coefficient between the variables was determined to be 0.929, which indicates a strong relationship [Hair et al., (2017)].

Table no.5 Spearman's rank correlation matrix for GDP_RO and INV_RO

			GDP_RO	INV_RO
Spearman's rho	GDP_RO	Correlation Coefficient	1.000	.963**
		Sig. (2-tailed)	.	.000
		N	35	35
	INV_RO	Correlation Coefficient	.963**	1.000
		Sig. (2-tailed)	.000	.
		N	35	35

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors' calculating

A similar result was obtained for Romania. Specifically, the Spearman rank correlation coefficient between the variables was calculated as 0.963, indicating a very strong positive correlation between GDP and GFCF in the case of Romania [Hair et al., (2017)].

The existence of a strong correlation between GDP and GFCF in both countries suggests that GFCF has a measurable impact on economic growth. This finding indicates that employing the classical macroeconomic proportional indicator, ICOR, to assess investment efficiency is theoretically and economically justified.

In order to address the research questions posed in this study, it is necessary to conduct an ICOR analysis for both Azerbaijan and Romania.

Table no. 6. Changes in GFCF, GDP and ICOR in Azerbaijan

Years	K*	Y*	ΔK	ΔY	ICOR
1990	1,80	8,88	-	-	-
1991	0,61	5,34	-1,19	-3,54	0,34
1992	0,10	0,44	-0,51	-4,90	0,10
1993	0,33	1,57	0,23	1,13	0,20
1994	0,31	1,19	-0,02	-0,38	0,05
1995	0,38	2,42	0,07	1,23	0,06
1996	0,92	3,18	0,54	0,76	0,71
1997	1,47	3,96	0,55	0,78	0,71
1998	1,58	4,45	0,11	0,49	0,22
1999	1,31	4,58	-0,27	0,13	-2,08
2000	1,22	5,27	-0,09	0,69	-0,13
2001	1,31	5,71	0,09	0,44	0,20
2002	2,13	6,24	0,82	0,53	1,55

2003	3,85	7,28	1,72	1,04	1,65
2004	5,01	8,68	1,16	1,40	0,83
2005	5,47	13,25	0,46	4,57	0,10
2006	6,23	20,98	0,76	7,73	0,10
2007	7,07	33,05	0,84	12,07	0,07
2008	9,08	48,85	2,01	15,80	0,13
2009	8,34	44,29	-0,74	-4,56	0,16
2010	9,61	52,91	1,27	8,62	0,15
2011	13,31	65,95	3,70	13,04	0,28
2012	15,65	69,68	2,34	3,73	0,63
2013	19,13	74,16	3,48	4,48	0,78
2014	20,64	75,24	1,51	1,08	1,40
2015	14,77	53,08	-5,87	-22,16	0,26
2016	9,48	37,87	-5,29	-15,21	0,35
2017	9,73	40,87	0,25	3,00	0,08
2018	9,75	47,11	0,02	6,24	0,00
2019	10,18	48,17	0,43	1,06	0,41
2020	9,68	42,69	-0,50	-5,48	0,09
2021	8,90	54,83	-0,78	12,14	-0,06
2022	9,47	78,81	0,57	23,98	0,02
2023	12,60	72,43	3,13	-6,38	-0,49
2024	12,48	74,32	-0,12	1,89	-0,06

Source: Authors' calculating

Note: * - billion US dollar

As shown in the table, the ICOR indicator in Azerbaijan is generally below 1, which may suggest potential efficiency in invested capital. However, in recent years the ICOR value has turned negative, casting doubt on conclusions regarding investment efficiency. Specifically, in 2023 the negative value was driven by changes in GDP, while in 2024 it resulted from movements in GFCF. This may indicate the presence of lag effects in the relationship between investment and output. Therefore, relying solely on ICOR may be insufficient, and incorporating lag analysis in future research would be important for a more comprehensive assessment.

To address the next research question, it is necessary to analyze the ICOR for Romania.

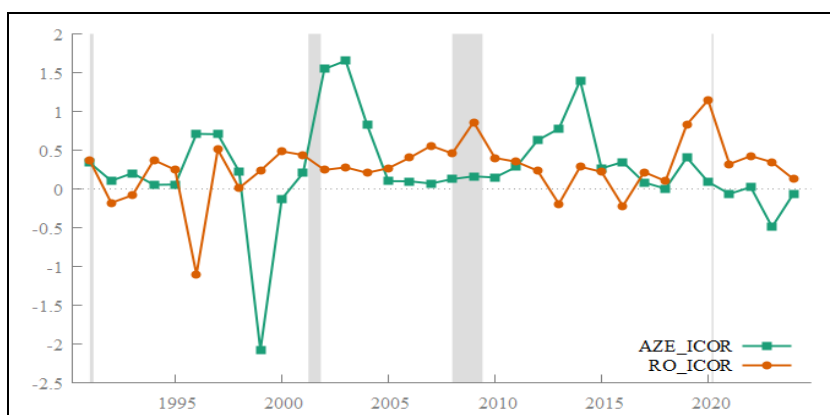
Table no.7 Changes in GFCF, GDP and ICOR in Romania

Years	K*	Y*	ΔK	ΔY	ICOR
1990	7,57	38,25	-	-	-
1991	4,15	28,85	-3,42	-9,40	0,36
1992	4,82	25,12	0,67	-3,73	-0,18
1993	4,72	26,36	-0,10	1,24	-0,08
1994	6,10	30,07	1,38	3,71	0,37
1995	7,92	37,43	1,82	7,36	0,25
1996	8,46	36,94	0,54	-0,49	-1,10
1997	7,77	35,58	-0,69	-1,36	0,51
1998	7,84	41,70	0,07	6,12	0,01
1999	6,49	35,95	-1,35	-5,75	0,23
2000	7,12	37,25	0,63	1,30	0,48
2001	8,50	40,40	1,38	3,15	0,44
2002	9,89	46,07	1,39	5,67	0,25
2003	13,15	57,81	3,26	11,74	0,28
2004	16,72	74,97	3,57	17,16	0,21
2005	23,00	98,45	6,28	23,48	0,27
2006	32,48	122,02	9,48	23,57	0,40
2007	61,70	174,59	29,22	52,57	0,56
2008	79,91	214,32	18,21	39,73	0,46
2009	45,28	174,11	-34,63	-40,21	0,86
2010	43,66	170,06	-1,62	-4,05	0,40
2011	51,56	192,62	7,90	22,56	0,35
2012	48,38	179,12	-3,18	-13,50	0,24
2013	46,32	189,80	-2,06	10,68	-0,19
2014	49,16	199,72	2,84	9,92	0,29
2015	44,33	177,89	-4,83	-21,83	0,22
2016	42,69	185,29	-1,64	7,40	-0,22
2017	48,08	210,15	5,39	24,86	0,22
2018	51,29	241,79	3,21	31,64	0,10
2019	58,17	250,08	6,88	8,29	0,83
2020	58,80	250,63	0,63	0,55	1,15
2021	69,85	285,07	11,05	34,44	0,32
2022	74,20	295,32	4,35	10,25	0,42
2023	92,32	347,76	18,12	52,44	0,35
2024	96,76	382,56	4,44	34,80	0,13

Source: Authors' calculating

*Note: * - billion US dollar*

The analysis for Romania also indicates that investments have generally been efficient. However, an interesting observation is that in 2020, according to the ICOR indicator, investments in Romania appeared inefficient, whereas Azerbaijan demonstrated efficiency. This suggests that the structure of investments and the lag effects differ across countries. For a clearer comparative assessment, it is necessary to examine the graph below.

Figure no.1 ICOR Dynamics in Azerbaijan and Romania

Source: Authors' calculating

The comparative analysis indicates that the average ICOR in both countries suggests investment efficiency. However, during the NBER-defined recession periods, which are marked in grey on the graph, the two countries exhibited different responses. This highlights differences in their economic development cycles and the lag structures of investments. In the long run, further research focusing specifically on these dynamics may provide a more precise and meaningful understanding of investment efficiency patterns.

5. Conclusion

Investments constitute a core component of countries' economic development strategies. Therefore, analyzing their efficiency is essential within the framework of strategic planning to ensure the optimal use of resources. The findings of this study further confirm that investments have had a positive impact on economic growth in both Azerbaijan and Romania.

Within the scope of the research questions, it has been determined that investments in both economies are generally efficient. However, the economic development cycles and investment lag structures differ between the two countries.

Moreover, to obtain more comprehensive results, it is necessary to conduct a sectoral, lag-based analysis of investment efficiency in these economies. This direction may serve as a key research question for future studies and contribute to more robust and insightful conclusions.

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STRATEGIES FOR THE DEVELOPMENT OF PRIVATE HIGH SCHOOL EDUCATIONAL SERVICES

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Abstract

Through education, people become specialists in a field of activity and can bring added value to society as a whole. Increasing the standard of living and quality of life is based on education, through the accumulation of knowledge, skills and complements to put them to personal and societal benefit. Choosing the right school for children completing middle school is essential for developing career prospects. Often, it makes you think about the following aspects: "is the high school close to home?", "is it a private high school or a state high school?", "what are the essential attributes for choosing a high school?". In fact, choosing the right high school must start from the children's vocations, their talents and their inclinations towards a particular preferred subject. Therefore, the observation of children throughout their school development, by parents and teachers, is essential in developing career perspectives for future high school students. Thus, strategies for developing educational services in private high schools take into account the vocations of children. Focusing on the talents of high school students is the basis of a comprehensive strategy and the starting point for providing quality educational services. The present paper assesses the private high school educational services in Romania and generates a plan strategy to enhance the development of this kind of educational services. In 2023, there were a total of 7102 education units in Romania, of which 6180 were public and 922 were private, according to the Romanian Institute of Statistics. The quality of education offered with an emphasis on talent and vocations, the lunch conditions and the cleanliness of the buildings, the safety offered, and the financial costs were criteria for differentiating between public and private education units in Romania. We propose a "meaningful private high school" as one that is based on the following values: creativity, courage and humanity. By implementing development strategies based on these values, we will succeed in offering high school children a better life and a high quality of life.

Keywords: high school education, SWOT analysis, school enrollment rate, school dropout rate

JEL Classification: I21, I24

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1. Introduction

A distinction has always been made between hard skills (technical knowledge and skills, cognitive skills) and soft skills (empathy and social interrelationship, non-cognitive skills) (Heckman et al., 2006). Thus, the personal preferences of employers take precedence over the academic knowledge of employees. Moreover, the development of artificial intelligence (AI) covering analytical tasks is leading humanity towards an era of the “Feeling Economy” in which human qualities are paramount (Huang et al., 2019).

By practicing non-cognitive skills from high school, children will be able to meet the current demands of the labor market (Chen & Chen, 2025). Social emotional competence leads to positive youth development according to studies conducted by Taylor et al. (2017). Moreover, social emotional competence is directly responsible for achieving a solid career (Cipriano et al., 2023) and increasing the quality of life (Shi & Cheung, 2024).

A private high school based on cultivating vocations and talents will aim to instill the values of trust and self-esteem, collaboration through teamwork, emotional communication, and the ability to relate to peers (Gil-Hernandez, 2021).

The 21st-century skills are critical thinking, digital literacy and emotional intelligence (Maoulida et al., 2023). These skills are more pronounced in private high schools than in public ones (Martínez-Bravo, 2022). The Romanian public education system comes with a lack of resources, overcrowded classrooms, and constant political changes that affect the entire public education system (Grigoriu, 2025).

Education services represent an investment in the economy and society with a view to their development (Febrianti et al., 2023). Unfortunately, the high cost of quality education limits access for students who do not have the money to learn in a high-performing system (OECD, 2019).

This paper first conducts an economic analysis of supply and demand for private high school education services in Romania, continues with a SWOT analysis of private high school services in Romania, and finally develops a unified development strategy for private high school education services in Romania.

The importance of this paper stems from the fact that private high school education services need a unified approach to educational provision in order to develop the empathy and interpersonal skills of potential students and future employees in the Romanian labor market.

Moreover, in order to raise the standard of living of the community as a whole, private high school education services create the right context for economic and social prosperity.

2. Literature review

According to Niche (2025), the selection of the best private high schools in America is based on their academic reputation and excellence. In addition,

the student-teacher interaction that develops over the years of study is important for potential students to develop an interest in the subjects.

For example, Groton School in Massachusetts (tuition \$44,800, student-teacher ratio: 5:1, students: 1,146) is considered to be the best private high school in America. Private high schools in America have always been intended for the wealthy, with fantastically high tuition fees and admission based on family connections passed down from generation to generation. The scholarship system and transparency in admissions have improved access over the past 10 years for high school students from a wider range of social classes, including those with high and average incomes. However, white students are still in the majority at prestigious private high schools in America, and racial issues have often been a topic of discussion (Newsweek, 2025).

Tarkhnishvili et al. (2022) analyzes the reasons why parents choose private high schools over public ones. The analysis is conducted at the level of high schools in Georgia and highlights the fact that the reputation of the high school, the importance of parental involvement in the process of choosing their child's future, and the social status of families are essential in choosing private high schools over public ones. Azimi et al. (2023) researched how private high schools influence students' performance in literature and mathematics, and the results confirmed that some private schools outperform public schools. According to Shakeel & Dills (2023) enrollment in private schools has boomed worldwide, from around 14% in 2000 to 18% in 2019, and the countries that have diversified enrollment in private schools have made better progress in learning than those that have not.

The public education system in Romania is rightly criticized. The figures are frightening. The pass rate for the aptitude test (8th grade for 9th grade) barely exceeds 70%, and for the baccalaureate (12th grade for university) it does not even reach 70%. In Romania, public education is free. However, parents still pay significant amounts each year for the “class” fund, the “school” fund, security, video surveillance systems within the school, transportation, in some cases, alternative textbooks and workbooks, and, last but not least, private tutoring (Agerpres, 2025).

Over the last 10 years (2014-2023), private high schools in Romania have seen a steady increase in demand and supply. According to the Romanian Institute of Statistics, in 2023 there were 922 private educational institutions registered, of which 88 were high schools. A total of 18,742 high school students were enrolled in these schools.

The largest increase in the number of private schools in Romania took place between 2012 and 2013, with an increase of 49 schools in that year. In the following years, the increase was steady, but did not maintain the same rapid pace. Most private schools are located in the Bucharest-Ilfov region, with 69 schools, 55 of which are in Bucharest alone.

Cluj ranks second in the ranking, with 24 such educational institutions, followed by Constanta, with 20 schools, and Iasi, with 15.

Firstly, private high schools are in demand because they offer a modern learning environment with opportunities for an international university career. Secondly, parents believe that the best financial investment is in their children's future, and allocate part of the family budget to pay for private education services.

The novelty it brings to the field our research is that it is usefully to have a development strategy created specifically for private high schools in Romania. In this way, prospective students can be provided with soft skills for their professional careers.

3. Research methodology and methods

First, we conducted a detailed analysis using up-to-date data on the supply and demand for private education services at the high school level. For this purpose, we used the databases of the National Institute of Statistics of Romania. The data was collected, analyzed, and interpreted. The following reference indicators for the private education services system at the high school level in Romania were considered, namely: Education units, by categories of units and ownerships in Romania; The evolution of the Private education units in Romania; The evolution of the enrolled population in private high schools in Romania; The evolution of the Classroom teachers in private education in Romania.

The data was organized into tables and figures to increase the degree of analysis and highlight the evolution of the phenomenon. The data was interpreted over a 10-year period, from 2014 to 2023, with 2023 being the most recent year in the Statistics Institute's database for which we had complete annual information.

The data analysis was supplemented with a SWOT analysis, and finally, the proposed development strategy was outlined.

4. Results and discussion

In 2023, a total of 7102 Education units were registered in Romania, of which 6180 were state education units, and 922 were private education units. The total number of private high schools in Romania in 2023 was 88, representing 6% of the total number of high schools in Romania (see Table 1).

Thus, in 2023, there were 1469 high schools in Romania, of which 94% were public high schools. Regarding the number of private theoretical high schools, these are 72, representing 12% of the total number of theoretical high schools in Romania.

The figures highlight a significant demarcation between state and private high schools and the fact that there is demand, and there is a market for private high school education services in Romania.

Table no.1 Education units, by categories of units and ownerships in Romania

Categories of educational units	Type of ownership	Year 2023
		Number
Total	Total	7102
-	Public ownership	6180
-	Private ownership	922
High schools - secondary education 2nd cycle	Total	1469
-	Public ownership	1381
-	Private ownership	88
Theoretical high schools and colleges	Total	598
-	Public ownership	526
-	Private ownership	72

Source: adapted from Romanian Institute of Statistics (2025),
<http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table>

Analyzing the evolution over time (2014-2023) for 10 years regarding the development of the private high school system in Romania, we note that in 2014, 82 private high schools were registered, of which 53 were theoretical high schools (65% of all private high schools) (see Table 2).

In 2023, the total number of private high schools was 88, of which 72 were private theoretical high schools. Practically, in 2023, the share of private theoretical high schools in the total number of private high schools in Romania was 82%.

The demand is overwhelmingly directed towards the theoretical profit of high schools on the education services market.

Even though the pandemic closed and halted the activity of a number of private high schools in 2020-2021, a return to their offer is observed for 2022-2023.

Table no.2 The evolution of the Private education units in Romania

Categories of private educational units	Year 2014	Year 2015	Year 2016	Year 2017	Year 2018	Year 2019	Year 2020	Year 2021	Year 2022	Year 2023
	MU: Number									
High schools - secondary education 2nd cycle	82	79	68	63	68	68	69	70	80	88
Theoretical high schools and colleges	53	53	50	49	51	53	55	56	65	72
Share of the Theoretical high schools and colleges from the total High schools	65%	67%	74%	78%	75%	78%	80%	80%	81%	82%

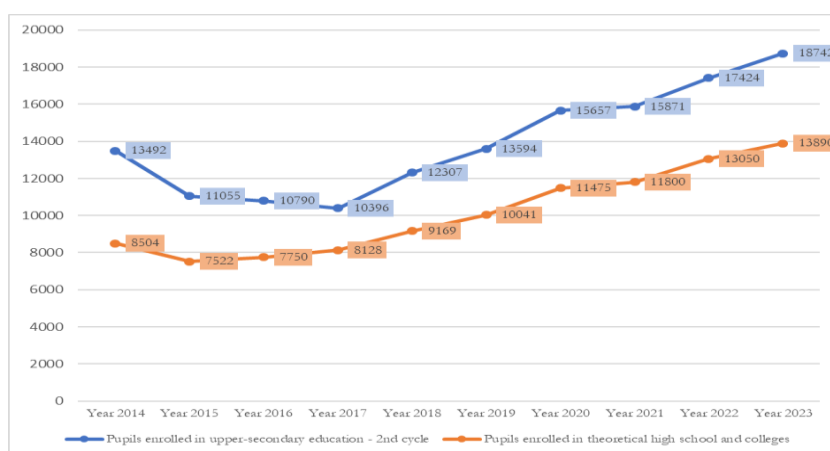
Source: adapted from Romanian Institute of Statistics (2025),
<http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table> ,
 shares authors own calculations

Studying the enrolled population in private high schools, over 10 years of activity (2014-2023), it can be observed in Figure 1 a year-on-year growth in the number of high school students in private education in Romania. The financial effort of parents is capitalized on through foreign language teaching programs, extracurricular activities that enhance the creative character of high school students. In 2023, 18,742 high school students were enrolled in private high schools in Romania, of which 13,890 were high school students studying in private high schools with a theoretical profile. On average, during the period 2014-2023, in Romania, approximately 14,000 high school students were registered in the private education environment. On average, during the period 2014-2023, 10,000 high school students were registered in private high schools with a theoretical profile. In a single year, 2023 compared to 2022, there was an 8% increase in the number of high school students attending private education services.

Regarding the elite private High Schools in Romania: One such institution is Avenor College, an institution that adheres to the British educational curriculum and offers the subsequent programs: The International General Certificate of Secondary Education (IGCSE), typically taken during the 10th and 11th grades, and the Advanced Level (A-Level) program, which is generally followed in the 12th and 13th grades, both highlight a robust focus on entrepreneurship. Alternative distinguished institution is the American International School of Bucharest (AISB), which suggest a distinguishing curriculum. The AISB has been decided full accreditation to offer the International Baccalaureate (IB) programs: The Middle Years Programme (MYP) is planned for students in Grades 6–10, while the Diploma Programme (DP) is intended for students in Grades 11–12. Moreover, the British School of Bucharest boasts a longstanding reputation. The Cambridge School of Bucharest is an institution that offers the opportunity to take Cambridge exams. Olga Gudynn International School has received accreditation for its provision of the IB Diploma Programme. Ioanid International High School has been recognized for its innovative and interactive teaching methodologies. Mark Twain International School: An emphasis on the arts and humanities. Verita International School: An emphasis on inquiry-based learning. Școala Europeană București: A multilingual, civic education emphasis. Under Romania's National Strategy for Environmental Education and Climate Change (2023–2030), private institutions can earn “Green School” status by meeting criteria like energy efficiency, biodiversity. Curriculum Innovation: Subjects like “Climate Change Education” and “Ecological Education” are gradually obtainable by the Romanian private high schools. Environmental Awareness Campaigns: Many private institutions run extracurricular programs, eco-clubs, and green weeks. Private education in Romania is self-confident to be a compound for: Entrepreneurial Mindsets: Encouraging students to reason imaginatively and

launch green or tech startups. Global Competitiveness: Equipping learners with skills that meet EU and global standards for sustainability and digital fluency. Resilience and Adaptability: Making students not just for jobs, but for lifelong learning in a rapidly evolving economy. Digital Skills Training: Coding, robotics, and AI are taught from primary levels in many private institutions. Partnerships with Tech Firms: Collaborations with companies like Microsoft, Google, and local startups help bring cutting-edge tools and real-world relevance into classrooms. Alignment with SMART-Edu Strategy: Many private institutions mirror the goals of the national digitalization strategy, such as fostering innovation, inclusivity, and preparing students for future jobs.

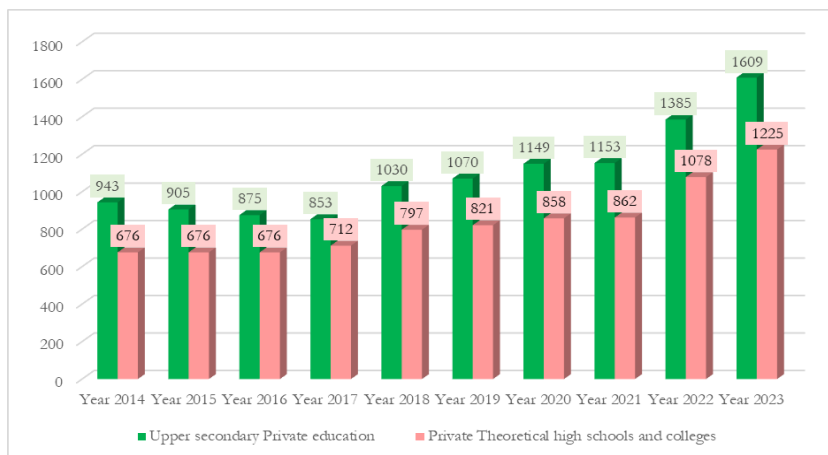
Figure no.1 The evolution of the enrolled population in private high schools in Romania



Source: created by the author using real data from Romanian Institute of Statistics, <http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table>

Closely following the number of teachers in private education services in the high school cycle, a favorable evolution is observed, increasing the number of teachers. Thus, demand influences supply, and in 2023 there were 1609 high school teachers teaching in the private system and 1225 theoretical high school teachers teaching in the private structure (see Figure 2). In 2023 compared to 2014, the number of high school teachers in the private environment increased by 70%, and the number of teachers in private theoretical high schools increased by 80%.

Figure no.2 The evolution of the Classroom teachers in private education in Romania



Source: created by the author using real data from Romanian Institute of Statistics,
<http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table>

Romania's private high schools are walking into a transformative role, bring into line their educational strategies with European and global priorities for sustainable development, institutional resilience, and innovation. Green Curriculum Integration: Schools like Avenor College are ground-breaking transdisciplinary tactics that connect subjects like mathematics with real-world sustainability challenge. Environmental Literacy: Students are taught climate science, circular economy principles, and ecological responsibility, making them to be agents of change in the green economy. Private schools are showing agendas that can be replicated nationwide, influencing policy and practice across Europe.

With growing student mobility and emigration of families, private schools modified by input bilingual programs, international curricula (e.g., Cambridge, IB), and supple enrollment policies to accommodate transient student populations.

Strategic Resilience Factors – Community Engagement Strong ties with parents and local communities allowed private schools to mobilize support and resources during crises—whether through fundraising, volunteerism, or digital outreach.

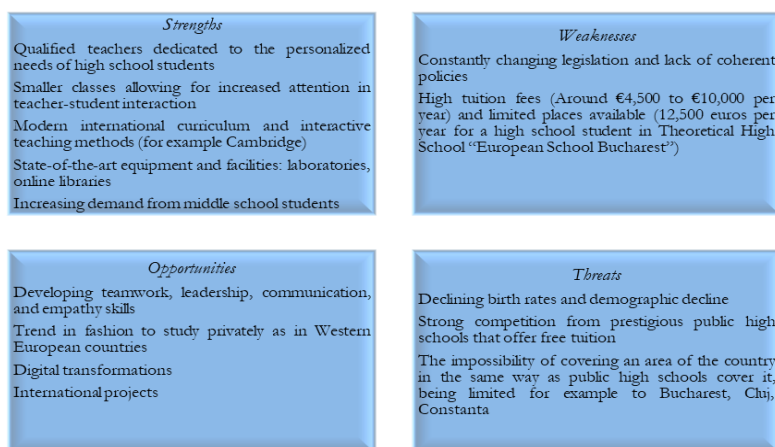
Reducing Dropout Rates with personalized learning smaller class sizes and customized attention help identify at-risk students early, offering personalized interventions that prevent dropout. Private schools frequently offer counseling, mentorship, and extracurricular appointment that foster a sense of belonging and motivation to stay in school.

Promoting Inclusive Education – Support for Students with Disabilities, as private schools have begun integrating inclusive teaching practices and facilities for students with special needs.

Anti-Discrimination Initiatives Programs that encourage tolerance, diversity, and civic responsibility are gradually implanted in curricula, serving fight social exclusion.

By designing a SWOT analysis for the high school private education services in Romania, we can highlight the following essential elements (see Figure 3):

Figure no.3 SWOT analysis for the high school private education services in Romania



Source: created by the author

Conceiving the strategy

In developing the strategy for the development of educational services in private high schools, the entire analysis carried out above and critical and empathetic thinking towards high school students were taken into account. Thus, in our opinion, the mission is to create an optimal environment in which students can develop harmoniously and express their personalities, generating opportunities for each student to train their intellectual, creative, moral, professional, physical, and aesthetic resources.

Strategic objectives (SO)

SO1 Use educational portfolios that allow for transparent monitoring of the child's progress during private high schooling

Specifically, the following actions will be pursued: implementing an automated portfolio, generated after completing the electronic catalog, which will include grades, summative assessment of students throughout their school career, and observations from school counselors; creating a section of the portfolio that highlights a profile and a series of recommendations for recovery or improvement, if necessary, based on the accumulated data.

SO2 Encouraging innovation, creativity, and entrepreneurial initiative among high school students by creating opportunities to stimulate their interest through various experiments, projects, and simulations

Precisely, the following steps will be taken as an action plan: identifying talents in various fields of activity (such as sports, art, chess, practical skills, etc.); supporting all students with special skills and talents to achieve excellence; enrolling talented students in contests or competitions to develop their skills, gain experience, and boost their self-confidence.

SO3 Developing practical solutions for identifying high school students' areas of performance, as well as their values, vocations, and talents in the way that academic excellence can be accomplished

Explicitly, organizing competitions and talent contests that emphasize teamwork, collaboration, and stimulating quick decisions that encourage courage and empathy among the high school students involved.

SO4 Support and continuous training of teaching staff and administrative personnel in private high schools

Recruiting and selecting the best teachers. Creating development opportunities for teachers through international mobility and financial and non-financial incentives (vacations and medical service packages). Organizing team-building events, training sessions, and free courses for teachers. Evaluating performance and offering subsequent bonuses.

SO5 Development, along with the renewal of equipment and laboratories used during classes and vocational hours

Purchase and use of new, high-performance, state-of-the-art equipment and devices (computers, printers, SMART boards, video projectors, tablets).

SO6 Developing the promotion of private education services for high school students through student and parent reviews and social media, so that publicity leads to an increase in the number of high school students in private high schools in Romania

Creation of official pages for each private high school on social media networks, creation of online content on social media pages, paid promotion through Google Ads/Facebook Ads, and Instagram. Promotion plays an extremely important role in building a reputation and creating awareness among parents and students.

Private education services can also be promoted through various competitions and contests, workshops for students, games, as well as informative and educational videos.

5. Conclusions

Reduced government funding and the perception that private schools offer a superior education have motivated parents to seek ways to afford private high school education. The rapid increase in the number of private schools in

Romania is largely due to the increase in the financial income of parents who can afford to pay expensive fees. With demand for private high school education services, there is also supply. This is evident from the analyzed data. In 2023, a total of 7102 Education units were registered in Romania, of which 6180 were state education units, and 922 were private education units.

Consequently, in 2023, 18,742 high school students were enrolled in private high schools in Romania, and there were 1609 high school teachers teaching in the private system. In conclusion, there are considerable differences between public and private schools in terms of teacher remuneration, extracurricular activities, employment opportunities after graduation, and national exam results. Private schools also offer a varied collection of extracurricular activities, with arts and sports facilities such as tennis courts.

The development strategy was designed to better position the strengths of private educational services in the eyes of consumers and ensure academic excellence by focusing on high school students with their vocations and talents.

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CONVERGENCE BETWEEN BIOECONOMY AND ARTIFICIAL INTELLIGENCE: A BENCHMARKING BETWEEN EU AND US UNDER 2026 PROSPECTS

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Abstract

This paper aims to analyze the current evolution of the global biotechnology sector, with a focus on green biotechnology and biopharma in the context of the multiple disruptive elements identified at international level and the increasing share of the influence of artificial intelligence on the sector. In the current context, the article aims to analyze how innovations, artificial intelligence and the BioTech industries have redefined their strategies and some of the world's best-placed players. The analysis highlights that while biotechnology remains a resilient engine of economic growth, new challenges related to AI ethics, data sovereignty and R&D costs are forcing a re-evaluation of traditional business models.

Keywords: Global Biotechnology, Artificial Intelligence, Green Biotech, Biopharma, Disruptive Innovation.

JEL classification: L65 O31 O33.

Introduction

The convergence between the bioeconomy and artificial intelligence has emerged as one of the most significant technological and economic developments of the current decade. Biotechnology is increasingly evolving into a data-driven sector in which artificial intelligence accelerates research and development, supports the discovery of new therapies, and enhances the sustainability and efficiency of agricultural and industrial bioprocesses.

Against this background, the present paper examines how artificial intelligence influences the competitiveness and strategic positioning of the biotechnology sectors in the European Union and the United States. These two regions represent distinct but highly relevant innovation models: the United States benefits from a highly integrated ecosystem supported by strong private investment and advanced research infrastructure, while the European Union combines substantial public funding with a regulatory framework strongly oriented toward sustainability, responsible innovation and strategic autonomy.

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The paper provides a comparative analysis of the European and American biotechnology ecosystems, with particular attention to green biotechnology, biopharma and agricultural biotechnology. It also explores the disruptive role of artificial intelligence in reshaping research processes, business models and regulatory approaches, and discusses the main technological and strategic trends expected to influence the sector during the 2026–2030 period.

By integrating economic, technological and policy perspectives, the article offers a structured interpretation of the emerging relationship between biotechnology and artificial intelligence and highlights its implications for global competitiveness and the future development of the bioeconomy.

Research methodology

This study employs a comparative qualitative research design aimed at examining the convergence between biotechnology and artificial intelligence in the European Union and the United States. The analysis is based on secondary data collected from institutional reports, market studies, scientific publications and official documents issued by international organizations, public authorities and major companies operating in the biotechnology sector.

The methodological approach combines three complementary perspectives. First, a comparative analysis is used to identify the main structural differences and similarities between the European and American biotechnology ecosystems in terms of financing, regulatory frameworks, innovation capacity and market dynamics. Second, a strategic analysis is conducted to assess the role of artificial intelligence as a disruptive factor influencing research and development processes, business models and competitive positioning. Third, a prospective approach is applied to explore the technological and economic trends likely to shape the biotechnology sector during the 2026–2030 period.

The study focuses on three major biotechnology domains: biopharmaceuticals, agricultural biotechnology and green biotechnology. The selection of these domains reflects their significant contribution to global economic growth, public health, food security and environmental sustainability. The analysis does not aim to provide econometric testing, but rather to develop an integrated interpretative framework that links technological innovation, policy developments and market evolution.

By combining recent statistical evidence with strategic and comparative analysis, the paper offers a structured perspective on how artificial intelligence is reshaping the global bioeconomy and influencing the relative competitive advantages of the European Union and the United States.

Chapter I: European Green Biotechnology – defining elements

The year 2021 was a historic moment in terms of attracting funds for research and development in the field of biotechnologies. Recent reports have

narrated a significant increase in the BioTech industry, especially since 2020, a phenomenon that can be explained by the new economic and social realities generated, among other things, by the COVID-19 pandemic. In fact, the pandemic year of 2020 was the catalyst that demonstrated to the relevant industries that investment volumes can evolve quickly even in a rather turbulent business environment. Many companies also experienced serious failures during the same period, an example of this being cancer studies that were in many cases suspended to allow all available resources to be channeled towards the development of effective vaccines in the shortest possible time.

In 2021, the **European Investment Bank Group** encouraged a major budget allocation for new funding for renewables and green efficiency, emphasizing Europe's pledge to improve access to green resources⁴.

The period 2021-2025 was a good time for the **European Investment Bank Group** to strengthen its role as the 'EU climate bank'⁵, while reaching historic funding thresholds.

Initially, the EIB set a target of more than 50% of annual financing going to climate action by 2025. This goal was achieved in advance. Thus, according to official reports, the year 2022 meant reaching a share of financing on the "green" component of approximately 58%, and in 2025 the same share rose to over 60% (the equivalent of approximately 50.3 billion EUR).⁶ The total amount allocated to "green" investments between 2021 and 2025 amounted to over 560 billion at the end of 2024. EUR.⁷

For the period 2026-2030, the EIB Group will also introduce a new financing target of €30 billion, practically doubling the volumes assumed from the years 2021-2025. These efforts will focus on increasing *energy competitiveness and security (reducing energy prices* and further promoting clean technologies), doubling the volume of financing for adaptation projects that will primarily target the agricultural and water resources sectors, as well as promoting resilient infrastructure.

The year 2026 will represent for many of these milestones the year of maturity of these programmed investments. For the financial year 2025, the

⁴ https://www.eib.org/files/publications/sustainability_report_2021_en.pdf accessed on 02.04.2026

⁵ <https://www.eib.org/en/press/all/2025-353-eib-group-to-accelerate-and-simplify-green-investment-boosting-european-competitiveness-energy-security-and-tech-leadership?lang=ro>, accessed on 02.04.2026

⁶ <https://www.eib.org/en/publications/online/all/eib-group-activity-report-2025> accessed on 02.04.2026

⁷ <https://www.eib.org/en/publications/20230176-eib-group-climate-bank-roadmap-mid-term-review> accessed on 02.04.2026

EIB has disclosed a record allocation of €20 billion, dedicated specifically to projects within the sectors of sustainable energy and applied biotechnology⁸.

The recent energy crisis has transformed the objectives of the European Investment Bank (EIB) Group from a purely green strategy into a pillar of national security and strategic autonomy for the whole of Europe. Instead of slowing down the green transition, the recent crisis, which does not seem to be easily solved and without long-term effects, will act as a catalyst, forcing the acceleration of investments to reduce dependence on fossil fuel imports.

The likely impact of the authors will be reflected in the following directions:

- *budget extension through REPowerEU+⁹*
- *prioritizing investments in the Biotechnology and clean technologies sector – "cleantech"*
- *the modification of some aspects of the energy strategy at European level, namely the fact that climate objectives, which were often seen as a cost, in the current context, are classified as strategic objectives at continental level.*

The level of transactions in the biotechnology segment, especially agricultural in the European Union, is estimated at around €14.70 billion in 2026, with a projection to grow to around €33.17 billion by 2034¹⁰. The "biostimulants" sector makes Europe a global market leader with a market share of over 38%, estimated at over €1.5 billion in 2026.¹¹

Europe maintains its leading status through the Dutch Belgian "innovation corridor" and technology clusters located in Switzerland. Companies such as **Novo Nordisk, AstraZeneca, Novartis, Roche and Sanofi** dominate the market capitalization chart, with a combined value exceeding the €1.1 trillion in 2026.¹²

An important competitive advantage of the European Union lies in its capacity to combine biotechnology development with broader policy objectives related to sustainability, digitalization and data governance. Unlike other major economic regions, the European model integrates research funding, climate policies and regulatory instruments into a coherent framework that supports both technological innovation and societal objectives. This integrated approach creates favorable conditions for the convergence between biotechnology and

⁸ <https://www.caleaeuropeana.ro/raport-bei-anul-2025-a-marc-at-un-moment-de-referinta-pentru-grupul-bei-care-a-atins-un-nivel-istoric-de-100-miliarde-de-euro-in-finantari-noi/#:~:text=Raport%20BEI:%20Anul%202025%20a%20marcat%20un,100%20miliarde%20de%20euro%20%C3%AEn%20finan%C8%9B%C4%83ri%20noi.> accessed on 05.05.2026

⁹ https://commission.europa.eu/topics/energy/repowereu_de accessed on 02.05.2026

¹⁰ [https://www.mordorintelligence.com/industry-reports/europe-biostimulants-market#:~:text=Europe%20Biostimulants%20Market%20Analysis%20by%20Mordor%20Intelligence.,\(CE\)%20marked%20products%20that%20streamline%20cross%2Dborder%20sales.](https://www.mordorintelligence.com/industry-reports/europe-biostimulants-market#:~:text=Europe%20Biostimulants%20Market%20Analysis%20by%20Mordor%20Intelligence.,(CE)%20marked%20products%20that%20streamline%20cross%2Dborder%20sales.) accessed on 02.05.2026

¹¹ Ditto 6

¹² <https://www.alpha-sense.com/largest-pharmaceutical-companies-by-market-cap/> accessed on 02.05.2026

artificial intelligence, particularly in areas such as precision agriculture, biopharmaceutical research and circular bio-based industries. As a result, Europe is increasingly positioning itself not only as a major biotechnology market, but also as a regulatory and strategic leader in the development of responsible and sustainable BioTech ecosystems.

Chapter II: The Biotechnology Sector in the United States of America – Innovation and Resilience

The biotechnology sector has grown a consistently positive dynamic in the US as well, especially after 2004, providing answers and solutions to national economic challenges, especially during the 2020 pandemic, generating well-paid jobs and a significant economic impact, generally helping the entire US economy, almost blocked by the restrictions imposed during that period.

Biotechnology industries have experienced constant growth rates, especially in the last 5 years, supporting the national economy and generating a substantial impact on the US economy.

There are a few areas that can be mentioned as spearheads of the **BioTech** field when we talk about the American economy. The U.S. is undoubtedly the world leader in the **BioPharma** industry. The U.S. economy is home to the world's largest innovation ecosystem (industrial clusters located in the Boston and San Francisco regions) and holds more than 40% of the global biologics market¹³. Although the US is certainly also a leader in agricultural biotechnology, the "spearhead" of this sector is not organic or organic farming, but conventional agriculture based on modern biotechnologies (GMOs). The US is massively focused on gene editing (CRISPR), genetically modified seeds (corn, soybeans, cotton) and precision technologies, with more than 90% of America's main crops being modified by biotechnology.

The United States maintains a preeminent position in biopharmaceutical research and development (R&D) through strategic allocation of substantial resources toward the discovery and advancement of some fresh therapeutic protocols. This innovative ecosystem is characterized by synergistic collaborations between private pharmaceutical enterprises, academic institutions, and research organizations. Furthermore, federal support is committed to further cultivate this culture of scientific advancement.

US is also known for its rigorous regulatory framework, primarily governed by the **Food and Drug Administration (FDA)**. These standards ensure clinical efficacy and safety for providers and patients. Moreover, the nation's robust intellectual property protection rules provide the necessary legal security to incentivize continued long-term investment in high-risk pharmaceutical R&D.

¹³ <https://pharmaboardroom.com/country-reports/healthcare-life-sciences-review-usa-2026/> accessed on 02.05.2026

Based on internationally available data, the most active and expanding **BioTech companies** in the U.S. are *Moderna, Takeda, AbbVie, Amgen, Regeneron, BioMarin, FUJIFILM Dozent Technologies and Frederick National Laboratory for Cancer Research*.

Companies such as *Moderna, AbbVie and Amgen* have expanded their manufacturing facilities at an accelerated pace over the past 5 years, benefiting from a robust regulatory framework. The U.S. remains a leader in personalized medicine and precision genomics, turning previously incurable conditions into manageable conditions.

The U.S. share for 2024 accounted for 38% of the global agricultural biotechnology market, and it is estimated that by the end of this year the U.S. will hold a market share of about 40%.¹⁴

According to **USDA ERS**¹⁵ data, between 2024 and 2025, the adoption of genetically engineered (GE) seed varieties within the United States reached unprecedented levels.

The gene editing segment (CRISPR-Cas9) seems to be the main catalyst for innovations for 2026, being preferred for its precision in the development of crops resistant to climate stress generated by climate changes manifested in recent years and the emergence of new categories of pests, resistant to classic treatments.

Although plant genetic modification remains the dominant segment in the market, a new trend should be mentioned in this context, namely microbe-based biotechnology, which is growing rapidly, offering alternatives to the now classic genetically modified seed crops.

The latest estimates for the American market in the BioTech area (including the Pharma industry) mention that the total reported value for last year, of over USD 690 billion, projects a massive growth for the current year as well¹⁶.

An additional structural advantage of the United States stems from its ability to rapidly transform scientific discoveries into commercially viable products and scalable industrial solutions. This capacity is supported by a highly integrated innovation ecosystem that combines world-leading universities, specialized research institutes, venture capital, and large pharmaceutical and biotechnology corporations. In contrast to the more policy-driven European model, the U.S. approach is characterized by strong entrepreneurial dynamics, faster access to private financing, and a regulatory environment that, while rigorous, often enables quicker market deployment of

¹⁴ <https://www.coherentmarketinsights.com/industry-reports/agricultural-biotechnology-market> accessed on 07.05.2026

¹⁵ <https://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-united-states/recent-trends-in-ge-adoption> accessed on 07.05.2026

¹⁶ <https://www.precedenceresearch.com/biologics-market> accessed on 07.05.2026

innovative therapies and technologies. The increasing integration of artificial intelligence further strengthens this ecosystem by accelerating drug discovery, optimizing clinical trials, and enhancing the development of precision agriculture and genomics-based applications. As a result, the United States continues to maintain a leading position in the global biotechnology industry and sets many of the technological and commercial trends that shape the future evolution of the bioeconomy.

Chapter III Competitive Analysis of Global Leaders and the Disruptive Impact of Artificial Intelligence

In the **BioTech** industry of 2026, the dividing line between what we call a traditional company and what represents a company that exists and grows thanks to innovation and technological research processes has become almost invisible. Of the companies mentioned in this article, at least the six major international competitors – **Novo Nordisk, Roche, Novartis, AstraZeneca, Sanofi and Pfizer** – have integrated what we now call Artificial **Intelligence** (AI) not only as a support tool in the research area, but also as the core of their entrepreneurial efficiency. This transition to a business oriented towards the inclusion and use of AI in as many company-wide processes as possible has inevitably generated systemic challenges that put pressure on the very profitability models established at the beginning of this decade.

Some companies, especially those operating in the pharma area, are already making extensive use of artificial intelligence to analyze and simulate the behavior of new innovative molecules that are in the testing procedure through the various clinical trials.

Although particularly useful, the help provided by AI can prove to be extremely expensive in the medium and long term, if the learning algorithms fail to generate a quasi-efficient and efficient "Deep Learning" process. Any result generated today with the help of AI and subsequently invalidated, for various reasons, by clinical trials will generate huge losses for these companies, either through the inefficiency of these new molecules, or through the additional costs, incurred after the research and testing phase to remedy the deficiencies.

Another challenge that did not exist a few decades ago is the so-called **Genetic Data Sovereignty** or, more clearly, protecting patients' data and preventing them from accessing computer systems from outside the country. In 2026, AI oncology analysis platforms, for example, are processing exabytes of data available and stored in both the US and the EU. The integration of AI into research processes makes it necessary to access these global databases. However, new data protection regulations in the EU and the US already severely limit AI's ability to "learn" cross-border. **Roche**, for example, is currently forced to invest heavily in Federated Learning (shared learning

without raw data transfer), a method that protects patient privacy but increases the complexity and costs of research infrastructure by more than 30%.¹⁷

Recently, another well-known company, **Novartis**, was forced to develop "Explainable AI" departments to logically translate machine decision-making processes into understandable clinical language, because regulatory authorities, such as the EMA, increasingly refuse and reject approval files for new pharma molecules, if the molecule's mechanism of action is determined exclusively by algorithmic inference. without the interaction of the human factor¹⁸.

Another and final challenge that I will mention in this chapter with reference to the pharma industry based largely or exclusively on the involvement of AI refers to the non-uniformity of historical data and time series that are practically part of the "menu" of any AI algorithm currently trained. Specifically, **Sanofi** recently admitted that a so-called "digital cleansing" is needed for clinical data collected in previous decades to be standardized and usable by AI algorithms¹⁹. This "digital cleaning" will undoubtedly require massive investment. AI trained on inconsistent data produces erroneous results, which can lead to the underrepresentation of certain variables in simulated clinical trials, risking the exclusion of products from international markets. Moreover, as in the case of commercial AI models, there is a tendency for the AI model to provide erroneous data, a trend that can be catastrophic for a business model in such sensitive industries.

Another sector synergistic to the BioTech industry that is particularly influenced by AI is that of agricultural biotechnology. The integration of artificial intelligence in the agricultural sector is not only a natural stage of technological evolution but is already a disruptive factor that will redefine the way we produce food, in which we optimize the resources of the present while managing the resilience of ecosystems in the face of future climate change.

Perhaps the most visible technological evolution is already taking place at this time in the processes of crop improvement. Traditionally, the development of a new hybrid took years, in some cases even over a decade. Today, advanced algorithms can analyze massive genomic databases to analyze the likely interactions of certain mutant or non-mutant genes under different environmental conditions. This enormous analysis and simulation capacity allows the total time required for genomic editing (such as CRISPR) to be reduced, allowing the creation of cultures with specific traits in record time.

In addition to the above, crop monitoring systems, mounted on drones, tractors or other machinery, can identify changes in crop health or nutrient

¹⁷ <https://cordis.europa.eu/project/id/831472> accessed on 07.05.2026

¹⁸ https://www.novartis.com/sites/novartis_com/files/novartis-responsible-use-of-ai-systems.pdf accessed on 08.05.2026

¹⁹ <https://fortune.com/2024/02/19/sanofi-ceo-ai-promises-great-era-drug-discovery-fundamentally-change-medicine/> accessed on 08.05.2026

deficiencies, before they are widely visible and begin to cause permanent damage. This targeted biotechnology, implemented with the help of artificial intelligence, allows the application of treatments only to the affected plots, reducing the consumption of pesticides and fertilizers, compared to the classic approach, according to which the treatments were applied in the necessary dose, to the entire crop, whether affected or not.

The integration of artificial intelligence into biotechnology is transforming not only the speed of scientific discovery, but also the economic logic and organizational structures of leading companies. AI has evolved from a supporting analytical tool into a strategic capability that influences the entire innovation cycle, from target identification and molecular design to clinical development, manufacturing optimization and post-market monitoring. At the same time, this transformation introduces new challenges related to data quality, model transparency, cybersecurity and regulatory compliance. The effective use of artificial intelligence therefore depends not only on access to advanced algorithms, but also on the ability of organizations to develop robust data governance frameworks and interdisciplinary expertise. In this context, competitive advantage increasingly derives from the capacity to combine biological knowledge, computational infrastructure and regulatory readiness into integrated innovation systems capable of delivering faster, more reliable and more sustainable outcomes.

Chapter IV: Prospective Trajectories and Evolutionary Technologies in the Biotech Sector

For 2026–2030 predictions are characterizing these following years like a profound transformation momentum across the biotechnology landscape, with particularly significant advancements anticipated within the medical and agricultural sectors.

Although the current period is found to be particularly complicated at the socio-economic and political level, the resettlement of the world economy and the global polarization of the economies of most of the states of the month will not be able to stop the evolutionary processes of the BioTech fields. If recent years have been dominated by the response of economies to multiple global crises, the next time horizon will most likely be defined by the convergence between generative artificial intelligence, precision genetic engineering and sustainable bioprocessing.

By 2030, the process of developing innovative new molecules will be radically transformed. New predictive technologies, based on artificial intelligence, for example "**AlphaFold**",²⁰ will enable the design of innovative

²⁰ Jumper, J. et al. (Nature, 2021/2024 updates): Highly accurate protein structure prediction with AlphaFold. accessed on 02.05.2026

proteins from scratch, shortening research times from a few years to just a few months. The algorithms will be able to predict not only the structure of proteins, but also complex interactions within human biological systems, reducing the failure rate in clinical trials and allowing the creation of "personalized" therapies, depending on the patient and condition.

If the first generations of artificial intelligence-based R&D iterations, the so-called CRISP therapies, focused on editing cells outside the patient's body, the 2026-2030 horizon will probably mark the emergence and maturation of new technological versions, which will advance in the direction of operating these genomic edits right at the level of the patient's body. Technologies such as "**Prime Editing**"²¹ will become standard, offering surgical precision at the molecular level, capable of correcting point mutations directly in the patient's body. This dynamic will turn chronic genetic diseases into curable or partially curable conditions.

The BioTech revolution will not only redefine the medical industries, but also other industrial branches such as those of the various materials necessary for the medical act.

For the agricultural sector, the 2026-2030 horizon will likely mean the shift from traditional agriculture to innovative and sustainable agriculture, also known in the literature as Agriculture 4.0²², where biotechnology and digitalization will work together to ensure global food security, under likely climate stress.

The period 2026–2030 is expected to mark a new stage in the evolution of biotechnology, characterized by the accelerated convergence of artificial intelligence, advanced genomic engineering and sustainable industrial processes. The most competitive ecosystems will be those capable of integrating scientific excellence, digital infrastructure, access to capital and adaptive regulatory frameworks into coherent innovation strategies. In the medical field, technologies such as AlphaFold and Prime Editing are likely to significantly reduce research timelines and improve the precision of therapeutic development, while in agriculture the expansion of Agriculture 4.0 will support the creation of more resilient and resource-efficient production systems. At the same time, the growing strategic importance of biotechnology and artificial intelligence will intensify global competition for talent, data and technological sovereignty. Under these conditions, the ability to align innovation with sustainability, public trust and responsible governance will become a decisive factor in shaping the future hierarchy of the global bioeconomy.

²¹ Anzalone, A. V. et al. (Nature, 2019/2023): Search-and-replace genome editing without double-strand breaks or donor DNA. accessed on 02.05.2026

²² https://www.researchgate.net/publication/398616382_AGRICULTURE_40_-_INNOVATION_S_FOR_SUSTAINABLE_DEVELOPMENT accessed on 02.05.2026

Conclusions

The **BioTech** industries in the European space have experienced a process of accentuated development in recent years, the European Union consolidating its top position in the world R&D hierarchy, through a robust institutional ecosystem and a business environment focused on the need to adopt innovative technologies.

In the **Biopharma** sector, the European Union operates in a framework marked by the heterogeneity of national health systems and reimbursement policies. This regulatory fragmentation unfortunately constitutes a significant barrier to the cross-border roll-out of innovative therapies.

Simultaneously, at the agricultural level, along with the implementation of innovative technologies, the bloc has intensified efforts to restore ecosystems by reducing human intervention and the reintroduction of regional native species, integrating precision agriculture and agroecology to ensure the long-term viability of sustainable food systems.

In contrast, the **U.S. BioTech** industry has long held global hegemony in the commercialization of disruptive therapies, benefiting from effective synergy between academia, the private sector, and government authorities. This model facilitates the harmonization of regulations and the acceleration of clinical trials.

At a global level, the demand for innovative biotechnological solutions is fueled by the urgent need to address some of the challenges of the current century, namely the identification of innovative therapies to combat the major diseases and conditions that have affected humanity for centuries, and at the economic and social level, climate change with all its possible implications and the scarcity of resources. From an economic perspective, BioTech industries will generate new competitive advantages in multiple fields. However, regional disparities remain evident: while the US dominates in terms of innovation capacity, Europe, through the voice of states such as Germany, France and Spain, must adopt much more incisive strategies to maintain the pace imposed by international competitors and to reduce a possible competitiveness gap.

From this perspective, the future of the bioeconomy will be shaped by those regions and organizations capable of transforming the convergence between artificial intelligence and biotechnology into a strategic instrument for improving public health, strengthening food security, advancing climate objectives and generating long-term economic value.

Future Research Directions

Future research could extend the present analysis by developing quantitative models to measure the relationship between artificial intelligence adoption and biotechnology competitiveness across different regions and industrial segments. Additional studies may also investigate the impact of regulatory frameworks, data governance and ethical standards on the pace of

innovation and market diffusion. Another promising direction concerns the analysis of emerging economies and their capacity to integrate biotechnology and artificial intelligence into sustainable development strategies. Finally, further research may explore the skills and institutional capabilities required to support this convergence, particularly in the context of growing demand for interdisciplinary expertise at the intersection of life sciences, digital technologies and public policy.

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FROM "HUMAN RESOURCE" TO "HUMAN PERSON" IN MODERN MANAGEMENT

Doru Negricea*

Abstract

This study analyzes the outlining of an integral paradigm of management, located at the intersection of human resource management, organizational ethics, artificial intelligence and theological anthropology. The paper highlights the shift from an administrative approach to personnel management to strategic and human-centered management, in which employees are seen as people endowed with dignity, creativity and the capacity for innovation. Through the contrast between the model of the "economic man" and the theological concept of the man created according to the "Image of God", the study proposes a reconsideration of managerial practices beyond the utilitarian logic and the exclusive orientation towards profit.

The research also examines the role of spiritual management, value innovation, and artificial intelligence in developing sustainable, ethical, and competitive organizations. Both the opportunities generated by AI in recruitment, assessment, talent development and decision-making are highlighted, as well as the risks associated with algorithmic bias, decision-making opacity and diminishing the human dimension of work. The study concludes that the future of human resource management must be based on responsible collaboration between humans and algorithms, supported by ethical governance, transparency, human oversight and respect for the dignity of the person.

Keywords: human resource management; theological anthropology; artificial intelligence; ethical leadership; spiritual management; sustainability; human dignity; algorithmic governance.

JEL Classification: M00; Z12.

Introduction

The profound transformations of the contemporary economic environment, marked by accelerated digitalization, organizational volatility, the intensification of global competition and the reconfiguration of the relationship between man and technology, require a substantial reassessment of the traditional paradigms of human resources management. If, in classical approaches, the HR function was predominantly associated with personnel administration, procedural compliance and transactional management of labor relations, today it acquires a strategic, ethical and transformational significance. Human resources can no longer be understood as simple productive tools, but as carriers of intellectual capital, creativity, organizational identity and innovative potential. This change marks the shift from an instrumental

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perspective on the employee to a holistic vision, centered on the dignity of the person, professional autonomy, continuous development and active participation in the construction of organizational value.

In this context, the present study analyzes the reconceptualization of human resources management from the perspective of a humanistic, strategic and sustainable paradigm, capable of integrating the imperatives of organizational performance with the ethical requirements of respect for human dignity. Such an approach implies going beyond the traditional model of the "economic man", defined by instrumental rationality and productive utility, and adopting an organizational anthropology that recognizes the employee as a moral, creative and relational subject. In this sense, the theological concept of the "Image of God" provides a relevant interpretative framework for understanding the person as a reality irreducible to his or her economic value, emphasizing the freedom, responsibility, vocation and creative potential of each individual.

Against the background of this reorientation, the HR function is called to evolve from a cost center into a strategic value generator, by aligning the recruitment, training, motivation, retention and professional development processes with the general directions of the organization. In an environment characterized by uncertainty, technological change and complex labor market dynamics, sustainable competitive advantage no longer derives exclusively from operational efficiency or material resources, but from the organization's ability to mobilize and capitalize on human potential. Thus, human capital becomes a central factor of sustainability, innovation and institutional resilience.

The study also examines the relevance of value innovation and the "blue ocean" strategy for human resource management, arguing that organizational differentiation can be sustained through a culture centered on meaning, values, engagement, and integral development. In this logic, spiritual management is understood not as a restricted confessional dimension, but as a managerial orientation that recognizes employees' need for meaning, belonging, contribution and moral coherence. By integrating ethical principles, social responsibility, and concern for employee well-being, organizations can build innovation spaces where economic performance and human development mutually enhance each other.

A central place in the present analysis is occupied by the impact of artificial intelligence on human resource management. The implementation of digital technologies, HR analytics, automation, and AI-powered systems is transforming the processes of recruitment, onboarding, assessment, professional development, workforce planning, and talent retention. These tools can base decisions on data, anticipate skills needs, personalize the employee experience, and streamline repetitive tasks. However, the technological potential of AI is accompanied by significant ethical risks, such as algorithmic bias, lack of

transparency, excessive surveillance, vulnerability of personal data, indirect discrimination, and diminished human contact in organizational processes.

For this reason, the integration of AI in HRM must be analyzed not only as a problem of managerial efficiency, but as a challenge of ethical governance, institutional accountability and protection of employee rights. The study argues for the need for robust AI governance frameworks in human resources, including independent audits, continuous monitoring mechanisms, algorithmic explainability, human oversight, privacy protection, and clear accountability procedures. In this framework, the role of the HR specialist is redefined, becoming an architect of hybrid work ecosystems, in which the collaboration between human and artificial intelligence is oriented towards performance, equity and well-being.

At the same time, the study addresses sustainability and diversity management as essential dimensions of contemporary HRM. The management of resources cannot be reduced to the economic logic of maximizing profit, but must be understood as responsibility towards employees, communities and the environment. In the context of AI-generated transformations, sustainability involves reskilling, upskilling, transparent communication, continuous feedback and the active involvement of employees in organizational change. Also, in a plural organizational environment, differences in gender, age, race, religion, culture, and professional identity influence recruitment, development, and retention policies. AI can help reduce unconscious biases, but it can also replicate existing inequalities if it operates without ethical audit, transparency, and human oversight.

By articulating these dimensions — anthropological, strategic, technological, ethical, spiritual and sustainable — the study contributes to the development of an integrated perspective on the future of human resource management. The originality of the approach lies in the fact that HR digitization is not treated as a purely technical process, and organizational ethics is not seen as an external normative addition, but as a constituent part of a unitary vision in which technology, human dignity, performance and social responsibility are analyzed in their interdependence. Thus, the research highlights that the future of HRM does not consist in substituting the human factor through algorithms, but in building hybrid organizational models, in which artificial intelligence amplifies, without canceling, people's moral discernment, creativity and relational capacity.

The main objective of the study is to examine how human resource management can be reconstructed as a strategic and ethical discipline in the era of artificial intelligence, through the integration of an anthropology of dignity, responsible technological governance and a sustainable vision of organizational development.

1. A New Paradigm: Prioritizing Autonomy and Holistic Development of the Individual

This conceptual evolution, observed since the end of the twentieth century, marked the shift from an administrative and instrumental approach to personnel to a strategic perspective, in which employees are considered essential factors of organizational performance. In this context, human resources management has begun to integrate dimensions such as skills development, professional involvement, organizational culture and talent retention, recognizing that the value of a company is built not only through material assets, but also through human and social capital. Thus, employees are no longer perceived exclusively as usable resources in the production process, but as carriers of knowledge, creativity and organizational identity, directly contributing to the company's sustainability and competitive advantage^[1].

This paradigmatic shift implies overcoming the traditional models of personnel administration, mainly oriented towards control, evidence and procedural compliance, in favor of a holistic approach, focused on the development of human capital and its integration into the organizational strategy. In this perspective, human resources management no longer functions as an isolated structure, but as a relational mechanism that articulates the interests of employees, management, institutional partners and other external actors involved in the socio-professional environment. Collaboration between internal and external entities is therefore becoming an essential condition for strengthening organisational adaptability, stimulating innovation and creating a sustainable working climate^[2].

In this context, human-centered management, or "human management", proposes a reinterpretation of the relationship between the organization and the employee, shifting the focus from the simple efficient use of the workforce to valuing the person as an active subject of organizational processes. This perspective supports a more sustainable and ethical form of governance, in which managerial decisions are guided not only by economic criteria, but also by social responsibility, fairness of professional relations and respect for human dignity. By recognising the intrinsic value of work and individual contributions, human management fosters the development of an organisational climate based on trust, participation and commitment, while strengthening long-term performance sustainability^[3].

This transition to human-centered management highlights the fact that talent development can no longer be treated as a secondary activity, but as a strategic imperative of organizations oriented towards sustainable performance. Through mechanisms such as continuous training, coaching, mentoring and support for organizational learning, companies can harness the individual potential of employees, while strengthening the collective capacity to adapt to changes in the professional environment. In parallel, building a supportive

organizational culture, focused on trust, participation and well-being, contributes to increasing engagement, stimulating innovation and staff retention, making human capital a decisive factor of long-term success^[4].

This approach becomes essential in a business landscape characterized by volatility, complexity and accelerated transformations, in which organizations are forced to constantly redefine their strategies and managerial practices. Flexibility and adaptability are, in this respect, fundamental organizational capabilities, as they allow to anticipate market changes, quickly adjust internal processes and maintain competitiveness in an uncertain environment. At the same time, harnessing intellectual capital – expressed through knowledge, skills, creativity and professional experience – helps to generate innovation and strengthen long-term competitive advantage^[5].

At the same time, the current challenges of the economic and organizational environment require a profound redefinition of human resource management practices, which can no longer be limited to administrative, operational or strictly procedural activities. Within this framework, the human resources function acquires a strategic role, contributing to the formulation and implementation of organizational objectives by attracting, developing, motivating and retaining the human capital necessary to obtain the competitive advantage. Moreover, the recognition of employees as strategic partners, capable of participating in decision-making processes, generating innovative solutions and actively contributing to organizational change, becomes essential for increasing productivity and strengthening long-term performance^[6].

This change of perspective determines the repositioning of the human resources departments from predominantly administrative structures into strategic partners of the management, actively involved in supporting the organizational development directions. In this regard, personnel management practices must be adapted so that they are consistent with business strategies, contributing to increased performance through effective policies for recruitment, professional development, motivation and employee retention. At the same time, integrating the concern for the well-being of employees with the capitalization of their knowledge, skills and experience strengthens the role of human capital as an essential strategic resource for the competitiveness and sustainability of the organization^[7].

The strategic perspective on human resources management highlights the need for continuous investment in the development of employees' skills, competencies and knowledge, as a fundamental premise for strengthening the organizational capacity to adapt. In this framework, employees are no longer perceived exclusively as operational resources, but as valuable assets, bearers of intellectual capital, creativity and professional expertise, capable of generating added value. By supporting continuous training and organizational learning, human resources management contributes to stimulating innovation, making

internal processes more flexible and maintaining competitiveness in a constantly changing economic environment^[8].

The strategic integration of the HR function highlights the fact that human resources management is no longer just an administrative support, but an essential component of the company's decision-making and operational architecture. By aligning recruitment, training, evaluation and motivation policies with the overall objectives of the organization, the HR function directly contributes to strengthening performance, flexibility and innovation capacity. Thus, human resources become a central element of the operational strategy, supporting long-term competitiveness and creating an organizational advantage that is difficult to replicate^[9].

Therefore, there is an increasing dependence of companies on the level of involvement, loyalty and commitment of employees, which become determining variables of organizational performance. In an economic environment marked by competitiveness and continuous change, employees who show attachment to the organization contribute more effectively to the achievement of strategic objectives, through active participation, professional responsibility and results-orientation. Therefore, strengthening employee engagement should be approached as a managerial priority, as it directly influences productivity, the quality of internal processes and the company's ability to sustain its long-term competitive advantage^[10].

2. Anthropology and Management: "The Economic Man" vs. "The Image of God"

This section examines the anthropological foundations of managerial theories, highlighting the tension between the traditional paradigm of the "economic man," reduced to instrumental rationality and his productive function, and a holistic perspective on the person, inspired by the concept of the "Image of God," which affirms the intrinsic dignity, moral freedom, and creative potential of each individual. This antithesis reveals the need for a critical re-evaluation of managerial practices, so that organizations go beyond the strictly utilitarian logic of profit maximization and adopt management models oriented towards the authentic valorization of human capital. In this framework, the strategic integration of the HR function with business objectives becomes essential, as employees are no longer perceived as mere means of production, but as organizational partners capable of generating solutions, innovation and sustainable competitive advantage^[11].

This evolution marks the shift from a purely transactional personnel management, focused on record-keeping, compliance and operative management of labor relations, to a strategic approach to human resources. In this new framework, the HR function is no longer limited to the execution of administrative procedures, but becomes an active partner in the formulation and

implementation of the business strategy, contributing to the definition of organizational development directions. Thus, human resources management acquires a central role in supporting performance, by aligning the skills, motivation and potential of employees with the long-term objectives of the organization^[12] ^[13].

In this context, the HR function goes beyond its traditional status as a cost center, being reconceptualized as a strategic engine of the organization, capable of directly influencing innovation capacity, structural adaptability and long-term performance. Aligning human resources strategies with business objectives thus becomes an essential condition for attracting, developing and retaining talent, as it allows the correlation of human potential with the company's major growth and competitiveness directions. At the same time, by promoting an organizational culture oriented towards collaboration, continuous learning and openness to change, human resources management contributes to strengthening an environment favorable to innovation and organizational sustainability^[14].

Thus, the need to reconsider the investment in employee development is highlighted, as it is no longer perceived as a simple operational expense, but as a strategic approach aimed at strengthening human capital. Through professional training, continuous development, coaching and skills development programs, organizations can increase the level of expertise, adaptability and involvement of employees, contributing directly to institutional performance. Consequently, employee development becomes a source of sustainable competitive advantage, as it generates organizational knowledge, stimulates innovation and supports the company's ability to respond effectively to changes in the business environment^[15].

This change is essential for strengthening the HR function as a true strategic partner, capable of contributing not only to personnel management, but also to the creation of organizational value and to the achievement of business objectives in an economic environment marked by volatility, uncertainty and accentuated competitiveness. In this sense, HR transformation involves going beyond its traditional administrative role and assuming a proactive function, oriented towards identifying, developing and capitalizing on the potential of employees. At the same time, this critical perspective distances itself from the classic HRM model, which has often treated employees as mere productive resources, proposing instead an approach that recognizes the intrinsic dignity, skills and creative capacity of each individual^[16].

The emerging paradigm of human resources management, based on a humanistic perspective, proposes to overcome the instrumentalist vision of the employee and recognize him as a valuable subject, bearer of dignity and potential for development. In this logic, talent management and human resource development are no longer simple support functions, but strategic imperatives

through which the organization builds a culture oriented towards continuous learning and collective responsibility. Thus, the HR function transforms from a cost center into a strategic value generator, integrating the principles of transformational management and organizational ethics into personnel decisions^[17].

This strategic reorientation highlights the maturation of human resources management by going beyond its traditional procedural role in favor of a direct contribution to organizational strategy. Human capital is recognized as an essential strategic resource, capable of influencing performance and competitiveness in the long term. Thus, the HR function becomes an integral part of the organization's strategic architecture, facilitating the alignment of employees' motivation and potential with institutional objectives^[18]. The paradigm shift is essential for organizational sustainability, as employees are recognized as holders of intellectual capital and strategic skills. However, HR leaders need to overcome resistance to change and overly technology-centric mindsets at the expense of human value, ensuring real and proactive strategic alignment^[19].

3. Value Innovation and Spiritual Management: A "Blue Ocean" Strategy

This section looks at how value innovation, associated with the creation of undisputed market spaces or "blue oceans", can be strengthened through spiritual management oriented towards meaning, values and the integral development of the person within the organization. Such a perspective goes beyond the traditional economic logic, focused exclusively on efficiency and profit maximization, proposing to capitalize on the deep human dimension of employees as a source of creativity, commitment and strategic differentiation. By integrating ethical principles and social responsibility into human resources strategies, organizations can simultaneously support innovation, employee well-being, and long-term sustainability, generating value for both the company and society^[20].

This synergy between value innovation and spiritual management gives organizations the opportunity to overcome direct competition and build forms of differentiation based on organizational sense and authentic commitment. Within this framework, sustainable competitive advantage results from the organization's ability to mobilize the human potential and loyalty of the workforce around a common vision. To support this orientation, the HR function must evolve into a strategic partner capable of integrating advanced technologies and data analytics into recruitment and development processes, ensuring consistency between business objectives and organizational values^[21].

This requires a profound rethinking of management practices, going beyond traditional administrative functions and moving towards an approach

capable of supporting agility and inclusion. The HR function must integrate an advanced understanding of technological transformations and the expectations of an increasingly diverse and dynamic workforce. By continuously adapting employee engagement policies, organizations can strengthen their resilience and competitive advantage in the face of the challenges of today's economic environment^[22].

The implementation of digital technologies, such as artificial intelligence and advanced data analytics, is becoming a central pillar of the strategic transformation of human resource management. A "blue ocean" strategy applied in HR involves rethinking the talent management ecosystem by creating differentiated value, based on ethics, well-being and personalization of the professional experience. Thus, the HR function evolves from an administrative role to a transformational one, capable of using data to inform decisions and support work flexibility in the digital age^[23].

These modern tools contribute to streamlining performance management by providing relevant data to inform decisions. The integration of artificial intelligence allows the automation of repetitive tasks, such as candidate screening, reducing operational time and increasing the accuracy of the selection. In this way, HR specialists are relieved of administrative burdens and can direct more resources towards strategic initiatives, such as talent development and improving the employee experience^[24].

The digitization of the HR function facilitates smarter, predictive and personalized management of human capital. Within this framework, a hybrid talent management architecture is outlined, in which strategic decisions are based on the complementarity between advanced algorithms and qualified human judgment. At the same time, for this digital transformation to generate a legitimate competitive advantage, it is necessary to establish an ethical governance of artificial intelligence, based on transparency, algorithmic fairness and the development of hybrid skills of HR professionals^[25].

4. Ethical Leadership in the Age of Artificial Intelligence: The Technical-Theological Perspective

The integration of artificial intelligence into leadership processes generates significant challenges regarding the moral character of algorithmic decisions, especially in situations where they influence the evaluation of performance, the distribution of opportunities or the orientation of organizational behaviors. In this context, it becomes necessary to develop ethical governance mechanisms, capable of ensuring transparency, accountability, fairness and human oversight of the algorithmic systems used in the managerial act. Thus, AI-assisted leadership must be grounded in solid human values, so that technology does not replace the moral discernment of leaders, but supports more informed, fair and well-oriented decision-making^[26].

This paradigm requires a comprehensive approach to the implementation of artificial intelligence in organizations, where operational benefits, such as efficiency and process optimization, are balanced with the need to comply with ethical standards and protect employee well-being. In this regard, the development of robust ethical frameworks for AI becomes essential to prevent risks associated with discrimination or technological opacity. At the same time, collaboration between HR, IT and data science teams is indispensable for aligning AI initiatives with strategic HR objectives^[27].

This integration means that HR professionals continuously develop their technical and digital skills so that they can critically evaluate and implement appropriate AI solutions. The adoption process must take into account not only operational efficiency, but also criteria such as personal data protection and information security. In this way, the HR function can ensure a responsible use of AI, helping to build employee trust in the digital transformation of the organization^[28].

The development of a solid digital infrastructure is a fundamental condition for the efficient scaling of AI-based solutions in human resources processes. Such an infrastructure allows you to reap the benefits of digital transformation while reducing the risks associated with data security and technological dependency. In parallel, the institutionalisation of an AI ethic at the organisational level becomes essential by developing governance frameworks that guarantee algorithmic transparency and the protection of employees' rights^[29] ^[30].

This process involves the establishment of continuous monitoring of the algorithmic systems used in human resources, in order to identify and correct any biases that may affect recruitment or promotion decisions. In the absence of rigorous audit mechanisms, algorithms can replicate existing inequalities, undermining the principles of fairness and inclusion. Therefore, responsible monitoring of these systems becomes essential both to maintain employee trust and to comply with non-discrimination regulations^[31].

A constant commitment to continuous learning becomes essential to maintain the relevance of the HR function in a context marked by accelerated digitalization. Adapting to new technologies requires the continuous development of digital and strategic skills, so that specialists can use emerging tools in an efficient and value-oriented way^[32] ^[33]. The ability to interpret the data generated by AI systems becomes essential for substantiating balanced decisions, integrating operational efficiency with ethical responsibility and employee well-being^[34].

Such an approach requires multi-stakeholder involvement, in which experts in artificial intelligence, human resources and organizational ethics collaborate to design responsible solutions. The complexity of automation requires an interdisciplinary perspective, capable of anticipating both the

operational benefits and the risks associated with algorithmic discrimination or decision-making transparency^[35] ^[36]. This collaboration is essential for the development of artificial intelligence systems that are not only technically efficient, but also compatible with the social principles of human resource management^[37] ^[38].

It is also necessary for organisations to establish independent audit mechanisms for AI systems so that their operation is regularly assessed for accuracy and compliance with ethical rules. Such a practice allows for the early identification of algorithmic errors and systemic biases that may affect recruitment or performance evaluation processes^[39]. This demonstrates the organization's commitment to the responsible use of technology, strengthening the legitimacy of the digital transformation of the HR function in a climate based on institutional responsibility and safety^[40].

5. Economics and Sustainability: Resource Management as a Vocation

This section examines the fundamental role of ethics in the sustainable management of human and material resources, highlighting the need to articulate economic principles with the requirements of social responsibility and sustainable development. In this perspective, managerial decisions cannot be evaluated exclusively by criteria of efficiency, productivity or profitability, but must also be analyzed in relation to their long-term effects on employees, communities and the environment. Thus, resource management acquires a normative and strategic dimension, oriented towards the creation of sustainable value, balancing economic interests with social and ecological ones and overcoming the restrictive logic of profit maximization^[41].

In the context of the work revolution generated by artificial intelligence, sustainable human resource management requires a proactive approach to technological transformations, in which change is strategically managed for the benefit of the organization and employees. This involves supporting staff through reskilling and continuous upskilling processes so that skills are aligned with the emerging demands of the digital labour market. By investing in future skills development, organizations can strengthen resilience and performance sustainability, turning the impact of AI into an opportunity for human growth^[42].

Human resources departments must develop integrated change management strategies capable of facilitating the adaptation of employees to new forms of human-machine collaboration. These strategies include systematic development programs, transparent communication and continuous feedback mechanisms. Through the use of pilot programs and the direct involvement of staff, HR can reduce resistance to change and support a sustainable transition geared towards building trust in new technologies^[43] ^[44] ^[45].

Integrating AI into human resource management can significantly contribute to sustainable development by supporting fairer and data-driven decisions. By using AI technologies responsibly, organizations can address societal challenges such as equal access to career opportunities and reducing discrimination in recruitment. Thus, the HR function becomes a strategic actor in achieving sustainable development goals, articulating economic performance with employee well-being^[46].

However, to fully realise the potential of AI, it is necessary to rigorously address ethical implications, especially those related to data privacy and algorithmic bias. The ethical governance of AI becomes indispensable for balancing innovation with social responsibility, ensuring that the automation of repetitive tasks does not diminish the relational and human dimension of human resource management^[47]. Ethical principles must be incorporated into all stages of the life cycle of AI systems, contributing to the transformation of the HR function through the emergence of new roles, oriented towards algorithmic governance and strategic optimization of the workforce^[48].

This transformation involves a rethinking of the role of HR departments, which are becoming architects of hybrid work ecosystems. HR has the responsibility to design policies that capitalize on the complementarity between algorithmic capabilities and specifically human skills, such as moral judgment and empathy^[49]. At the same time, extensive workplace oversight and the opacity of automated decisions create challenges for organizational trust. It is imperative to develop robust governance frameworks that include the explainability of decisions and the protection of personal data, ensuring fairness and alignment of innovation with the Sustainable Development Goals^[50] ^[51].

Finally, HR managers need to develop specific skills in identifying algorithmic bias and ensuring the transparency of AI systems. The establishment of clear accountability and human oversight mechanisms remains essential to prevent discrimination and legitimise the organisation's digital transformation into a sound ethical framework.

6. Diversity Management: The Dialogue Between Science, Religion, and Organizational Culture

Addressing the complexity of diversity in contemporary organizations requires a nuanced understanding of how scientific perspectives, religious values, and dominant cultural norms intersect, generating both potential tensions and opportunities for dialogue, cohesion, and organizational innovation. These dynamics directly influence the formulation and implementation of diversity management policies, and it is necessary to develop inclusive strategies that promote equity, mutual respect and the capitalization of identity plurality at an operational and strategic level. In this regard, future research needs to propose rigorous methodologies for assessing the social

impact of religious and cultural diversity, as well as ethical frameworks for designing AI systems used in recruitment, so that they reduce algorithmic biases and support an organizational culture geared towards human dignity^[52].

There is also a need to investigate how artificial intelligence can support the development of tailor-made training and professional development programmes tailored to employees' individual skills profile and goals. By analyzing data on performance and learning preferences, AI systems can help identify skills gaps and recommend relevant educational pathways. Thus, the integration of AI into organizational learning processes facilitates the transition to the new skills required by the digital age, strengthening workforce adaptability and professional inclusion^[53]. In this context, future research needs to look at the impact of artificial intelligence on employee self-efficacy, investigating factors that influence acceptance or resistance to these solutions, such as the level of digital skills and trust in algorithmic systems^[54].

At the same time, it is important that studies examine the ways in which AI can support the management of generational diversity, gender identities and racial plurality. Through the use of ethically audited algorithmic systems, AI can help identify and reduce biases in selection processes, promoting more transparent and fair decision-making criteria^[55] ^[56]. This requires an in-depth analysis of the ethics of AI in recruitment, given that algorithms can significantly influence candidates' access to professional opportunities. The design and continuous monitoring of systems are essential to prevent the recurrence of discrimination related to cultural origin or other identity criteria^[57].

A crucial aspect is the ability of artificial intelligence to analyze large volumes of data to identify decision-making patterns that may reflect unconscious biases. Through advanced analytical models, AI can highlight imbalances in selection, providing support for correcting unfair practices. However, this capacity must be supported by ethical audits and algorithmic transparency to effectively promote diversity^[58]. Future research should investigate the long-term impact of these innovations on institutional performance and the quality of the candidate experience, integrating technical and ethical dimensions to ensure decisions aligned with the principles of non-discrimination^[59].

Conclusions: Towards a New Paradigm of Integral Management.

In conclusion, the transformations generated by artificial intelligence require a profound reconceptualization of human resource management, which can no longer be understood exclusively as an administrative or operational function, but as a strategic, hybrid and ethical field, at the intersection of technology, human capital and social responsibility. The integration of AI into recruitment, selection, professional development, retention, and workforce planning processes gives organizations the opportunity to anticipate labor

market trends, optimize managerial decisions, and build more effective talent capture mechanisms. However, these benefits cannot be separated from the associated risks, such as algorithmic bias, decision-making opacity, excessive surveillance, vulnerability of personal data and the potential diminishment of the human dimension of labour relations.

Therefore, the future of human resource management must be based on a holistic vision, in which advanced technologies are integrated with sound ethical principles, respect for human dignity and the promotion of organizational fairness. The HR specialist of the digital age is no longer just a personnel administrator, but becomes a strategic architect of organizational culture, capable of harmonizing algorithmic efficiency with human judgment, predictive analytics with empathy, technological innovation with social responsibility. In this regard, technical skills must be complemented by socio-emotional, ethical and legal skills, so that AI-based decisions remain transparent, explainable, inclusive and oriented towards the well-being of employees.

At the same time, the study highlights the need to develop robust AI governance frameworks in HRM, including algorithmic audit mechanisms, protection of candidate and employee confidentiality, bias mitigation strategies, and clear institutional accountability procedures. In the absence of such mechanisms, the use of AI risks replicating or even amplifying existing inequalities, affecting organizational trust and the legitimacy of decision-making processes. Instead, when designed and implemented responsibly, artificial intelligence can help create fairer recruitment practices, develop tailored training and reskilling programs, and build organizational resilience in an economic environment marked by uncertainty and accelerated change.

On this basis, future research should delve into the ethical, social and legal implications of AI in human resource management, with a focus on recruitment, performance evaluation, skills development and the dynamics of the human-technology relationship. Longitudinal studies are needed to analyze the evolutionary impact of artificial intelligence on employee performance, professional self-efficacy, organizational diversity, institutional culture, and long-term sustainability. Thus, the future direction of HRM does not consist in replacing the human factor with technology, but in building a model of intelligent collaboration between humans and algorithmic systems, capable of supporting performance, inclusion, innovation and human dignity in the organizations of the future.

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ECONOMIC CONVERGENCE WITHOUT FINANCIAL DEEPENING: A SELF-REINFORCING STRUCTURAL TRAP IN ROMANIA

Florin Dănescu *

Abstract

This paper addresses a central paradox in economic development: how can a country achieve rapid convergence in GDP per capita while maintaining persistently low levels of financial intermediation? The existing literature emphasizes the critical role of financial intermediation in supporting economic growth, efficient resource allocation, and institutional discipline [Levine, 2005; Beck et al., 2000]. However, Romania represents a notable deviation from this framework, combining strong economic growth with one of the lowest levels of financial intermediation in the European Union—approximately 23% of GDP compared to an EU average of around 75%. We argue that this apparent contradiction reflects not the absence of financing, but the presence of alternative mechanisms of economic coordination and capital allocation, including European funds, foreign direct investment, remittances, trade credit, and state-mediated resource allocation. While these mechanisms partially substitute for formal financial intermediation, they also reshape economic behaviour, weaken financial discipline, and reduce incentives for formalization. The analysis is based on a comparative framework using World Bank and European datasets, covering the period from the 1990s to the present, and benchmarking Romania against Central and Eastern Europe and advanced European economies. The empirical analysis focuses on three interconnected dimensions: the divergence between economic convergence and financial intermediation, the role of substitute financing mechanisms, and the structural constraints affecting bankable demand. A key contribution of this paper is the formulation of a self-reinforcing structural model of financial underdevelopment, in which limited bankable demand, institutional constraints, and the availability of substitute financing mechanisms interact to endogenously sustain low levels of financial intermediation despite ongoing economic convergence. The Romanian economy thus emerges as a structurally constrained system in which convergence is sustained through alternative mechanisms that simultaneously limit the expansion of formal financial intermediation and the long-term sustainability of growth.

Keywords: Financial intermediation; economic convergence; structural trap; bankable demand; informal economy; institutional economics; trade credit; EU funds; Central and Eastern Europe; Romania.

JEL Classification: O16.

Introduction

Over the past two decades, Romania has experienced one of the fastest rates of economic convergence in the European Union, reaching approximately 75–80% of the EU average in GDP per capita. This performance represents a

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historically unprecedented improvement in Romania's economic position, reflecting substantial structural transformation and integration into the European economy.

At the same time, financial intermediation has remained persistently low, at around 22–23% of GDP, significantly below both the European average and the levels observed in comparable Central and Eastern European economies. This divergence challenges the conventional assumption that financial deepening is a necessary condition for economic development and points to a structurally distinct growth configuration.

Standard statistical indicators do not fully capture the structure of the Romanian economy. A significant share of economic activity operates partially outside formal financial and institutional channels, creating a mismatch between measured financial depth and actual economic dynamics. In this context, low financial intermediation reflects not only financial underdevelopment, but also deeper structural characteristics, including limited transparency and incomplete formalization.

A key explanatory factor lies in the legacy of the transition period of the 1990s, which in the Romanian case can be described as a “lost decade”. Unlike several Central and Eastern European economies that advanced through coordinated reform frameworks such as the Visegrád process, Romania experienced a delayed and fragmented transition, marked by repeated episodes of institutional instability and social disruption, most notably the *mineriads*. Rather than consolidating market-oriented institutions, this period contributed to the persistence of informal practices and weak enforcement mechanisms. In economic terms, the stagnation is visible: GDP per capita in current USD remained broadly unchanged, from approximately 1,640 USD in the early 1990s to around 1,660 USD by 2000, indicating a decade of negligible real progress.

This divergence in initial conditions had long-term consequences. While other countries in the region entered a phase of earlier institutional consolidation and integration, Romania's delayed adjustment reduced its capacity to build a stable foundation for financial intermediation. Moreover, the timing of convergence proved structurally unfavourable: the acceleration of growth and financial deepening occurred only in the 2000s and was rapidly interrupted by the global financial crisis, limiting the time available for the organic consolidation of bank-based intermediation.

These early dynamics generated long-term path dependencies, shaping a structurally embedded form of economic coordination based on informal networks. Such arrangements—often referred to in the Romanian context as “*cumetrie*”, a form of relationship-based and network-driven access to economic opportunities—reflect non-transparent mechanisms of coordination that continue to influence market functioning, competition, and resource allocation.

The implications extend beyond financial intermediation into broader dimensions of economic performance. Romania exhibits relatively low fiscal revenue collection compared to the European average, reflecting both limited formalization and structural inefficiencies. Firms operating within the formal economy often face competitive disadvantages relative to those relying on informal or relationship-based mechanisms, contributing to distortions in market competition.

From a structural perspective, the Romanian economy can be understood through three interrelated dimensions: financial, fiscal, and legal. These dimensions interact in shaping institutional capacity, economic behaviour, and resource allocation. Weaknesses across these domains reduce incentives for formalization and contribute to the persistence of informal practices.

These dynamics are reinforced by resistance to institutional change. Drawing on insights from change management and strategic analysis literature, such resistance is embedded not only in cultural factors, but also in economic incentives, organizational structures, and historical legacies. When existing arrangements provide short-term advantages, economic actors face limited incentives to transition toward more transparent and rule-based systems.

At the same time, Romania's economic growth has been supported by alternative financing and coordination mechanisms, including European structural and investment funds, foreign direct investment, remittances, trade credit, and the role of the state in resource allocation. While these mechanisms compensate for low levels of financial intermediation, they also contribute to a fragmented system of economic coordination.

An important implication of this structure is the emergence of constrained "bankable demand." The combination of firm size distribution, informality, limited transparency, and behavioural factors reduces the capacity of firms and households to engage with the formal financial system, reinforcing persistently low financial intermediation.

In this context, the concept of "bankable demand" becomes central to the analysis. Rather than reflecting purely supply-side constraints, financial intermediation is shaped by the capacity of economic agents to meet the transparency, capitalization, and behavioural requirements of formal finance.

This paper argues that Romania represents a self-reinforcing structural trap in which convergence is sustained through mechanisms that simultaneously weaken the conditions required for deeper financial intermediation. This configuration supports short-term economic convergence, but generates long-term vulnerabilities, including weak fiscal capacity, limited institutional trust, and constrained financial development.

The empirical analysis that follows examines the divergence between economic convergence and financial intermediation, the role of substitute

financing mechanisms, and the structural constraints affecting bankable demand, in order to explain the persistence of this structural trap.

Literature review

The relationship between financial intermediation and economic growth has been extensively documented in the literature. Financial systems are widely understood to facilitate capital allocation, risk management, and productivity growth [Levine, 2005], while empirical evidence shows that financial depth is strongly associated with long-term economic development [Beck, Levine, and Loayza, 2000]. These contributions establish financial intermediation as a central mechanism of economic coordination.

However, subsequent research has nuanced this relationship. Differences in financial structure have been shown to affect growth outcomes [Demirgüç-Kunt and Levine, 2001], while other studies suggest that beyond a certain threshold, finance may exhibit diminishing returns for economic growth [Arcand, Berkes, and Panizza, 2012]. Together, these findings indicate that the finance–growth nexus is not linear, but conditional on broader institutional and structural factors.

Institutional economics provides a critical extension of this perspective. Informal institutions, path dependency, and historical legacies play a fundamental role in shaping economic performance [North, 1990], while inclusive institutional frameworks are essential for sustaining long-term development [Acemoglu and Robinson, 2012]. In the context of transition economies, persistent distortions such as soft budget constraints continue to influence firm behaviour and resource allocation beyond the initial reform period [Kornai, 1992].

Cultural and behavioural dimensions further enrich this framework. Trust, social norms, and cultural factors have been shown to influence financial participation and development [Guiso, Sapienza, and Zingales, 2006], while legal institutions and enforcement mechanisms shape access to external finance [La Porta et al., 1997]. These perspectives support the view that financial intermediation is deeply embedded in broader social and institutional contexts.

An important strand of literature highlights the role of alternative financing mechanisms in environments with weaker formal financial systems. Firms in such contexts rely more heavily on non-bank channels, including trade credit and informal finance, as substitutes for bank intermediation [Allen, Qian, and Qian, 2005]. Empirical evidence further shows that trade credit can exceed bank credit in less developed financial systems, reflecting structural constraints in access to formal finance [Demirgüç-Kunt and Maksimovic, 2001; Beck, Demirgüç-Kunt, and Maksimovic, 2011].

More recent contributions emphasize the importance of financial inclusion and the concept of “bankable demand,” suggesting that low levels of financial

intermediation may reflect not only supply-side limitations, but also demand-side constraints rooted in firm structure, informality, and institutional quality.

Despite these advances, the literature has paid limited attention to cases in which rapid economic convergence coexists with persistently low financial intermediation. Existing frameworks typically treat financial deepening as a driver of growth, or as a variable subject to diminishing returns, but rarely as an endogenous outcome of structural and behavioural factors that may constrain its own expansion.

This paper contributes to the literature by proposing that, in such contexts, financial underdevelopment may become part of a self-reinforcing structural mechanism. By integrating financial, institutional, and behavioural perspectives, the analysis advances the interpretation of economic convergence without financial deepening as a structurally constrained process, rather than a temporary deviation from standard development patterns.

Methodology

i. This study employs a comparative and longitudinal analytical approach to examine the relationship between economic convergence and financial intermediation in Romania relative to the European Union, with the objective of identifying structural divergences rather than estimating econometric causality.

ii. The empirical analysis is based on World Bank data covering the period 1995–2024, selected for consistency and cross-country comparability. Two core indicators are used: economic convergence, measured as GDP per capita in purchasing power parity expressed as a percentage of the EU average, and financial intermediation, proxied by domestic credit to the private sector as a percentage of GDP.

iii. The comparative framework includes Romania as the primary case study, the Central and Eastern European region (CEB) as a group of structurally comparable emerging economies, and the euro area as a benchmark for mature financial systems. Despite its evolving composition, the euro area remains a relevant proxy for financial depth and institutional stability.

iv. The analysis incorporates a periodization of the Romanian economy reflecting its structural evolution: reconstruction (1990–2000), expansion (2000–2008), forced adjustment following the global financial crisis (2008–2014), stabilization (2014–2020), and resilience (2020–2024). This periodization represents an original contribution of the research and supports the interpretation of long-term dynamics.

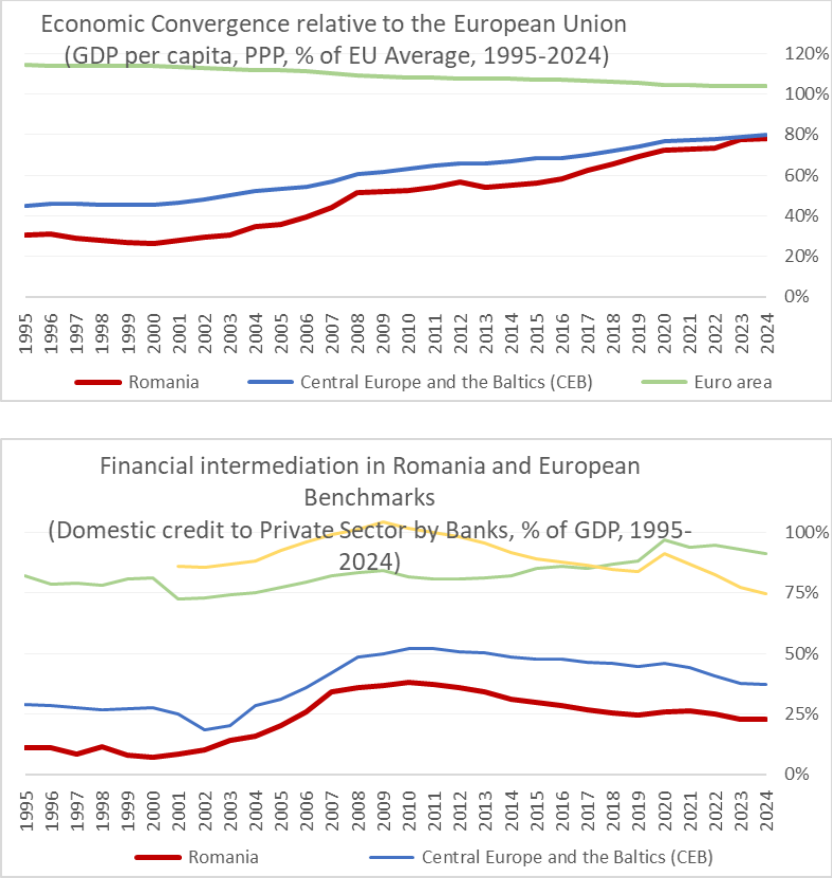
v. To interpret the observed divergence between convergence and financial intermediation, the quantitative analysis is complemented by a qualitative structural perspective capturing persistent economic behaviours,

informal practices, and institutional characteristics that influence the formation of bankable demand.

vi. The methodological framework integrates quantitative evidence with structural interpretation in order to explain how economic convergence can coexist with persistently low financial intermediation, while acknowledging the limits of purely data-driven analysis in capturing underlying economic mechanisms.

Results and Discussion

i. Divergence between economic convergence and financial intermediation



Taken together, the two figures reveal the core paradox of the Romanian growth model. The first figure shows a strong and sustained process of economic convergence, with Romania rising from approximately 30% of the EU average in GDP per capita in the mid-1990s to nearly 80% in recent years. This trajectory, however, did not begin immediately. The relative deterioration visible between 1995 and 2000 marks the final phase of a lost decade of

transition, characterized by institutional fragility, delayed adaptation to market economy principles, and the persistence of informal economic practices. The upward shift observed after 2000 reflects Romania's gradual exit from this initial phase of structural disorganization.

The second figure presents a fundamentally different trajectory. Financial intermediation in Romania follows a short phase of expansion prior to the global financial crisis, reaches its local peak around 2008–2010, and then enters a prolonged period of contraction and stagnation. Unlike the euro area, where financial intermediation remains broadly stable at high levels, and the broader CEB region, where deleveraging stabilizes at intermediate levels, Romania remains locked into structurally low credit-to-GDP ratios throughout the post-crisis period.

Read together, the two figures point to a growing divergence between economic convergence and financial deepening. Romania continues to converge in income terms even as domestic financial intermediation weakens and flattens. This divergence is visible, to a lesser extent, at the level of the CEB group, but it is far more pronounced in the Romanian case. By contrast, in advanced European economies, relative income stability is accompanied by a much more stable financial structure, suggesting that convergence and intermediation remain more closely aligned.

A further important result emerges in the most recent period. Between 2020 and 2024, the slope of Romania's convergence path becomes visibly flatter, while financial intermediation remains broadly stagnant at low levels. This simultaneous loss of momentum suggests that the alternative mechanisms that have supported convergence in the absence of financial deepening may be approaching their limits.

This raises the question of whether Romania's convergence model—built to a significant extent on non-bank, external, and structurally fragmented mechanisms—has begun to reach a structural ceiling in the absence of deeper domestic financial intermediation.

ii. Mechanisms of convergence without financial deepening

The divergence between economic convergence and financial intermediation raises a fundamental question regarding the underlying mechanisms supporting growth in the Romanian economy. If convergence has continued in the absence of financial deepening, alternative channels must have played a significant role.

Several structural mechanisms can be identified as partial substitutes for domestic financial intermediation. External sources of financing, including remittances and capital inflows, have supported consumption and investment without being fully intermediated through the domestic banking system. European funds have played an increasingly important role, particularly after

EU accession, acting as a non-repayable source of financing with significant macroeconomic impact.

At the same time, the structure of the domestic economy has allowed for the persistence of informal and semi-formal financing mechanisms. These include intra-firm financing, supplier credit, and various forms of relationship-based economic activity operating outside the formal financial system. Such mechanisms reduce the apparent demand for bank credit while limiting transparency and scalability.

This combination of external financing, public transfers, and informal mechanisms has enabled Romania to sustain economic convergence despite low levels of financial intermediation. However, these channels differ fundamentally from credit-based intermediation in terms of efficiency, allocation, and long-term sustainability.

iii. Structural origins of weak financial intermediation

The persistence of low financial intermediation in Romania cannot be explained solely by post-crisis developments. Its roots lie in the incomplete transformation of the 1990s, a lost decade of transition marked by institutional fragility, delayed adaptation to market economy principles, and the persistence of informal economic practices. These structural features continued to shape the corporate sector and the formation of bankable demand.

This legacy becomes visible in the evolution of financial intermediation itself. After a period of strong pre-2008 expansion, Romania entered, from 2010 onward, a structurally divergent trajectory relative to comparable economies in the region. Financial intermediation remained persistently low despite continued economic convergence, indicating that growth has been supported, to a significant extent, by mechanisms operating outside traditional bank-based intermediation.

This divergence is particularly significant because it unfolded in parallel with a strong increase in GDP per capita. Romania experienced real convergence in income terms while financial depth stagnated or declined, supporting the interpretation that growth has relied on alternative channels of financing and adjustment, consistent with the broader literature [Levine, 2005; Beck, 2008].

A central structural cause of this pattern is the limited base of bankable demand within the corporate sector. Evidence from the Romanian Association of Banks study *Financial Intermediation and the Entrepreneurial Footprint of Romania* (2023) shows that only around 15% of Romanian companies are bankable under current conditions, while even under support mechanisms the share increases only to approximately one third. At the same time, structural fragilities are widespread: firms with negative equity account for roughly one

third of total companies, indicating weak capitalization and limited capacity to absorb external financing [Asociația Română a Băncilor, 2023].

These vulnerabilities are consistent with broader structural evidence on the Romanian corporate sector. Corporate financing relies predominantly on internal funds, shareholder financing, and trade credit, while bank lending plays a comparatively limited role, with trade credit significantly exceeding bank credit in the overall financing structure [PwC, 2019].

At the same time, firm-level weaknesses further constrain bankability. Low productivity levels, structural fragmentation, and limited investment capacity reduce firms' ability to generate stable revenues and meet prudential lending standards, thereby restricting effective access to formal financing; PwC estimates indicate that labour productivity in Romania remains significantly below the EU average, while corporate financing relies predominantly on internal funds and trade credit rather than bank lending [PwC, 2019].

Taken together, these elements indicate that weak financial intermediation in Romania is not a temporary outcome, but the manifestation of a deeper structural configuration shaped by transition legacies, corporate sector fragmentation, and the persistence of partially formalized financing practices.

Crucially, these structural characteristics do not only limit financial intermediation at a given point in time, but also shape the mechanisms through which financial depth evolves over time. This suggests that the problem is not merely one of level, but one of dynamics: limited bankability does not simply coexist with weak financial intermediation, but contributes to reproducing it over time.

iv. The bankability constraint

The mechanism identified in this paper can be formalized as a self-reinforcing structural loop:

- (i) weak firm-level fundamentals reduce bankability,
 - (ii) limited bankability constrains financial intermediation,
 - (iii) reduced reliance on formal finance increases the use of substitute mechanisms,
 - (iv) substitute mechanisms weaken incentives for formalization and transparency,
- thereby reproducing the initial conditions that sustain low financial intermediation.

The structural features identified above converge into a central mechanism that shapes the Romanian financial system: the bankability constraint, understood as the limited systemic capacity to generate sustainable demand for formal credit.

Bankability should not be understood as the simple availability of credit, but as the systemic capacity of an economy to generate a sufficient volume of

firms and households capable of meeting the financial, institutional, and behavioural conditions required for sustainable access to formal financing.

In this context, low financial intermediation is not primarily the result of constrained credit supply, but the outcome of a structural equilibrium characterized by limited bankable demand.

The evidence presented in the previous section indicates that firm-level characteristics—such as weak capitalization, low productivity, and fragmented structures—reduce the pool of economically viable borrowers. However, the implications extend beyond static constraints and point to a dynamic mechanism.

Limited bankability reduces the effective demand for bank credit and constrains the expansion of financial intermediation. In turn, reduced reliance on formal financial systems increases the role of alternative financing mechanisms, including internal funds, trade credit, and relationship-based economic arrangements. While functional in the short term, these mechanisms weaken incentives for financial transparency, capital accumulation, and formalization.

This interaction generates a self-reinforcing dynamic. Lower financial transparency and weaker balance sheets reduce bankability; reduced bankability limits access to formal credit; reliance on substitute financing mechanisms diminishes incentives for formalization and financial discipline; and these effects reproduce the structural conditions that constrain financial intermediation.

In this sense, the Romanian case reflects not simply a coexistence between convergence and low financial depth, but the emergence of a self-reinforcing structural trap. Financial underdevelopment becomes endogenously sustained by the very mechanisms that allow economic activity to continue in the absence of deep intermediation.

Such a configuration can be understood as a stable but suboptimal equilibrium. Rather than representing a temporary deviation from standard development patterns, it reflects a structurally embedded growth model in which the expansion of financial intermediation is constrained by the internal characteristics of the economic system itself.

v. Interpretation and broader implications

The Romanian case cannot be adequately explained by the traditional framework linking financial deepening to economic convergence. Instead, it reflects a growth configuration in which convergence has been sustained in the absence of a corresponding expansion of domestic financial intermediation.

This configuration can be understood as structurally adaptive but ultimately self-limiting. Alternative mechanisms—external financing, European funds, and internal corporate arrangements—have supported growth without

requiring a proportional increase in credit-based intermediation. However, the greater the reliance on such mechanisms, the weaker the incentives for formalization and deeper financial integration, suggesting the emergence of a structural ceiling.

The persistence of the bankability constraint provides a unifying explanation. Financial depth appears not as an exogenous driver, but as an endogenous outcome shaped by the structure and quality of economic agents.

This interpretation has broader implications for emerging European economies. It suggests that convergence without financial deepening is possible, but only up to a point. As substitute mechanisms reach their limits, the absence of sufficiently developed financial intermediation may constrain further progress.

The recent flattening of both convergence and financial intermediation may therefore signal not a cyclical slowdown, but the emergence of such a structural ceiling. Future convergence will depend increasingly on the capacity of the domestic economy to generate transparent, scalable, and sustainable bankable demand.

Conclusions

This paper challenges the conventional assumption that financial deepening is a necessary condition for economic convergence. The coexistence of rising income levels and persistently low credit-to-GDP ratios points to the existence of a structurally distinct growth model.

The analysis suggests that this model has been sustained through a combination of external financing, public transfers, and internal corporate mechanisms that partially substitute for the role of the banking sector. However, these channels differ fundamentally from credit-based intermediation in terms of efficiency, scalability, and long-term sustainability.

The concept of a bankability constraint provides a coherent explanation for this divergence. Limited financial transparency, weak capitalization, and structural fragmentation within the corporate sector restrict the capacity of the economy to generate sustainable demand for formal credit, leading to an equilibrium characterized by persistently low financial depth.

The recent flattening of both convergence dynamics and financial intermediation may indicate that this model is approaching its structural limits. The central implication of the paper is that Romania's development pattern should not be understood simply as convergence without finance, but as convergence achieved through mechanisms that may themselves constrain the future expansion of formal financial intermediation. In this sense, the structural trap is not external to the growth model; it is embedded in the way that model functions.

In particular, the interaction between fiscal compliance, legal enforceability, and financial transparency plays a critical role in shaping access to formal finance. Where these dimensions remain fragmented or only partially enforced, a significant share of economic activity remains outside the scope of bank intermediation, reinforcing the persistence of low financial depth.

Rather than representing a temporary deviation, this configuration may reflect a stable but suboptimal equilibrium. Breaking this self-reinforcing structural trap therefore requires not only financial deepening, but broader adjustments in the institutional, behavioural, and firm-level conditions that shape the formation of bankable demand.

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THE LONGEVITY OF SPORTS LEADERS IN GOVERNING BODIES

Diouf Djibril *

Abstract

The objective is to contribute to the understanding of the determinants of the longevity of managers and to emphasize its particular relationship with the controls established and planned in the Senegalese context. To the question: What is the relationship between the longevity of sports leaders in Senegal and the controls exercised over them? It is appropriate to respond, in light of the theory of entrenchment of managers, that beyond the advantages that can be drawn from the longevity of leaders, this can be explained by inertia both internal and external controls. On one hand, networks forming between public authorities and the sports movement attenuate the capacities of internal organs to exercise their powers. On the other hand, the existence of various actors at the national level and an international network seems to put the leaders out of control. The originality of the article lies in the fact that the question of longevity is rarely linked to the question of control in the Senegalese context. However, this is often linked to the difficulties that control bodies have in monitoring sports leaders.

Keywords: Longevity; Sport's leaders; Control; Public authorities.

JEL Classification: H12

1. Introduction

The question of the longevity of sports leaders in their organizations falls within the framework of their management. This department guarantees the completion of action plans, the accomplishment of tasks, the exercise of activities and the implementation of projects. In this context, managers communicate with everyone and participate in achieving objectives. They must mobilize, train, guide, inspire and penalize, if necessary. They must ensure, according to Thietart (2019), that all individuals in sports organizations give their full performance and work together in harmony and efficiency. The longevity of such leaders is a subject of interest and has been the subject of several studies in Senegal. Diouf (2012) analyzes, in the Senegalese context, the relationships between the longevity and leadership of sports leaders, while Sarr (2012) returns to the challenges and opportunities that can be found in the longevity of the latter. Others emphasize the effect of longevity on the leadership of sports managers (Gueye, 2013; Faye, 2015). Ndiaye (2017) concludes that the role of longevity in improving the governance of sports organizations. These studies analyze the effects, advantages or limits of

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manager longevity on aspects of sports organizations. However, they do not put the relationship between the question of the longevity of leaders and their propensity to escape planned and established controls, whether internal or external.

As part of this study, the objective is to contribute to the understanding of the determinants of the longevity of managers and to emphasize its particular relationship with the controls established and planned in the Senegalese context, rendering the question: To what extent is the longevity of sports leaders in Senegal explained by the nature of controls planned and established for them?

The main hypothesis put forward allows us to consider that the longevity of sports leaders in Senegal is explained by the nature of conflicting controls planned and established for them. This is linked to the absence of evaluation of their activities at all levels and of corrective measures for their actions.

To achieve this, we have subscribed to an interpretivist epistemological positioning to understand the meaning of the speeches of sport actors and stakeholders on the issue; thus, a qualitative approach was used to collect the information given by the chosen respondents.

On a theoretical level, the theory of entrenchment was used within the framework of organizational governance. This covers all the organizational mechanisms having the effect of delimiting the powers and influencing the decisions of managers, in other words which govern their conduct and define their discretionary space (Charreaux, 1996). This theory assumes that these mechanisms are not always sufficient to force managers to manage the firm in accordance with the interests of shareholders (Alexandre & Paquerot, 2000).

2. Conceptual Background

Defining longevity, *Le Larousse* dictionary¹ (2025) emphasizes, among other things, that it is the “quality of what is maintained for a relatively long period; permanence, persistence, resistance.” Applied to sports, it refers to the sports leader’s propensity to remain in the management of sports bodies. Cochenec (2012) underlines that, in the absence of term limits, there is a tendency for Presidents of sports federations in France to remain in charge of such bodies beyond three or four mandates. In the African context,

...sports leaders who in reality are almost never elected but imposed by (political or financial) networks that are always corrupt, behave like real pugilists to position themselves at the head of delegations generally reduced to a few rare athletes to support during the international competitions, the ideologies of the ruling class. (Abalot et al., 2017, p.11)

¹ <https://www.larousse.fr/dictionnaires/francais/long%C3%A9vit%C3%A9/47754/> 21/07/2025 à 21 h 30 mn

However, it should be noted that the long-term presence of leaders at the head of sporting bodies cannot be considered negative in itself. Sherman (2016) considers that longevity is a power in leadership when the leader fully assumes his role.

This is why the question of their control arises. Control, being “the means used to obtain the performance that we propose to achieve and to verify whether the quantitative and qualitative aspects of this performance agree with the specific characteristics of the organization” (Etzioni, 1965, p.650). This classic definition allows us to consider both from a political and cybernetic point of view, that is to say by the obligation for sports managers to be accountable but also by the need to put in place a control system based on self-correction (Gortner *et al.*, 1993). In all cases, meeting such objectives requires modalities linked to control systems based on quantitative measurements of outputs, quantitative and qualitative reports on activities and behaviors, active participation of the various stakeholders in project monitoring, and their identification with the mission of the organization.

To analyze the question of the longevity of sports leaders under the prism of the control exercised over them, the theory of the entrenchment of leaders is put forward. This is part of the governance of organizations which covers all the organizational mechanisms having the effect of delimiting the powers and influencing the decisions of managers, governing their conduct and defining their discretionary space (Charreaux, 1996). This theory assumes that these mechanisms are not always sufficient to force managers to manage the firm in accordance with the interests of shareholders (Alexandre & Paquerot, 2000).

The entrenchment of leaders is therefore a reaction to the different control mechanisms submitted to leaders. It becomes a question of an attempt to avoid internal and/or external control mechanisms imposed on managers. There are numerous external control mechanisms for managers. However, relying on Bienaymé (1998), it is possible to note

a competition of ubiquity, a competition driven certainly by the multiplication of actors and markets but also by the mobility of decision-makers and by the assets that the most attentive and the most agile forge there... the competition for ubiquity accelerates and multiplies performance comparisons. (p. 434)

In the context of sport, it must be remembered that sports organizations within the framework of the national and international sports movement are subject to the same comparisons. As part of the co-management of sport with public authorities, they also remain subject to the same comparisons, which naturally reflects on their leaders. From this perspective, it is possible to invoke Caby and Hirigoyen (2001) for the failure to achieve the strategic objectives chosen by managers becomes a source of conflict of interest; and this can only be resolved through a coercive instrument: an external takeover which can lead

to their revocation. In the context of the co-management of sport, the legal and regulatory environment imposes limitations on the behavior of the leaders; sanctions are provided for in the event of non-compliance with such legal and contractual rules (Prowse, 1994).

Internal control mechanisms in sport are mainly General Assemblies, Steering Committees, internal ethics commissions, etc. The general assemblies of the federations, in principle, exercise control over sports leaders. However, in the context of sport, some members of the general assembly can be more influential than others; and therefore, more capable of limiting the risk of discretionary management by the manager (Nabet, 2000).

Steering committees are also levers of control through which members ensure the good management of their organization. Within the framework of transaction cost theory (Williamson, 1985), steering committees constitute internal control mechanisms. The same applies to internal committees. With these internal control mechanisms, it is possible to mitigate information asymmetries that could put sports managers out of control.

Reaction to control mechanisms:

Alexandre and Paquerot (2000) define the entrenchment strategies of managers as having the objective of increasing their discretionary space by using the means at their disposal, that is to say their human capital but also the assets of the organization to neutralize control systems and increase the dependence of all the organization's partners on the resources they control (specific human capital, information asymmetry).

Entrenchment strategies aim to counter key internal control mechanisms

Rooting via the board of directors.

The control exercised by the steering committees has limits. Like the Board of Directors, this is linked to the accumulation of mandates of chairman of the board of directors and general director (Fama and Jensen, 1983), but also that linked to the very nature of the directors. The “duality” of functions broadens the powers of managers within the board of directors, calls into question the impartiality of the board and particularly the independence of the directors. In the case of sport, this is the Steering Committee. This duality allows leaders to increase their power in the organization. They have information asymmetry compared to the other stakeholders of the Steering Committee and have easier access to financial resources. They can also rely on the dependence of the members of this Committee to initiate decisions that benefit them.

As for external directors, they are recruited for their skills. Co-optation in sport makes it possible to use it. Their freedom from leaders allows them to theoretically oppose the most questionable decisions (Caby & Hirigoyen, 1997). However, like internal directors, they are not more inclined to control

the managers, because in the majority of cases, they are appointed on the recommendation of the managers (Charreaux & Pitol-Belin, 1990). On the other hand, in the sports context those co-opted by the State have more freedom and can go against the positions of sports leaders. Generally speaking, the entrenchment of managers is due to the limits of the control exercised by the board of directors (Paquerot, 1997), in the specific case of steering committees.

Entrenchment as a reaction to shareholder control

Shareholder control is strongly linked to the very nature of shareholders and capital structure. On the one hand, the majority shareholder holds a privileged position which allows them to counter the entrenchment of managers. On the other hand, institutional shareholders (banks, insurance companies) can exercise effective control thanks to their independence from managers (Brickley et al., 1988). However, the manager can, faced with this type of shareholder, invest in specific assets (Castanis & Helfat, 1992) which make their replacement costly. He can increase his remuneration and benefit from greater managerial latitude. The manager also has informational asymmetry. Information is an essential resource for organizations, and its possession constitutes an important source of power for actors (Pfeffer, 1981). In addition, in sport, it can develop networks between the State and the sports movement which puts them in an advantageous position (Diouf & Tine, 2023). The conflicts in sport analyzed in the light of theories linked to the school of proximity (Talbot, 2018) show that the actors do not seem to have the same representations, the same beliefs and knowledge (Torre & Rallet, 2005). On the organizational level, the state model, which adapts to a system of control or co-management, is not necessarily in line with the autonomy of the sports movement. With regard to material resources, and relying on Bouba-Olga and Grosseti (2008), it is possible to note the weakness of the means allocated by the State to the federations and the desire to control them. Differences could also be noted in the networks and at the cognitive level. However, relying on Bouba-Olga and Grosseti (2008), it should be emphasized that the actors of the conflict are in the same networks. The knowledge bases at the cognitive level, which a priori seem different, are getting closer. Finally, the institutional arrangement is presented as a trans-organizational arrangement, in the form of networks, between public authorities and leaders of the sports movement.

Rooting as a reaction to takeover attempts

Takeovers are the last tool shareholders have to tame managers. However, leaders, thanks to mechanisms, avoid these takeovers. They then put in place anti-takeover measures by positioning their action over the long term (Sundaramurthy, 2000). In the context of sport, the long-term objectives set by the leaders fit into this framework.

In summary, managers seem to take advantage of the limits and ineffectiveness of internal and external control mechanisms to take root in the

organization. And this entrenchment of leaders, perceived in the sense of ruse by Williamson (1985), would be against the interests of sports organizations even if, according to Paquerot (1997), it is not without advantages.

3. Methodology

The epistemological posture of the study is constructivist, more precisely interpretivist. Indeed, the question of the longevity of sports leaders is discussed through the prism of the control exercised over them. Such questioning calls for an analysis of the discourse of the different stakeholders to grasp the desired reality through their intentional, meaningful and symbolic dimensions as indicated by Lyotard (1995). The intentional dimension underlines that human activity is the fruit of the consciousness, reflexivity and intentions of the actors (Avenier & Gavard-Perret, 2012). The signifying and symbolic dimensions come back to language and representations in the process of constructing meanings (Thietart *et al.*, 2019). In this interpretivist framework “social reality is above all constructed through the play of intentions and interactions of actors who construct the meaning of this reality through the confrontation and sharing of their representations” (Thietart *et al.*, 2019, p. 26). These interactions in particular contexts result in interpretations which can be the subject of intersubjective consensus within the social group. Bergman and Luckman (1966) refer to this process as the construction of social reality.

The research criteria relate to three aspects which make it possible to understand the relationship between the longevity of sports leaders and the question of control exercised over them. These are:

- ✓ The acceptance or not of the various stakeholders of the normality of the longevity of sports leaders;
- ✓ Apprehension of the effect of evaluation on the longevity of sports leaders;
- ✓ Determining the effect of the existence or coercive measures on the longevity of sports leaders.

Obviously, it appears that these criteria call for a collection of the discourse of all parties concerned to grasp social reality through intentions, representations and interactions in particular contexts, as Thietart *et al.* (2019).

The study focuses on the Senegalese sports movement. In addition to the Senegalese National Olympic and Sports Committee (CNOSS), this movement involves no less than 60 federations and sports groups organized at the national, regional and departmental level (Ministry in charge of sports of Senegal, 2022). The careers of sports managers are, in general, characterized by their longevity and allow us to understand the relationship between said longevity and the control exercised.

For example, it is possible to cite the case of the National Committee for Management of the Fight (CNGL) which saw President Alioune Sarr lead it for

26 years. This power play, without necessarily being a source of perspective, raises various questions in the relationship between sports leaders and public authorities, and sports leaders and internal stakeholders in sports organizations (Diouf, 2018). Indeed, on the governance of the arbitration of striking wrestling, the explanation of the conditions for developing the rules of striking wrestling and the determination of the rules which condition the recruitment into the body of referees, as well as the clarification of aspects relating to appeals against arbitration decisions have made it possible to note a marginalization of stakeholders essential to the control of sports leaders.

Based on the Stakeholder approach developed by Freeman (1984) and Clackson (1995), Diouf (2018) came to the conclusion that the governance of strike wrestling arbitration is strongly centered on Internal Stakeholders at the CNGL. The other Stakeholders, despite their status as associations recognized by the CNGL, play secondary roles. However, these associations (stables, wrestling schools, etc.) must occupy their place as is the case in all sporting association movements. The marginalization of grassroots associations is notable in their level of involvement, transmission and circulation of information, in the assessment of ethical conditions, as well as the consideration of their particular situation. This is why, from the point of view of the management of the arbitration of striking wrestling, it is appropriate to go beyond this governance model which ignores certain central Stakeholders in the sports association movement. The involvement of these Stakeholders could bring more legitimacy to the rules developed, to the determination of the rules governing the profile of referees and to arbitration decisions, and consequently to the controls exercised on sports managers.

For the concrete methods of data collection, in addition to the documentary elements, interviews were carried out. In this regard, nineteen (19) people, mainly executives in sport, were interviewed: seven (7) Inspectors of Popular Education of Youth and Sports (IEPJS), ten (9) members of the sports federation, and three (3) Physical and Sports Education Teachers (PEPS). The IEJPS and the members of federations are at the center of the problem of control and renewal of sports bodies, and therefore of the longevity of their leaders. The PEPS, as a player in Physical Education and sport, have a good knowledge of issues relating to the management of sports bodies. The interviews were semi-structured. The semi-structured interview is a data collection technique which contributes to the development of knowledge favoring qualitative and interpretative approaches relating in particular to constructivist paradigms (Quivy & Van Campenhoudt, 1995). The interviews were carried out and each respondent received a number for confidentiality purposes. The data were transcribed and the thematic content analysis method of Quivy and Van Campenhoudt (1995) was used. This made it possible to identify significant trends, relationships and conclusions. Finally, the results

obtained were discussed mainly based on the theories of the entrenchment of leaders.

4. Results

Longevity: between advantages and limits

Regarding the longevity of leaders in sporting bodies, respondents, for the most part, find that it is abnormal and does not respond to the democratic spirit. Respondent six notes: “I think not, because it does not respond to the democratic spirit and current practices around the world. I think that two mandates are enough for leaders who want to serve and not use sport.” For other respondents, longevity is linked to the texts of sports associations which can facilitate it. Respondent seven specifies:

The associative movement is governed by its own texts subject to compliance with state standards. The initiative of the association being most often private, it is up to each entity to set in its statutes the questions related to governance, in particular the conditions of eligibility, the duration of mandates, etc. Consequently, on a legal level the question of the longevity of sports leaders does not arise as long as the texts allow it and the actors have the right to choose the leaders.

However, this longevity must be correlated with results. In this sense, respondent 15 underlines:

Every structure needs results. Renewal helps nourish democracy in sporting bodies, but it must be accompanied by results. In other words, the normality of the longevity of sports leaders must be understood more from the angle of results. However, it proves essential to avoid clan and opaque management.

This may be linked to the advantages attached to the longevity of sports leaders. These are diverse; they are linked to the experience of managers, to the stability in the management of sports organizations, to the achievement of long-term objectives and the development of an international network. Respondent 14 states:

The longevity of sports leaders brings better stability in the governance of the structure and a gain for developing an international network: the federations are affiliated to international organizations and through this the sports leaders act on behalf of their State in these instances.

On the other hand, limits are noted in the longevity of sports leaders. They move from inaction to suspicions of corruption. Respondent 13 specifies:

Certain limits can be detected. This concerns the monotonous and static management of the sporting entity, clan and clientelist management, the disinterest and despair of young leaders interested in the management of the entity, etc.

Respondent 16 adds:

A team needs new blood to be revitalized. So, after years of experience, leaders must be able to leave in order to create a new dynamic and position themselves as advisors to share more of their experience. Experience has shown that after several years of experimentation, we no longer have anything to prove. Hence, to bring in new blood, you have to change teams so as not to stay in routine. No one is indispensable on this earth or even in the functions he or she occupies. Especially when the objectives are not achieved. In other words when we fail in relation to the type of management put in place to win trophies.

The evaluation of sports leaders by public authorities

The means of control relate to instruments for evaluating public policies or to the evaluation of accompanying or support programs from public authorities. It is appropriate to cite annual activity reports, reports from state control bodies such as the Court of Auditors in Senegal. In this sense, respondent no. 10 notes:

The best-known means is the regulatory obligation of federations delegated powers to communicate to the Minister in charge of Sports, the administrative and financial results of the past year, the state of its statistics and the annual program. The State often uses the latter to measure the degree of achievement of results.

Respondent five adds:

I think that the real means of evaluation between these two entities is limited to the performance contracts signed between the federations and the State because, beyond that, it has no control over them. An audit can also be commissioned by the State to measure the impact of the use of its resources. » Which seems to contradict the general scheme put in place to evaluate the activity of sports managers even if public authorities have been able in the past to carry out an evaluation of sports campaigns.

Respondent eight specifies:

Following the Football World Cup campaign in 2002, where Senegal managed to reach the quarter-finals, a state audit led to the arrest of several sports leaders. The State had become more careful about the subsidies it granted.

Otherwise, it is only within the framework of performance contracts that public authorities are theoretically more inclined to carry out an evaluation of the activity of sports federations. Which is not often the case in practice since these so-called contracts seem to escape any control, in the opinion of Diouf *et al.* (2024).

The absence of evaluation, source of the longevity of sports leaders

For some respondents, evaluation can be a source of the longevity of sports leaders. In this hypothesis, it is that it gives satisfaction both with regard to compliance with aspects linked to the texts (such as the duration of the mandate, the method of election), the achievement of previously fixed results

and transparent management. of the sporting entity. Unfortunately, as respondent 14 points out:

In concrete terms, a correct assessment is almost never made by the supervisory authority. The conclusions drawn are always complacent. Therefore, since they are not worried, they linger at the station.

Also, longevity seems in certain cases linked to sporting results rather than to a serious evaluation. In this regard, respondent 12 underlines:

It turns out that the government's assessment has made almost no contribution to the longevity of sports leaders if recorded sporting achievements are taken into account. For example, in 2008, the minister of sports at the time initiated the elimination of recovery funds, which unfortunately was not accepted by sports stakeholders. Subsequently, it will implement the signing of objective agreements which will condition the obtaining of subsidies for the federations. But this did not prevent leaders from retaining their seats and taking advantage of their functions without achieving the set objectives.

With the exception of the years 2021 and 2022 which saw Senegal record prowess in the field of football, the absence of results from sports leaders is notable, despite the means deployed by the Senegalese state, which did not necessarily influence their longevity.

This lack of evaluation necessarily leads to neglect in terms of performance, the method of election, as well as the management of financial or other resources which has an effect on the longevity of sports leaders. Respondent 10 explains: "Every mission must be evaluated. The manager being certain that his financial, accounting and sporting balance sheet, whether positive or negative, would have no impact on his future, would seek to keep his position as long as possible." This manifests itself in behavior that is not in line with the rules of good management. Thus, respondent five underlines:

There is a lack of rigor in achieving the objectives assigned to them because, without monitoring and evaluation, managers are free to invent everything they can to justify their actions and continue in office. Otherwise, the absence of strong texts which provide a guideline to follow before, during and after the activities of the federations.

This results in opaque and clannish management; a group alone holds, and for a long time, the management bodies of the structure through lobbying.

Respondent three supports:

Each structure needs an evaluation at the end of which sanctions will be noted. A lack of evaluation implies an absence of sanctions such as dismissal, criminal or financial sanctions in cases of management misconduct. This leads us today to see a group of people retaining their positions for more than a decade, despite management errors and without forgetting the lack of performance. This is to say that the lack of evaluation of the actions of sports leaders has greatly contributed to their longevity.

Consequently, the absence of evaluation is linked to a disorder which favors the longevity of sports leaders at the head of sports bodies.

The absence of corrective measures, a source of longevity for sports leaders

For respondents, there seems to be a sort of total impunity. Strictly speaking, there is no question of talking about corrective measures on the part of managers as long as the evaluation is not carried out rigorously. Respondent three underlines:

The question refers us to a certain extent to the previous one; in the sense that the absence of corrective measures makes managers think more about preserving their advantages than achieving results. Instead of boosting Senegalese sport, we are instead witnessing leaders who drag on in management bodies. This is the case of the President of the Senegalese Football Federation led by Augustin Senghor for fifteen years now.

Thus, this longevity is to be linked to the absence of evaluation and corrective measures of the action of sports leaders; even if some respondents think that it is the statutes of the federations which facilitate this longevity. Respondent No. 4 notes: "this longevity draws its source from the statutes which govern the said sports associations." Suffice to say that without evaluation and corrective measures, the texts do not force sports leaders to limit the number of their mandates. Respondent six specifies: "The Senegalese canoe federation lost its best technicians following a long conflict which started from the demands of Senegalese athletes during the African Games in Maputo. However, without evaluation or corrective measures, the leaders remained in their posts."

There are various reasons for the lack of corrective action. Some address lobbying, protection by political authorities, modification of texts in favor of the management team and co-optation. Respondent 18, for example, notes:

The blocking points seem to be linked to the non-firmness of the State in relation to the application of corrective measures, the status of associations, the influence of certain leaders and, increasingly, the right of scrutiny of the federation's international organizations such as FIFA on the relationship between the State and associative federations.

The absence of corrective measures must also be linked to the limited resources of the government authorities responsible for ensuring control. Respondent 13 explains:

Several points can be a source of blocking corrective measures. First, the lack of agents capable of proposing corrective measures. Then, the absence of effective measurement tools. Finally, the insufficient means to carry out a proper evaluation and propose corrective measures. For example, the Department of Physical and Sports Activities only has one manager. She has the weakest budget of the Ministry of Sports.

Furthermore, the principle of co-management reduces the control that the State can have over sporting bodies. Respondent five notes:

Sports organizations like federations are all private institutions which do not depend directly on the State but collaborate with it. So, taking certain measures can create a crisis between them. Therefore, donors limit themselves to an evaluation and partial measures to limit the conflicts that may arise when measures are taken that go against their expectations.

6. Discussions

The longevity of sports leaders can be explained by the existence of various actors who seem to influence the control exercised over them. As much as the development of an international network can have advantages, it can also put managers out of control. In addition, due to co-management between public authorities and the sports movement, the control of the former over the latter can prove delicate. The same is true of co-optation which is still present in certain sports federations and which brings out a diversity of external actors who exercise control over the sports movement. This seems to support Bienaymé (1998) for whom organizations are subject to external controls due to the multiplication of actors present. In the case of Senegalese sport, this concerns the public authorities, the local and international sports movement. From this multiplication of actors, external control mechanisms are observable. For the international sports movement, it will be a question of extending their powers by invoking the principle of autonomy of the sports movement. For the public authorities, it will be a question of getting their hands on the public sports service. These two opposing logics of control subject sports managers to external control mechanisms which increase their discretionary powers. This is not likely to discipline leaders in one direction or another, without risk of dismissal (Caby & Hirigoyen, 2001). This tension always puts sports leaders in a position that ensures them longevity. This does not always make it possible to sanction leaders who are not in phase with the public authorities, contrary to the assertions of Prowse (1994). The legal and regulatory limitations imposed on sports leaders by public authorities are attenuated by the affirmation of the principle of autonomy of the sports movement.

Added to the inertia of external control is that of internal control. Internal control bodies (General Assembly, Steering Committees, commissions, etc.) are in principle controlled by the members of sports organizations and the various stakeholders (Nabet, 2000). However, in the Senegalese case, networks are being formed between public authorities and the sports movement. These networks, through the proximity of their members, attenuate the capacities of the bodies to actually exercise their role (Diouf & Tine, 2023). A proximity that promotes the longevity of leaders at the head of sports organizations.

The institutional marginalization of essential stakeholders in sports like wrestling, as recalled by Diouf (2018), seems to have been noted in the context of this study. The only difference is that the intended stakeholders, at the legal and institutional level, are unable to exercise their internal powers of control due to networks formed within sports federations.

Alexandre and Paquerot (2000) consider that managers' entrenchment strategies aim to increase their discretionary space by using the means at their disposal, mainly their human capital, to neutralize control systems and increase the dependence of all of the organization's partners on the resources they control. In this case, sports managers rely on their internal, national and international network to neutralize the different control systems. Indeed, the results show that they escape controls. They are rarely evaluated; or if they are evaluated, the corrective measures are not followed (Diouf et al., 2024). Objective agreements as a financing tool for such organizations is a response provided by the public authorities. They set the objectives to be achieved by the sports movement through public funding in terms of athlete performance, development of sports infrastructures, and promotion of sport at the national and international level.

In the Senegalese context, the question that arose is why they cannot contribute effectively to the development of sport, to the improvement of the performance of athletes, while ensuring effective management of resources. At the end, it is possible to say that the said conventions have random objectives, a non-compliance with the commitments made by different stakeholders and a monitoring-evaluation system that is little or poorly used. This demonstrates the difficulty in implementing public management tools in the Senegalese context and recalled by the theory of National Public Governance Systems (SNGP) in French-speaking African countries, on the one hand, and the question of the receptivity, even the reluctance of African public administrations to adopt said tools, on the other hand. In this context sport leaders are not controlled.

The entrenchment of leaders considered as a ruse, an opportunism by Williamson (1985) can go against the interests of organizations. In this regard, the disadvantages of the longevity of sports leaders have been noted. These manifest themselves in the risk of corruption and cronyism, etc. The causes seem to be linked to a breakdown of the internal, governmental and international control system. However, the entrenchment of managers, according to Paquerot (1997), can be advantageous, since it allows them to escape short-term control constraints. It facilitates the achievement of long-term objectives through long-term stability and the development of a national and international network. In the context of sport, these advantages are observable in the context of football.

Conclusion

To the question: What is the relationship between the longevity of sports leaders in Senegal and the controls exercised over them? It is appropriate to respond, in light of the theory of entrenchment of managers, that beyond the advantages that can be drawn from the longevity of leaders (Paquerot, 1997), this can be explained by inertia both internal and external controls.

On the one hand, networks forming between public authorities and the sports movement attenuate the capacities of internal organs to exercise their powers (Diouf & Tine, 2023). On the other hand, the existence of various actors at the national level and an international network seems to put the leaders out of control. This corroborates Bienaymé (1998) for whom organizations are subject to external controls due to the multiplication of actors present. This does not always facilitate sanctions against leaders who are not in phase with the public authorities, contrary to the assertions of Prowse (1994). The affirmation of the principle of autonomy of the sports movement attenuates the legal and regulatory limitations imposed on sports leaders by public authorities.

Finally, the results show that leaders are rarely evaluated and their entrenchment strategies seem to work in the face of controls; as a result, they broaden their discretionary powers (Alexandre & Paquerot, 2000). On a managerial level,

- Clarify the powers of the actors responsible for controlling sports managers. It is not easy to control these due to their attachment to the national and international sports movement;
- Strengthen the powers of internal bodies which are weakened by networks serving sports leaders;
- Establish the longevity of sports leaders in certain contexts since it always causes decline.

The limitations of the study are linked to the fact that it focused more on internal and governmental controls. Control by international sporting bodies was not addressed.

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PEDAGOGICAL APPROACHES TO TEACHING COMMUNICATION IN MULTICULTURAL ACADEMIC CONTEXTS: INSIGHTS FROM INTERNATIONAL AND ERASMUS STUDENTS

Elena Museanu*

Abstract

In the context of internationalization in higher education, teaching communication to culturally and linguistically diverse groups requires pedagogical flexibility and intercultural awareness. This paper examines the challenges and opportunities associated with teaching communication courses to international and Erasmus students in English-medium instruction (EMI) environments. It discusses how variations in cultural norms, communicative styles, and academic expectations shape classroom interaction and learning outcomes. Drawing on qualitative observations and reflective teaching practice, the study identifies strategies that promote intercultural competence, inclusivity, and learner engagement. The analysis highlights the role of active learning, experiential tasks, and culturally responsive teaching methods in fostering meaningful communication across cultures. The findings contribute to ongoing discussions on pedagogical innovation and the development of global competences in higher education.

Keywords: intercultural pedagogy, internationalization, Erasmus mobility, communication, English-medium instruction, multicultural learning, higher education

JEL Classification: I20, I21, Z10, Z11.

1. Introduction

The internationalization of higher education has significantly transformed academic environments, bringing together students from diverse linguistic, cultural, and educational backgrounds. English-medium instruction (EMI) has become a central component of this process, particularly within international and Erasmus mobility programs. While EMI facilitates academic mobility and global knowledge exchange, it also poses substantial pedagogical challenges, especially in courses that focus explicitly on communication skills.

Teaching communication in multicultural academic contexts requires more than linguistic competence; it demands intercultural sensitivity, pedagogical adaptability, and an awareness of how cultural norms influence interaction, participation, and meaning-making. International and Erasmus students often enter host institutions with differing expectations regarding classroom discourse, teacher–student relations, and acceptable communicative

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behaviors. These differences can affect students' engagement, confidence, and learning outcomes.

This article explores pedagogical approaches to teaching communication in multicultural academic settings, with a particular focus on international and Erasmus students enrolled in EMI programs. Drawing on reflective teaching practice and qualitative classroom observations, the study examines recurrent challenges and proposes strategies aimed at fostering intercultural competence, inclusivity, and active participation.

2. Internationalization and English-Medium Instruction (EMI) in Higher Education

Internationalization has become a strategic priority for universities seeking to enhance academic quality, global visibility, and intercultural learning opportunities. Student mobility programs, such as Erasmus+, play a crucial role in facilitating cross-border education and cultural exchange. Within this framework, EMI has emerged as a dominant instructional model, particularly in non-Anglophone countries.

While EMI enables access to international curricula, it also introduces linguistic and pedagogical tensions. Research has shown that students' proficiency in English does not necessarily equate to their ability to participate effectively in academic communication, particularly in discipline-specific or interaction-intensive courses (Dearden, 2015). Moreover, EMI classrooms often amplify disparities between native and non-native speakers, potentially affecting participation patterns and classroom dynamics.

From a pedagogical perspective, EMI contexts require instructors to balance content delivery with language support, while remaining attentive to intercultural differences in communication styles and learning conventions (Kirkpatrick, 2018). These considerations are particularly salient in communication courses, where interaction, discussion, and oral performance are central learning objectives.

Moreover, EMI courses necessitate deliberate scaffolding of both language and content. For instance, instructors can provide glossaries of discipline-specific terminology, pre-task discussions, and structured participation frameworks to support students' comprehension and engagement. Such scaffolding ensures that learners are not only able to understand academic content but also to actively contribute to discussions, group projects, and presentations, bridging gaps between linguistic proficiency and academic performance.

Finally, the EMI environment offers unique opportunities for developing students' *transversal skills*, such as intercultural awareness, adaptability, and collaborative problem-solving. By incorporating interactive methods—such as debates, peer teaching, and collaborative research tasks—educators can foster

an inclusive classroom culture that values diverse perspectives and leverages multilingual and multicultural competencies as assets rather than obstacles. These strategies enhance both language development and students' preparedness for global academic and professional contexts.

3. Communication, Culture, and Academic Interaction

Communication is inherently shaped by cultural norms, values, and expectations. In academic contexts, these norms influence how students interpret tasks, engage in discussions, and negotiate meaning. Hall's distinction between high-context and low-context cultures remains relevant in understanding variations in communicative behavior, particularly regarding directness, turn-taking, and the expression of disagreement (Hall, 1976).

International students may come from educational cultures that prioritize teacher-centered instruction, accuracy, and deference to authority. In contrast, many Western academic environments emphasize student-centered learning, critical thinking, and active verbal participation. Such mismatches can result in silence, reluctance to speak, or perceived disengagement, especially in communication-focused courses.

Previous studies have highlighted that silence should not be interpreted solely as a lack of competence or motivation, but rather as a culturally mediated communicative choice (Jaworski, 1993). Understanding silence as a meaningful aspect of interaction allows educators to adopt more nuanced and inclusive pedagogical responses.

Furthermore, communication in multicultural academic settings is shaped not only by cultural norms but also by students' previous exposure to specific rhetorical conventions and discourse practices. For example, students from high-power distance educational systems may be hesitant to challenge ideas presented by instructors or to openly debate peers, perceiving such behavior as disrespectful. Conversely, students from low-power distance contexts might expect active engagement and frequent questioning. Recognizing these differences allows instructors to design classroom activities that scaffold participation, such as structured turn-taking, guided discussion prompts, and explicit modeling of academic argumentation, which can reduce cultural misunderstandings and encourage equitable participation.

In addition, instructors can leverage culturally responsive communication strategies to enhance students' engagement and learning outcomes. These strategies may include incorporating examples from diverse cultural contexts, acknowledging multiple ways of expressing reasoning, and encouraging reflection on personal communication styles. Activities such as small-group discussions, peer presentations, and intercultural problem-solving tasks provide safe opportunities for students to practice adaptive communication. By integrating these approaches, educators can foster an environment in which

silence or cautious participation is understood as part of a learning process, ultimately supporting both linguistic development and intercultural competence.

4. Challenges Faced by International and Erasmus Students

International and Erasmus students encounter multiple challenges when participating in communication courses delivered in English. Linguistic insecurity is among the most frequently reported obstacles, particularly in relation to speaking fluency, pronunciation, and the use of specialized vocabulary. Fear of making mistakes or being negatively evaluated can significantly inhibit oral participation. A significant source of communicative hesitation in EMI contexts is students' limited control of specialized academic and professional vocabulary. As specialized lexis plays a central role in structuring disciplinary discourse, insufficient familiarity with terminology can hinder both comprehension and production in academic interaction. Bidu-Vrănceanu (2002) emphasizes that specialized vocabulary is dynamic and context-dependent, requiring not only lexical knowledge but also an understanding of its functional use within specific communicative situations. For international and Erasmus students, the pressure to use discipline-specific terminology accurately often intensifies anxiety and contributes to reduced oral participation in communication-focused courses.

In addition to language-related difficulties, students often struggle with unfamiliar academic conventions, such as interactive seminars, group discussions, and oral presentations. These challenges are compounded by cultural differences in communication styles, including attitudes toward assertiveness, self-promotion, and public speaking.

Qualitative classroom observations indicate that students from similar cultural backgrounds may cluster together, limiting opportunities for intercultural interaction. Time constraints, large class sizes, and uneven levels of English proficiency further complicate the instructor's efforts to engage all learners equally.

Furthermore, some students experience *cognitive overload* when processing both content and language simultaneously. In communication-intensive tasks, such as group discussions or presentations, students must manage multiple demands: understanding the topic, formulating ideas in a second language, and adhering to academic norms. This dual cognitive load can result in hesitation, shorter responses, or complete silence, even among students with relatively strong English proficiency.

Another challenge is *affective barriers*, including anxiety, fear of judgment, and low self-efficacy. For example, students may avoid volunteering answers or contributing to debates if they anticipate being corrected publicly or if they perceive their peers as more fluent. These affective factors interact with

linguistic and cultural variables, creating complex patterns of participation that require careful pedagogical attention.

Finally, instructors must consider *practical and contextual constraints*. Large class sizes, limited opportunities for individualized feedback, and rigid curricular structures can prevent students from practicing and receiving support in speaking activities. Innovative solutions, such as rotating group roles, peer mentoring, or the integration of online discussion platforms, can help mitigate these constraints, fostering more equitable participation and supporting the gradual development of confidence and communicative competence.

5. Reflective Teaching Practice as a Methodological Framework

This study adopts a reflective teaching practice approach, grounded in systematic observation and critical self-reflection. Reflective pedagogy emphasizes the instructor's role as an active learner, continuously evaluating the effectiveness of teaching strategies and adapting them to students' needs (Schön, 1983). Data informing this analysis derive from longitudinal classroom observations, informal student feedback, and reflective teaching notes collected across several academic years in communication courses taught to international and Erasmus students. While the study does not aim for statistical generalization, it offers context-sensitive insights into recurring patterns and pedagogical responses.

Reflective teaching practice allows instructors to identify patterns of student participation, silence, and interaction that might otherwise go unnoticed. For instance, by maintaining detailed observation notes on which students actively contribute during discussions or group tasks, teachers can detect trends linked to cultural background, language proficiency, or prior educational experience. These insights inform the adaptation of teaching strategies, such as restructuring activities, providing additional scaffolding for complex tasks, or introducing alternative participation formats like small-group discussions or think-pair-share exercises.

Moreover, incorporating student feedback into reflective practice enhances the instructor's understanding of classroom dynamics. Informal surveys, post-activity discussions, or anonymous feedback forms can reveal students' perceptions of difficulty, anxiety, or engagement barriers. For example, feedback might indicate that certain role-play scenarios are too linguistically demanding, prompting the instructor to pre-teach relevant vocabulary or provide model dialogues. This iterative process ensures that pedagogical adjustments are responsive, evidence-based, and tailored to the specific needs of international and Erasmus learners.

Finally, reflective teaching practice can be operationalized through structured self-reflection and peer observation. Instructors may regularly review recordings of their own lessons, noting how questions are posed, how wait-time

affects student responses, and how culturally diverse students navigate participation. Peer observation allows colleagues to provide constructive input on engagement strategies and intercultural sensitivity. Together, these reflective processes create a continuous feedback loop, enhancing teaching effectiveness and promoting a classroom environment that supports active participation, confidence-building, and intercultural learning.

6. Pedagogical Strategies for Enhancing Participation and Engagement

6.1 Active Learning and Experiential Tasks

Active learning methodologies have proven effective in promoting student engagement in multicultural classrooms. Role-plays, simulations, case studies, and problem-based tasks encourage experiential learning and reduce the pressure associated with formal speaking performance. By focusing on meaning-making rather than linguistic accuracy, such tasks create a low-anxiety environment conducive to participation.

Experiential activities also allow students to draw on their diverse cultural and academic backgrounds, enriching classroom interaction and fostering mutual learning. When carefully scaffolded, these tasks support both linguistic development and intercultural awareness. For example, students can simulate international business meetings, academic conferences, or cross-cultural negotiation scenarios, which require them to apply discipline-specific vocabulary, adapt communication styles, and respond to culturally diverse interlocutors in real time. Such structured tasks make classroom learning dynamic while promoting critical thinking and problem-solving skills.

Additionally, reflective debriefing after experiential tasks can consolidate learning outcomes. Students can analyze their performance, discuss challenges encountered, and receive targeted feedback on both language use and intercultural interaction. This reflection helps students internalize effective communication strategies, understand the impact of cultural differences on interaction, and build confidence in speaking English in academic contexts.

6.2 Small-Group Work and Collaborative Learning

Small-group discussions offer a less intimidating context for oral interaction, particularly for students who are reluctant to speak in plenary settings. Collaborative learning promotes peer support, shared responsibility, and negotiation of meaning, which are essential components of communicative competence.

In multicultural groups, structured collaboration can facilitate intercultural dialogue and challenge stereotypes. Clear task instructions and rotating group roles help ensure balanced participation and prevent dominance by more proficient speakers. For instance, assigning roles such as discussion leader, note-taker, or timekeeper allows all students to contribute meaningfully while practicing different aspects of communication and leadership.

Moreover, integrating peer assessment and peer feedback into collaborative tasks encourages critical evaluation and reflective thinking. Students learn to articulate constructive feedback, justify their perspectives, and negotiate differences in interpretation or approach. These processes not only enhance linguistic and cognitive skills but also promote empathy, intercultural understanding, and collaborative problem-solving.

6.3 Culturally Responsive Teaching

Culturally responsive teaching acknowledges students' cultural identities as valuable resources in the learning process. In communication courses, this approach involves validating diverse communicative styles, encouraging multiple perspectives, and explicitly addressing intercultural differences in academic discourse.

By integrating culturally diverse examples, case studies, and discussion prompts, instructors can enhance students' intercultural competence and self-awareness. Reflective activities, such as journals or guided discussions on communication norms, help students recognize how culture influences behavior, participation, and interpretation of messages. For example, students may compare norms regarding disagreement, turn-taking, or directness in different educational cultures, promoting critical reflection on their own communicative assumptions.

Furthermore, culturally responsive strategies include designing *inclusive participation mechanisms*, such as think-pair-share, online discussion boards, and moderated debates, which accommodate diverse learning preferences and comfort levels. By providing multiple avenues for expression, instructors can ensure that all students have opportunities to engage meaningfully, regardless of confidence, language proficiency, or cultural background.

Finally, combining active learning, small-group work, and culturally responsive teaching creates a *synergistic effect*. Students experience meaningful interaction, receive targeted feedback, and develop adaptive communication strategies in authentic, supportive contexts. These strategies collectively foster engagement, participation, and the gradual acquisition of both linguistic and intercultural competencies essential for success in EMI and multicultural academic environments.

7. Assessment and Feedback in Multicultural Communication Courses

Assessment practices play a crucial role in shaping students' willingness to participate. Overemphasis on accuracy and formal correctness may discourage risk-taking and spontaneous communication. Alternative assessment methods, such as formative feedback, peer evaluation, and reflective journals, can support learning while reducing performance anxiety.

Constructive feedback that focuses on communicative effectiveness rather than error correction helps students build confidence and develop pragmatic

competence. Transparency in assessment criteria is particularly important for international students unfamiliar with local academic standards.

In addition to formative and peer-based assessment, *task-based evaluations* can enhance participation and motivation in multicultural classrooms. For example, students may be assessed on their ability to contribute meaningfully to group discussions, role-plays, or presentations, rather than solely on linguistic accuracy. This approach encourages risk-taking, promotes collaborative learning, and recognizes diverse communicative strengths. Rubrics that clearly define performance expectations, including aspects such as clarity of argument, engagement with peers, and effective use of discipline-specific terminology, provide students with concrete guidance and reduce anxiety associated with ambiguous evaluation standards.

Furthermore, *continuous and reflective feedback loops* strengthen students' learning outcomes and intercultural competence. Structured post-task discussions, instructor comments on group interactions, and reflective journaling enable learners to critically analyze their own performance and identify areas for improvement. These strategies also allow educators to address misunderstandings rooted in cultural or linguistic differences, helping students develop both self-awareness and adaptive communication strategies. By integrating assessment and feedback into everyday classroom activities, instructors create a supportive environment where students are encouraged to experiment, collaborate, and gradually build confidence in intercultural and English-medium communication.

8. Developing Intercultural Competence through Communication Teaching

Intercultural competence has become a key learning outcome in internationalized higher education. Communication courses provide a natural context for developing this competence, as they engage students in interaction across cultural boundaries.

Intercultural competence involves not only knowledge of cultural differences, but also attitudes of openness, curiosity, and empathy, as well as skills of interpretation and adaptation (Byram, 1997). Pedagogical approaches that encourage reflection on intercultural encounters help students develop these dimensions in an integrated manner.

In communication-focused courses, intercultural competence is further developed through guided interaction and structured communicative tasks that require students to negotiate meaning and adapt their discourse to culturally diverse interlocutors. Practical classroom activities can include:

- *Role-plays simulating international professional contexts*, such as business meetings, academic presentations, or project negotiations. Students assume specific cultural or professional roles and must communicate effectively

while respecting differing cultural norms, practicing both verbal and non-verbal strategies.

- *Case study analyses from multiple cultural perspectives*, where student groups examine real-world scenarios, such as marketing campaigns, organizational dilemmas, or public policy issues. Each group presents their findings, highlighting how cultural assumptions influence decision-making, communication strategies, and problem-solving approaches.

- *Intercultural debates on ethical or social issues*, structured to encourage students to articulate arguments from diverse cultural viewpoints. This activity not only develops public speaking and critical thinking skills but also fosters empathy and understanding of alternative perspectives, helping students recognize implicit cultural assumptions in communication.

- *Collaborative projects requiring cross-cultural coordination*, such as designing a virtual international workshop or producing a multilingual report. These tasks require negotiation of roles, consensus-building, and adaptation to different working styles, providing hands-on experience of intercultural teamwork in authentic academic and professional contexts.

Moreover, reflective and feedback-oriented activities consolidate intercultural learning. Students can maintain *learning journals* to document challenges, strategies, and emotional responses during intercultural interactions; participate in *peer-feedback sessions* to assess communication effectiveness and teamwork; or engage in *post-task reflective discussions* where cultural norms, communicative choices, and interaction outcomes are analyzed. These applied exercises help learners connect theory to practice, internalize culturally responsive communication strategies, and develop confidence, adaptability, and ethical awareness. As a result, students are better prepared for effective engagement in diverse academic, professional, and international environments.

9. Discussion

The findings of this reflective analysis suggest that teaching communication in multicultural academic contexts requires a shift from uniform pedagogical models toward flexible, student-centered approaches. Silence and reluctance to speak should be interpreted within broader linguistic and cultural frameworks, rather than as individual deficits.

Effective pedagogical strategies combine active learning, collaborative tasks, and culturally responsive teaching, supported by inclusive assessment practices. Such approaches not only enhance participation but also contribute to the development of global competences essential for students' academic and professional trajectories.

Furthermore, the discussion highlights the central role of the instructor as a mediator between linguistic, cultural, and pedagogical dimensions of learning in multicultural classrooms. In EMI communication courses, teachers are

required to balance content objectives with language support while remaining sensitive to students' diverse educational backgrounds and communicative expectations. This mediating role involves not only adapting teaching strategies but also explicitly addressing implicit academic norms, such as expectations regarding participation, argumentation, and interaction. By making these norms visible and negotiable, instructors can reduce ambiguity and empower international and Erasmus students to engage more confidently in classroom discourse. In this sense, pedagogical flexibility and reflective practice emerge as key factors in transforming multicultural classrooms into inclusive learning spaces where diversity is leveraged as a pedagogical resource rather than perceived as an obstacle.

Conclusion

The increasing presence of international and Erasmus students in English-medium instruction (EMI) programs has reshaped the pedagogical landscape of higher education, particularly in courses that focus on communication skills. This paper has argued that teaching communication in multicultural academic contexts requires a deliberate shift toward flexible, inclusive, and culturally responsive pedagogical approaches.

The analysis has shown that students' silence, reluctance to participate, or uneven engagement should not be interpreted simplistically as a lack of motivation or competence. Rather, these behaviors are often rooted in linguistic insecurity, differing academic traditions, and culturally shaped communication norms. Recognizing these factors enables educators to design learning environments that acknowledge diversity while supporting students' communicative development.

The pedagogical strategies discussed—active learning, experiential tasks, small-group collaboration, and culturally responsive teaching—have been identified as particularly effective in fostering participation and intercultural dialogue. When combined with formative assessment and supportive feedback practices, these approaches help reduce anxiety and encourage meaningful interaction among culturally diverse learners.

Moreover, communication courses represent a key space for developing intercultural competence, understood as an integrated set of knowledge, skills, and attitudes necessary for effective interaction in global academic and professional contexts. By engaging students in reflective and collaborative communicative practices, instructors can facilitate not only language development but also intercultural awareness and adaptability.

In conclusion, pedagogical innovation in multicultural communication teaching is essential in the context of internationalized higher education. Continuous reflective practice, sensitivity to students' backgrounds, and openness to methodological adaptation are crucial for ensuring inclusive,

effective, and ethically grounded teaching. Future research could extend these findings through empirical investigations incorporating student perspectives and longitudinal data, further refining pedagogical models for communication in multicultural academic environments.

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MACROECONOMIC CONSEQUENCES OF THE ENERGY CRISIS IN ROMANIA (2022–2025)

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Abstract

This paper analyses the macroeconomic impact of the 2022–2025 energy crisis on the Romanian economy. The study investigates developments in energy prices, inflation, purchasing power, economic growth, labour market conditions, and fiscal performance using official data from national and European institutions. The results indicate that the energy shock was a major driver of inflation and contributed to slower economic growth, declining real purchasing power, and increasing fiscal imbalances. While government support measures reduced part of the immediate social impact, they also generated significant budgetary costs. The findings suggest that the crisis acted both as a macroeconomic shock and as a catalyst for structural adjustments in Romania's energy sector, with implications for long-term economic resilience and energy security.

Keywords: Energy crisis; Inflation; Economic resilience; Fiscal sustainability; Energy security

JEL Classification: E31, E62, H63, Q43, O47

1. Introduction

On 24 February 2022, the Russian Federation launched a full-scale military invasion of Ukraine, triggering the most severe armed conflict in Europe since the Second World War. Beyond its geopolitical consequences, the conflict rapidly evolved into a major energy crisis with significant implications for European economies. Prior to the invasion, Russia supplied approximately 40% of the European Union's natural gas consumption and around 27% of its crude oil imports. The progressive disruption of these energy flows generated an unprecedented supply shock that affected energy markets, inflation dynamics, economic growth, and public finances across Europe (Eurostat, 2023a; IEA, 2022).

Although Romania occupied a relatively favourable position compared with several Central and Eastern European countries due to its substantial domestic hydrocarbon production, its integration into the European energy market exposed households and businesses to international price volatility. As a result, energy costs increased sharply, contributing to a substantial acceleration of inflation and requiring extensive government intervention. Annual inflation

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reached 16.8% in November 2022, representing the highest level recorded in Romania in more than two decades (BNR, 2022; INS, 2026a).

This study investigates the macroeconomic consequences of the energy crisis in Romania between 2022 and 2025. Specifically, it analyses the evolution of energy prices, inflationary pressures, purchasing power, economic growth, labour market developments, fiscal performance, and the effectiveness of government policy responses. The paper also evaluates the structural transformations accelerated by the crisis and discusses their implications for Romania's medium-term economic outlook.

2. Theoretical Framework and Literature Review

Economic theory defines a negative supply shock as an exogenous disturbance that reduces productive capacity or increases production costs, leading simultaneously to higher prices and lower output. Energy shocks represent a particularly important category of supply disturbances because energy constitutes a fundamental input in virtually all economic activities. Consequently, large increases in energy prices tend to generate inflationary pressures while weakening economic performance (IMF, 2023b).

Recent empirical evidence highlights the central role of energy markets in the inflation surge experienced by European economies after the pandemic and the outbreak of the war in Ukraine. Baba et al. (2023) demonstrate that inflation in Europe during 2021–2022 was largely driven by external energy and food price shocks. Their findings indicate that these effects were more pronounced in emerging economies, where energy and food account for a larger share of household expenditure. Similarly, Hansen, Toscani, and Zhou (2023) show that firms frequently transferred rising energy costs to final consumers and, in some cases, expanded profit margins, thereby amplifying inflation beyond the direct impact of higher input prices (Hansen et al., 2023).

The literature identifies five principal transmission channels through which energy shocks affect macroeconomic performance. First, higher energy prices increase production costs and contribute to cost-push inflation. Second, households allocate a larger share of their income to utility bills and fuel expenses, reducing discretionary consumption and weakening aggregate demand. Third, heightened uncertainty and increased operating costs discourage private investment and reduce medium-term growth potential. Fourth, rising energy import costs may deteriorate trade balances and current-account positions, placing pressure on exchange rates. Finally, governments often intervene through subsidies and compensation schemes, increasing fiscal expenditures and potentially worsening budget deficits and public debt dynamics (IMF, 2023b; Baba et al., 2023).

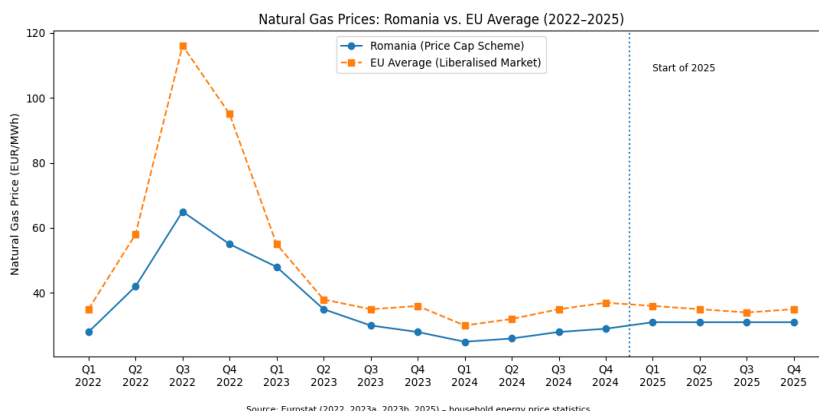
The current crisis shares certain characteristics with previous energy disruptions but also exhibits unique features. Unlike the oil crises of the 1970s,

which primarily affected petroleum markets, the post-2022 energy shock simultaneously disrupted natural gas, oil, electricity, and coal markets. The International Energy Agency (IEA) therefore described it as the first truly global energy crisis of the modern era (IEA, 2022). The multi-sectoral nature of the shock amplified its transmission across European economies and required large-scale policy interventions. According to estimates cited by the International Monetary Fund, European governments allocated more than €600 billion to energy-related support measures between late 2021 and early 2023 (IMF, 2023a). These theoretical considerations provide the analytical foundation for understanding Romania's experience during the energy crisis. The following sections examine how the shock affected inflation, economic activity, labour markets, and public finances, as well as the extent to which policy interventions mitigated its economic and social consequences.

3. Energy Price Dynamics and Inflationary Effects in Romania (2022–2025)

Romania entered the energy crisis from a relatively advantageous position compared with many Central and Eastern European countries due to its substantial domestic natural gas production and diversified electricity generation mix. Before 2022, domestic production covered approximately 85–90% of national gas consumption, reducing direct dependence on Russian imports (European Commission, 2024). However, Romania's integration into the European energy market exposed domestic consumers and businesses to international price volatility.

The outbreak of the war in Ukraine and the subsequent disruption of Russian energy exports generated unprecedented turbulence in European energy markets. Wholesale natural gas prices increased dramatically during 2022, reaching historical peaks across Europe (IEA, 2023; Eurostat, 2023a). Although Romania benefited from relatively high energy self-sufficiency, domestic prices followed the upward trend observed throughout the European Union.

Figure 1. Natural Gas Prices: Romania (Capped) vs. EU Average (2022–2025)

Sources: Eurostat (2022, 2023a, 2023b, 2025); National Bank of Romania (2022); Government Emergency Ordinance No. 6/2025.

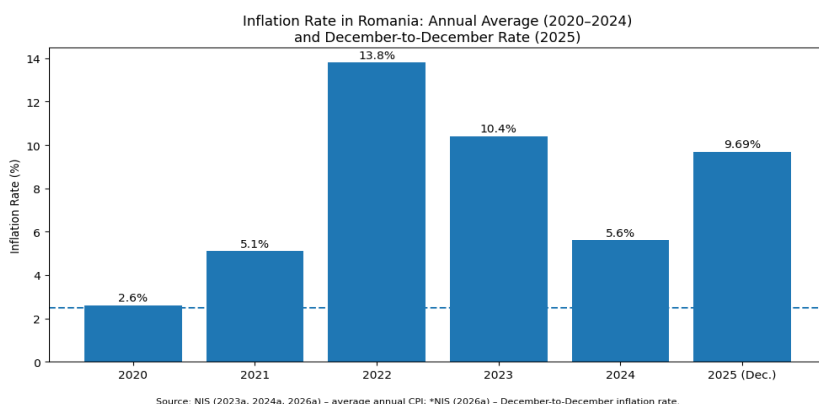
Figure 1 illustrates the substantial divergence between prices paid by Romanian households and the European average during the crisis period. Government price-capping measures maintained domestic prices significantly below market levels, particularly during the second half of 2022 when European gas prices reached their peak. According to National Bank of Romania estimates, the price-capping scheme prevented a considerably stronger inflationary shock and mitigated the immediate impact on household budgets (BNR, 2022).

According to Eurostat data, household electricity prices in Romania increased by more than 100% during 2022 compared with the previous year, while natural gas prices rose by approximately 165%, placing Romania among the countries most affected by energy price inflation (Eurostat, 2022). Nevertheless, government intervention prevented consumers from bearing the full burden of market prices.

By the first half of 2025, European natural gas prices had gradually stabilised as supply chains adjusted and dependence on Russian energy declined (Eurostat, 2025). Romania continued to maintain some of the lowest regulated household gas prices in the European Union due to the extension of support measures.

3.1 Inflation Dynamics and Monetary Policy Response

The energy shock rapidly translated into broader inflationary pressures throughout the Romanian economy. Annual inflation accelerated from moderate pre-crisis levels to 16.8% in November 2022, representing the highest inflation rate recorded in Romania in more than two decades (INS, 2026a; BNR, 2022). Rising energy costs increased production expenses across multiple sectors, generating substantial spillover effects on consumer prices.

Figure 2. Annual Inflation Rate in Romania (2020–2025)

Sources: National Institute of Statistics (2023a, 2024a); National Bank of Romania (2022, 2023a).

Figure 2 highlights the extraordinary acceleration of inflation during 2022, followed by a gradual disinflation process in 2023 and 2024. Average annual inflation vs. December-to-December inflation, NIS data confirm a December-to-December inflation rate of 9.7% in December 2025 compared with December 2024.

The evidence suggests that energy prices were the primary driver of inflationary dynamics during the initial phase of the crisis (Baba et al., 2023). However, inflation soon spread beyond the energy sector, affecting a broad range of goods and services through second-round effects.

National Bank reports indicate that core inflation also increased significantly during the period, confirming that the shock was transmitted throughout the economy rather than remaining confined to energy markets. This finding is consistent with the results of Hansen et al. (2023), who argue that firms often transfer rising energy costs into final prices, amplifying inflationary pressures. In response, the National Bank of Romania implemented the most aggressive monetary tightening cycle in its recent history, increasing the policy interest rate from 2.0% in early 2022 to 7.0% by January 2023 (BNR, 2023). Although this restrictive monetary stance contributed to reducing inflationary pressures, it also increased financing costs and weakened investment activity.

Inflation gradually declined to 10.4% in 2023 and approximately 5.8% in 2024. However, the expiration of electricity price caps in July 2025 generated a renewed inflationary impulse (INS, 2026a; EPG, 2025). Electricity prices increased by approximately 57% compared with previously regulated levels, contributing to a new acceleration in consumer price growth.

3.2 Purchasing Power and Household Welfare

The energy crisis had significant consequences for household welfare. Although nominal wages increased substantially between 2022 and 2025,

inflation consistently eroded purchasing power. Rising expenditures on energy and food reduced disposable income and constrained household consumption, particularly among lower-income groups (Baba et al., 2023).

Average net monthly earnings increased from approximately RON 3,836 in 2022 to RON 5,914 in December 2025 (INS, 2026b). Nevertheless, real wage growth remained weak and occasionally negative because consumer prices increased at a faster pace than incomes. Consequently, many households experienced a decline in living standards despite nominal income gains.

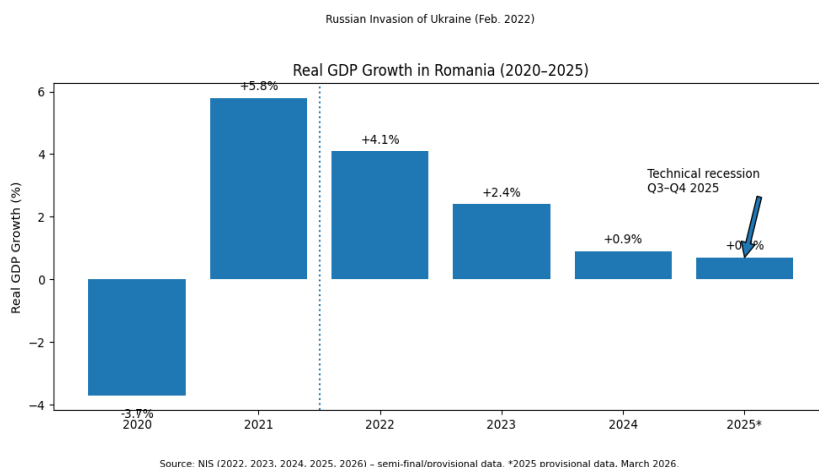
The Romanian case demonstrates how energy shocks affect households not only through higher utility bills but also through broader inflationary effects that reduce real incomes and weaken domestic demand. As a result, the energy crisis became both an inflationary and a social challenge, with consequences extending well beyond the energy sector itself.

4. Macroeconomic Consequences

4.1 Economic Growth and Labour Market Developments

Despite the severity of the energy shock, the Romanian economy demonstrated a relatively high degree of resilience during the initial phase of the crisis. According to data published by the National Institute of Statistics, real GDP growth remained positive throughout the 2022–2025 period, although the pace of expansion slowed considerably over time. Economic growth reached 4.1% in 2022, supported by robust domestic consumption, strong labour market conditions, and continued absorption of European funds. However, growth decelerated to 2.1% in 2023, 0.9% in 2024, and approximately 0.7% in 2025 (INS, 2026c).

Figure 3. Real GDP Growth in Romania (2020–2025)



Sources: National Institute of Statistics (2024b, 2026c); Eurostat (2023a).

As illustrated in Figure 3, Romania experienced a clear downward trend in economic growth following the outbreak of the energy crisis (European Commission, 2024). Higher production costs, declining purchasing power, tighter monetary conditions, and increased uncertainty reduced economic activity across several sectors. Although the economy avoided a prolonged recession during the first years of the crisis, growth became increasingly fragile.

A particularly concerning development emerged during the second half of 2025, when Romania experienced a technical recession during the second half of 2025. (INS, 2026c). Seasonally adjusted GDP contracted by 0.2% in the third quarter and by 1.9% in the fourth quarter compared with the previous quarter. Although annual growth remained marginally positive, these quarterly developments indicated a deterioration in underlying economic conditions. Sectoral performance was uneven throughout the period (European Commission, 2024). Construction, information technology, and agriculture remained among the strongest contributors to growth, while trade and professional services experienced weaker performance. Energy-intensive industries, including metallurgy, chemicals, and construction materials, were particularly affected by rising energy costs. Several industrial facilities reduced production or temporarily suspended operations due to deteriorating profitability.

The labour market remained relatively resilient despite the economic slowdown. Unemployment fluctuated within a relatively narrow range between 2022 and 2024, supported in part by government support measures and persistent labour shortages in certain sectors. However, labour market conditions weakened during 2025 as economic growth slowed further. The unemployment rate increased from approximately 5.5% at the beginning of the year to 6.3% by December 2025, reflecting the effects of weaker economic activity and the emergence of technical recession (INS, 2026d).

The relative stability of employment during most of the crisis period suggests that firms initially absorbed a significant portion of the shock through lower profitability rather than large-scale workforce reductions. Nevertheless, the deterioration observed in 2025 indicates that prolonged economic pressures eventually affected labour demand.

4.2 Fiscal Impact: Budget Deficit and Public Debt

The energy crisis generated substantial pressures on Romania's public finances. Government intervention aimed at protecting households and firms from rising energy costs required significant fiscal resources, while slower economic growth constrained revenue collection. As a result, fiscal consolidation efforts were interrupted and budgetary imbalances widened considerably (Ministry of Finance, 2025a).

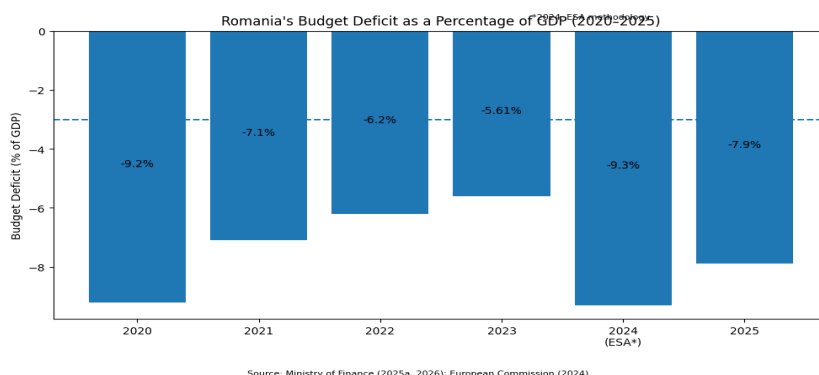
Romania recorded a budget deficit of 6.2% of GDP in 2022 and 5.61% in 2023. Although a modest improvement was observed during 2023, fiscal

performance deteriorated sharply in 2024, when the deficit reached 9.3% of GDP, the highest level recorded in the European Union during that year (European Commission, 2024; Ministry of Finance, 2026). The deficit declined to 7.9% of GDP in 2025 following the implementation of fiscal adjustment measures, but it remained substantially above the Maastricht reference value of 3%.

The deterioration of public finances reflected both cyclical and structural factors. On the expenditure side, the government financed extensive energy support programmes, including price caps and compensation schemes for households and businesses (IMF, 2023a). At the same time, slower economic growth limited the expansion of tax revenues. The combined effect of these developments significantly increased borrowing requirements.

Public debt followed a similar trajectory. Government debt increased from 47.3% of GDP in 2022 to 48.9% in 2023, reaching 54.8% in 2024 and 59.6% in 2025.

Figure 4. Public Deficit in Romania as a Percentage of GDP (2020–2025)



Sources: Ministry of Finance (2025b); Eurostat (2023a, 2025).

Figure 4 illustrates the persistence of large fiscal imbalances during the crisis period. By 2025, Romania's public debt approached the Maastricht threshold of 60% of GDP. The increase in debt was further amplified by higher interest rates, which raised the cost of government borrowing and increased debt-servicing expenditures.

According to Eurostat data, Romania recorded one of the fastest increases in the debt-to-GDP ratio within the European Union during the later stages of the crisis (Eurostat, 2025). This trend highlights the fiscal trade-offs associated with large-scale energy support measures. While such interventions contributed to social stability and reduced short-term inflationary pressures, they also generated long-term fiscal costs that will require continued consolidation efforts in the coming years.

Overall, the macroeconomic consequences of the energy crisis extended far beyond energy markets. The combination of slower growth, weakening labour market conditions, persistent fiscal deficits, and rising public debt illustrates the broad and lasting impact of the shock on Romania’s economic performance.

5. Policy Response and Structural Adjustments

The Romanian government's primary response to the energy crisis consisted of a comprehensive price-capping and compensation scheme for electricity and natural gas consumers (ANRE, 2025). Introduced in March 2022 and subsequently amended several times, the programme aimed to shield households and businesses from the unprecedented increase in energy prices while limiting the transmission of energy costs to the broader economy.

According to estimates published by the National Bank of Romania, the support scheme reduced inflation by approximately six percentage points during the first phase of the crisis (BNR, 2022). Without government intervention, inflationary pressures would have been significantly stronger, resulting in a more pronounced decline in household purchasing power and business activity. Consequently, Romania maintained some of the lowest regulated household energy prices within the European Union during the peak of the crisis.

Table 1. Evolution of Romania’s Energy Support Scheme (2022–2026)

Table 1. Evolution of Romania's Energy Support Scheme (2022-2026)

Legislative Act	Period	Beneficiaries	Capped Price
GEO 27/2022	Mar 2022 - Dec 2022	Households and SMEs	Electricity: ≤ RON 1,300/MWh Natural Gas: RON 0.31/kWh
GEO 119/2022	Jan. 2023 - Mar 2025	Household consumers	Electricity: RON 0.68-0.80/kWh Natural Gas: RON 0.31/kWh
GEO 6/2025	Apr.-Jun. 2025 (Electricity) Apr. 2025-Mar. 2026 (Natural Gas)	Household consumers	Electricity: RON 0.68-0.80/kWh Natural Gas: RON 0.31/kWh
Liberalised Market / GEO 12/2026	From Jul. 1, 2025 (Electricity) From Apr. 1, 2026 (Natural Gas)	All consumers	Electricity: RON 1.04-2.28/kWh (market prices)

Sources: ANRE (2025); National Bank of Romania (2022); European Commission (2024); Government Emergency Ordinance No. 6/2025.

Despite its effectiveness in mitigating the immediate social consequences of the crisis, the programme generated substantial fiscal costs. The cumulative budgetary burden of energy support measures exceeded EUR 6 billion between 2022 and 2024 (Ministry of Finance, 2025a). While these expenditures contributed to social stability and reduced short-term inflationary pressures, they also increased borrowing requirements and delayed fiscal consolidation efforts.

International Monetary Fund analyses classify such interventions as unconventional fiscal policies (IMF, 2023a). Although these measures can reduce inflation temporarily by limiting the direct transmission of energy prices, their long-term effectiveness is more limited because they do not eliminate the underlying causes of inflation. Instead, they primarily redistribute inflationary pressures over time while generating additional fiscal costs.

A major turning point occurred in July 2025, when Romania liberalised the household electricity market after approximately three years of administrative price controls (EPG, 2025). The liberalisation process was implemented in line with European Commission recommendations and commitments undertaken through the National Recovery and Resilience Plan. Following liberalisation, electricity prices increased substantially, contributing to a renewed acceleration of inflation during the second half of 2025.

Beyond short-term crisis management, the energy shock accelerated several structural transformations within Romania's energy sector. One of the most significant developments was the complete elimination of Russian natural gas imports by 2023 (IEA, 2023). Romania diversified its energy supply sources and strengthened regional energy cooperation, reducing vulnerability to future geopolitical disruptions.

The crisis also accelerated investment in renewable energy and domestic production capacity. The expansion of prosumer installations and renewable electricity generation reflected a broader shift toward energy diversification and sustainability. At the strategic level, the Neptun Deep project in the Black Sea emerged as one of Romania's most important long-term energy investments (Ministry of Energy, 2025). With estimated reserves exceeding 100 billion cubic metres of natural gas, the project is expected to begin production in 2027 and could position Romania among the largest natural gas producers in the European Union.

Overall, the crisis acted simultaneously as a major economic shock and as a catalyst for structural transformation. Although the short-term costs were substantial, the adjustments triggered by the crisis may strengthen Romania's long-term energy security and economic resilience.

Conclusions

The energy crisis of 2022–2025 represented one of the most significant economic challenges faced by Romania in recent decades. Triggered by the disruption of European energy markets following the Russian invasion of Ukraine, the crisis generated substantial inflationary, fiscal, and macroeconomic pressures that affected households, businesses, and public institutions alike.

The findings of this study indicate that energy prices were a major driver of inflation during the period under review. Annual inflation reached 13.8% in 2022, the highest level recorded in more than twenty years, before gradually

declining during 2023 and 2024. However, inflation remained above the National Bank of Romania's target throughout the period and accelerated again following the liberalisation of electricity prices in 2025.

The crisis also affected household welfare through a significant decline in real purchasing power. Although nominal wages increased considerably, inflation eroded a large share of these gains, reducing the real value of household incomes and limiting consumption growth.

From a macroeconomic perspective, Romania maintained positive economic growth throughout most of the crisis period, demonstrating a degree of resilience relative to many European economies. Nevertheless, GDP growth decelerated steadily from 4.1% in 2022 to 0.7% in 2025, while technical recession emerged during the second half of 2025. Labour market conditions remained relatively stable until the later stages of the crisis, when unemployment began to increase.

The fiscal consequences were equally significant. Large-scale energy support programmes contributed to persistent budget deficits and a rapid increase in public debt. Although these measures successfully mitigated the social impact of the crisis, they also generated long-term fiscal challenges that will require sustained consolidation efforts in the coming years.

At the same time, the crisis accelerated important structural adjustments. The elimination of dependence on Russian natural gas, increased investment in renewable energy, and the development of strategic projects such as Neptun Deep have strengthened Romania's prospects for long-term energy security and diversification.

The evidence analysed in this study suggests that the Romanian economy demonstrated considerable resilience during the energy crisis, maintaining positive GDP growth despite unprecedented inflationary pressures and severe disruptions in European energy markets. However, this resilience came at a significant fiscal cost, reflected in persistent budget deficits and a rapid increase in public debt. While the gradual normalisation of energy markets has reduced some of the immediate risks associated with the crisis, important challenges remain, including fiscal consolidation, inflation control, and the restoration of sustainable economic growth. In this context, strategic investments in domestic energy production and renewable energy capacity will play a crucial role in strengthening Romania's long-term energy security and macroeconomic stability.

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MAPPING ROMANIA'S COMPETITIVENESS WITHIN THE EU-27: A QUANTITATIVE ASSESSMENT OF TOURISTS FLOW

Gheorghe Camelia-Monica¹

Abstract

This paper analyses the position and dynamics of Romania's international tourism within the European context, focusing on the period 1995–2024 and on comparisons with EU-27 Member States. Using harmonized statistical series from Eurostat and national sources, the study examines both absolute indicators – the number of foreign tourist arrivals (NSTS) and overnight stays (NITS) in tourist accommodation establishments – and relative indicators, such as fixed-base and average annual indices, average annual growth rates, and tourist traffic density. The results reveal a strong concentration of international tourism flows in a small group of Western and Southern European countries, while Romania remains in the group of Member States with low NSTS and NITS levels, despite a marked post-pandemic recovery. Comparative analyses with neighboring countries (Bulgaria and Hungary) highlight Romania's structural lag, especially in terms of foreign tourist arrivals per 1,000 inhabitants and summer-season intensity. The findings underscore the importance of effectively leveraging tourism potential and of consistent policy measures aimed at improving Romania's attractiveness on the international tourism market.

Keywords: international tourism; foreign tourist arrivals; overnight stays; tourist traffic density; growth indices; Romania; EU-27; Eurostat data; tourism concentration; comparative analysis.

JEL Classification: Z32.

1. Introduction:

Economic development, increased labour productivity, the reduction of the length of the working week, and the gradual expansion of freedom of movement for persons, both within the European Union and worldwide, are just some of the factors that, in recent decades, have led to an intensification of international tourism in the European states of the current EU-27, from 274,237,319 tourist visits in 2005 to 435,635,578 tourist visits in 2024 (an increase by a factor of 1.84), as well as at the level of individual member states, the most significant increase, by a factor of 3.73, being recorded in Portugal, while in Romania the increase was only by a factor of 1.65, from 1,429,911 tourist visits in 2005 to 2,387,632 tourist visits in 2024. These developments have had direct effects on the sustainable development of destination countries, boosting economic growth and acting as a driver of their development (Nemec Rudež, 2020; Gómez & Cándano, 2023).

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On the other hand, in the last decade, international tourism has been influenced by crises and conflicts, the most important in terms of its impact being the Covid-19 pandemic. In April 2020, the aviation industry, a particularly important vector for international tourism, reported an 80% decrease in the number of flights compared to the same period in 2019 (Gaydarov, 2021), so that the negative impact, although gradually reduced, affected both the aviation industry itself and international tourism. At the level of the EU-27, the number of international tourist visits fell from 407,052,323 in 2019 to 114,039,015 in 2020 (a decrease of 71.98%), while in Romania it decreased from 2,683,748 visits in 2019 to 453,867 visits in 2020 (INS Tempo-online TUR104D, 2025), a reduction of 83.09%. Nevertheless, due to the resilience of the tourism industry and as a result of the policies and measures implemented by governments, 2023 saw a significant recovery in terms of revenues and employment. In Romania, revenues generated by international tourism amounted to 311.63 million US dollars compared to 178.42 million US dollars in 2020 (UN Tourism TSC, 2025).

These developments highlight, on the one hand, the resilience of the highly complex and diverse international tourism industry within the global economy and, on the other hand, the existence of a positive relationship between tourism development and economic growth and quality of life (Băndoi et al., 2020), although differences between European Union member states remain significant. By comparison, in 2024, in 12 of the 27 member states the number of international tourist visits (Eurostat ATAE, 2026) per 100 inhabitants of the destination countries (Eurostat PJAN, 2026) exceeded the resident population, while in the remaining states it ranged between 13 and 96 international visitors per 100 inhabitants. Unfortunately, Romania ranked last, with 13 visits per 100 inhabitants, compared with 58 visits per 100 inhabitants in Bulgaria and 67 in Hungary. Starting from these aspects, the main objective of this paper is to identify the position of Romania's international tourism compared with that of the other current member states of the European Union.

2. Literature review

The evolution of tourism in general, and of international tourism in particular, is interconnected with economic developments. A study of the dependence between tourism demand and economic growth, the real exchange rate and economic policy uncertainty was conducted by Gómez and Cándano (2023) for nine OECD member states over a 20-year period (1998–2018). The research showed that, in the long run, there is a causal relationship between tourism revenues, the exchange rate, GDP and economic policy uncertainty, in the sense that changes in these variables affect the behaviour of tourism demand and, implicitly, the economic performance of host countries. On the other hand, Li et al. (2025) show that the prosperity of tourism significantly promotes

high-quality economic development, with the relationship between them operating through industrial upgrading and infrastructure development, while the digital economy acts as a critical moderator that amplifies the transformative effects of tourism.

Studies based on economic modelling of the ways in which international and inter-regional tourism interact with national economic development have also been carried out by Zhang (2020) and Sanchez-Rivero (2020). In order to analyse the complex relationship between tourism and economic growth, Zhang proposes a simulation model that incorporates changes in the interest rate, foreigners' preferences for visiting a region, the total productivity of the regional services sector, domestic consumers' preferences for visiting a region, as well as the propensity to save and the propensity to consume regional services. By contrast, using a logistic model, Sanchez-Rivero concludes that tourism flows are not the most appropriate measure for assessing the contribution of tourism to economic growth; instead, the volume of revenues generated by tourists should be taken into account, challenging the widespread belief that an increase in tourist arrivals is a clear sign of success for destination managers.

In the diverse and complex global economy, international tourism plays an important role (Alsabhan et al., 2025; Bode, 2018); the evolution of tourism has been reflected both in the number of international tourist departures and visits, and in the volume of international tourism expenditure, as a result of changing consumer preferences for tourist destinations, the significant increase in the number of countries and geographical areas included in tourist circuits, and the improvement of national legislation to stimulate tourism. It has also emerged that, during the global economic crisis or in other turbulent periods of political and social instability, tourism has proved to be one of the most effective drivers of the economy in many countries, particularly in developing ones, but due to recent environmental and economic uncertainty, the sustainability of tourism growth has become a global concern that requires the attention of current research, as well as that of policy-makers (Kalogiannidis et al., 2025).

The global crisis of 2008–2009, as well as the crisis generated by the Covid-19 pandemic in 2020, represented unexpected external shocks that tested the resilience and, respectively, the economic vulnerability of the affected countries. A comprehensive analysis of the role of international tourism in reducing vulnerability, carried out by Wang et al. (2022), showed that the development of international tourism can reduce the magnitude and likelihood of external risks and structural exposure to shocks by promoting economic growth and adjusting the industrial structure, while the stable development of tourism can contribute to the stability of exports and exchange rates, which is particularly significant for developing countries.

The effects of the outbreak of the Covid-19 pandemic on international tourism have been the subject of analysis in numerous economic studies. Drawing on data provided by the World Tourism Organization, Korinth (2022) proposes a specific classification of subregions and of the main destination and origin countries that generate the largest tourism flows and concludes that the sharpest percentage declines in international tourism revenues in 2020, compared with 2019, were recorded in Hong Kong, Malaysia, Greece and Spain.

In addition to tourism, passenger air transport is among the sectors most severely affected by the Covid-19 crisis (Sobczuk & Borucka, 2025). Based on statistical data and strategic documents, particularly those of the World Tourism Organization, the World Travel and Tourism Council and the International Civil Aviation Organization, Ploch (2021) analyses the methods and procedures that can be implemented to mitigate the consequences of such crises and to revive air transport, and proposes, among other tools for strategic crisis management: the development of a strategic long-term vision for the sector supported by appropriate financial resources; new business models in the private sector; changes in the marketing mix and product development; digitalization in both the public and private sectors; as well as innovation and education.

However, due in part to the continued involvement of the World Tourism Organization, other relevant organizations and national governments in supporting tourism during the Covid-19 pandemic (Mihai & Toma, 2020), as well as to the overall resilience of tourism in general and international tourism in particular, international tourism recorded a significant rebound in 2023 in terms of revenues and employment. This recovery was driven not only by the policies and measures implemented by governments, but also by changes and subsequent improvements in consumers' travel behavior, with the overall trend pointing towards a full recovery and even surpassing pre-pandemic levels (Nicula, 2024).

Tourism should not be viewed only in relation to economic development, but also as a factor that improves quality of life (Slusariuc, 2025). Based on a cluster analysis and several variables, Băndoi et al. (2020) identified relevant groups of countries in which there is evidence of a positive relationship between tourism development and the improvement of quality of life, as well as between the level of sustainable performance and the intensity of tourism. In this configuration, in 2015 Romania formed a cluster together with Bulgaria, while in 2018 Romania was included in a cluster with Italy, Latvia, Lithuania, Poland and Slovakia, with higher values in terms of tourism's contribution to GDP, quality of life and sustainable development performance.

As a global economic phenomenon, tourism facilitates international cooperation and shapes the development of international relations (Tileagă &

Cristian, 2025). In this context, attention needs to be paid to global education, to raising community awareness of long-term sustainability, and to fostering active engagement in international cooperation. Today's tourism has become a distinctive phenomenon, being recognised as a global industry, and the global nature of tourism trends is reflected in the international transfer of ideas, information, capital and people from different cultures (Zhubi et al., 2024).

On the other hand, an excessively high volume of tourist flows can become harmful to local communities, as is already the case in some of the most popular destination cities, which has led to the introduction of restrictions on the number of foreign visitors. The intensity of international tourism, and especially its growth, significantly increases risks to biodiversity, with these effects displaying both delayed and cumulative characteristics, and the magnitude of the impact varying depending on the tourism model and the specific destination (Chen et al., 2025). Government regulations and international financial assistance play an important role in reducing these negative effects.

With regard to the future development of tourism, Georgieva (2024) points out, on the one hand, a reorientation of tourists towards health-related tourism products and towards destinations offering conditions for ecotourism and a clean natural environment, with greater emphasis on the tourism experience and on the search for new dimensions of travel, and, on the other hand, the widespread application of digitalisation as an opportunity to facilitate processes and respond to consumer needs, as well as the standardisation of positioning policies adopted by tourism enterprises on the global market in order to ensure a level playing field in a competitive environment.

3. Research methodology

In preparing this paper, I used several data series describing the evolution of international tourist movements in the 27 current member states of the European Union (EU-27), namely: Arrivals at tourist accommodation establishments (Eurostat ATAE, 2026), Arrivals at tourist accommodation establishments – monthly data (Eurostat MDTA, 2026), Nights spent at tourist accommodation establishments (Eurostat NSTA, 2026) and Population on 1 January by age and sex (Eurostat PJAN, 2026). Based on these datasets, five main variables were selected (Table 1), from which a significant number of derived variables were constructed for each EU-27-member state, in line with the specific objectives of the analyses carried out.

Table 1. Identifiers and definitions of the main variables used in the paper

Ind.	Semnificație	U.M
NSTS	Annual number of international tourist arrivals to tourist accommodation establishments with lodging facilities	number
NLSTS	Monthly number of international tourist arrivals to tourist accommodation establishments with lodging facilities	number
NITS	The annual number of overnight stays of foreign tourists in tourist accommodation establishments with lodging facilities	number
DMSTS	The average length of stay of foreign tourists in accommodation establishments with lodging functions	days
DCTS	Tourist traffic density	$\frac{NSTS}{loc.} \cdot 1000$

For the analysis of the evolution characteristics of the processes under study, the data series were arranged in matrices of the form:

$$Y = \|y_{ij}\|_{i=\overline{1,n}, j=\overline{1,m}} \cdot (1)$$

In expression (1), (Y) denotes the process under analysis (visits, nights spent, length of stay), (n) is the number of countries included in the analysis, and (m) is the number of time points (years or months) in the period under review. Starting from matrix (1), several indicators were computed and analysed, including:

- **Dynamic indicators:** Let $Y_i = \|y_{ij}\|_{j=\overline{1,m}}$ be the vector corresponding to country i, and $k \in [2, m]$, for a given time point, the dynamic indicators used are the following:

- the fixed–base index
$$I_{k/0}^{y_i} = \frac{y_{t=k}}{y_{t=0}} \quad 2)$$

- the average annual index
$$\bar{I}_{k/0}^{y_i} = \sqrt[m-1]{\frac{y_{t=k}}{y_{t=0}}}, k > 1 \quad 3)$$

- the average annual growth rate
$$\bar{R}_{k/0}^{y_i} = \bar{I}_{k/0}^{y_i} - 1 \quad 4)$$

- the average annual increase
$$\bar{\Delta}_{k/0}^{y_i} = \frac{y_{t=k} - y_{t=0}}{k - 1}, k > 1 \quad 5)$$

- **Territorials indicators:** Let the individuals values be y_i and y_j individual values of the process y (the number of international tourist arrivals) in the destination countries $i \neq j, i \neq j$ the territorial indicators used are:

- the tourist traffic density
$$DCT_i^y = \frac{y_i}{L_i} \cdot 1000 \quad 6)$$

Data processing and the presentation of results, including charts and geographical representations, were carried out using the functionalities provided by Excel 19.

4. Analysis of Romania's international tourism in Europe based on foreign tourist arrivals

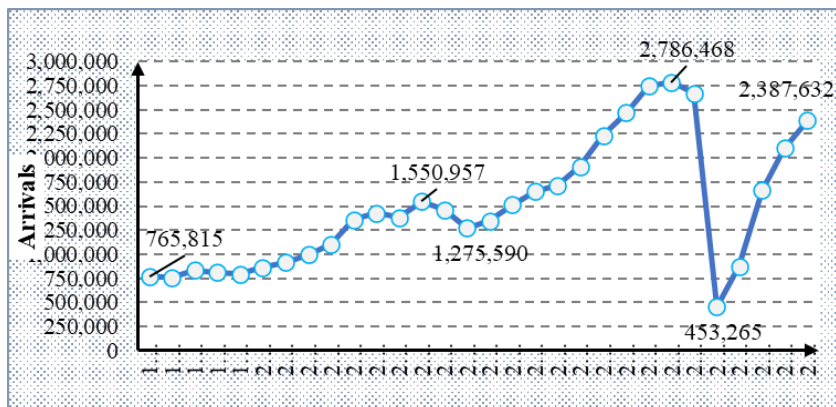
The intensity of inbound foreign tourist flows to a country, beyond their economic and social implications, is also an indicator of the attractiveness of tourist destinations and a measure of tourism performance compared with other states. This section analyzes the characteristics of the evolution of the number of arrivals of foreign tourists in tourist accommodation establishments (NSTS) in the current Member States of the European Union (EU-27).

4.1. Evolution of foreign tourist arrivals in Romania, 1995–2024

At the level of Romania, during the period 1995–2024, the annual number of arrivals of foreign tourists increased from 765,815 arrivals in 1995 to 2,387,623 arrivals in 2024 (Figure 1). The evolution of this number was, however, significantly influenced by the financial crisis of 2008–2009 and, even more strongly, by the Covid-19 pandemic that broke out in 2020. Taking these into account, three periods of growth in NSTS can be identified, characterized on the basis of three statistical dynamic indicators: the average annual index of NSTS (relation (3)), the average annual rate (relation (4)), and the average annual increase of NSTS (relation (5)).

Between 1995 and 2007, NSTS in Romania increased slightly from 765,815 arrivals in 1995 to 1,550,957 arrivals in 2007. Although they did not alter the overall upward trend, small decreases in foreign tourist arrivals were recorded in 1998, 1999, and 2006 compared with the previous year, by 22,862 arrivals in 1998, 14,801 arrivals in 1999, and 50,079 arrivals in 2006. Over this period, the evolution of foreign tourist arrivals in Romanian tourist accommodation establishments ($NSTS_{RO}$) was characterized by an average

annual index of $\bar{I}_{2007/1995}^{NTS_{RO}} = \sqrt[12]{\frac{1550957}{765815}} = 1,0606 = 106,06\%$, an average annual growth rate of $\bar{R}_{2007/1995}^{NTS_{RO}} = 0,0606 = 6,06\%$ and an average annual increase of $\bar{\Delta}_{2007/1995}^{NTS_{RO}} = \frac{1550957 - 765815}{12} = 65428$ arrivals of foreign tourists to Romania.

Figure 1. Evolution of NSTS in Romania over the period 1995–2024

Source: elaborated by the author based on Eurostat ATAE data series, 2026

The second growth period follows the 2009–2010 financial crisis and lasts until 2018, when the highest value of the foreign tourist flow is recorded (2,786,468 arrivals) for the entire period analyzed. This period is marked by a stronger increase in the number of foreign tourist arrivals in Romania than in the previous one, namely by an average annual increase of $\bar{\Delta}_{2018/2009}^{NTST_{RO}} = \frac{2,786,468 - 1,275,590}{9} = 167.875$ arrivals, an average annual index of $\bar{I}_{2018/2009}^{NTST_{RO}} = \sqrt[9]{\frac{2,786,468}{1,275,590}} = 1,0907 = 109,07\%$, and an average annual growth rate of $\bar{R}_{2018/2009}^{NTST_{RO}} = 0,0907 = 9,07\%$ (3.01 percentage points higher than in the previous period). Under these conditions, the number of foreign tourist arrivals in tourist accommodation establishments in Romania increased from 1,275,590 arrivals in 2009 to 2,786,468 arrivals in 2018.

Travel restrictions on the free movement of tourists in 2020 practically led to the collapse of inbound foreign tourist flows to Romania, from 2,672,887 arrivals in 2019 to only 453,265 arrivals in 2020 (a decrease of 83.05%). Compared to the number of foreign tourist arrivals recorded in January 2020 (127,620 arrivals), by March this figure had fallen to 34,220 arrivals (a decrease of 73.18%), and in May – when the minimum value of the entire period was reached (1,307 arrivals) – the reduction was 98.97%. Although starting in June, when 12,986 foreign tourist arrivals were registered, their number began to increase, reaching a maximum of 32,750 arrivals in September, by December 2020 the number of foreign tourist arrivals in tourist accommodation establishments in Romania represented only 11.05% of the level recorded in December 2019.

Starting in 2021, international tourism recovered rapidly, so that the number of foreign tourists arriving in Romania increased from 453,265 in 2020 to 2,387,632 in 2024 (14.38% less than in 2018). The rebound was very strong, being characterized by an average annual index of

$\bar{I}_{2024/2021}^{NTST_{RO}} = \sqrt[3]{\frac{2.387.623}{453.265}} = 1,3980 = 139,80\%$, an average annual growth rate of $\bar{R}_{2024/2021}^{NTST_{RO}} = 0,39806 = 39,80\%$, and an average annual increase of $\Delta_{2024/2021}^{NTST_{RO}} = \frac{2.387.623 - 453.265}{3} = 504583$ foreign tourist arrivals in Romania.

4.2. Romania's position within foreign tourist arrival flows in the EU-27: a relative-indicator perspective

The analysis of international tourism characteristics using relative indicators provides a picture of the intensity of increases or decreases in tourist flows from one year to the next, either in relation to a base year or as an average over a given period. For this purpose, we used four indicators: the fixed-base index of the increase in the number of arrivals of foreign tourists (IFNSTS), relation (2); the average annual index of the increase in the number of arrivals of foreign tourists (IMNSTS), relation (3); the average annual growth rate of the number of arrivals of foreign tourists (RMNSTS), relation (4); and the tourist traffic density (DCT), relation (6).

In the period analyzed (2005–2024), the intensity of foreign tourist flows in tourist accommodation establishments in the EU-27 countries increased at different rates.

Taking 2005 as the base year and excluding Ireland, for which data on foreign tourist arrivals are not available for 2005–2008, in 2024 the fixed-base index of foreign tourist arrivals (IFNSTS) in the other 26 EU-27 Member States shows increases ($I_{2024/2005}^{NTST,i} = \frac{NTST_{t=2024}}{NTST_{t=2005}}$, $i = \overline{1,26}$) in NSTS (Table 2) ranging from 3.7254 (372.54%) in Greece (a 3.73-fold rise, from 7,384,706 arrivals in 2005 to 27,367,693 arrivals in 2024) to 1.2763 (127.63%) in Estonia (a 1.28-fold rise, from 1,453,418 arrivals in 2005 to 1,855,063 arrivals in 2024). In this ranking, in terms of IFNSTS, Romania ranks 18th, with a value $I_{2024/2005}^{NTST,RO}$ of 1.6698 (166.98%), corresponding to a 1.67-fold increase in NSTS (from 1,429,919 arrivals in 2005 to 2,387,632 arrivals in 2024), while Bulgaria ranks 10th, with a value $I_{2024/2005}^{NTST,BG}$ of 1.9477 (194.77%), reflecting a 1.95-fold increase in NSTS, and Hungary ranks 14th, with a value $I_{2024/2005}^{NTST,H}$ of 1.7740 (177.40%), corresponding to a 1.774-fold increase in NSTS.

Compared with the average IFNSTS value estimated at EU-27 level ($I_{2024/2005}^{NTST,UE27}$) of 1.8427, (184.27%), only 11 states recorded higher IFNSTS values, while the other 15 – including Romania – had lower values.

Table 2. Ranking of EU-27 countries, excluding Ireland, by the ratio between the number of foreign tourist arrivals in 2024 and in 2005 ($I_{2024/2005}^{NST,i}$, $i = \overline{1,26}$)

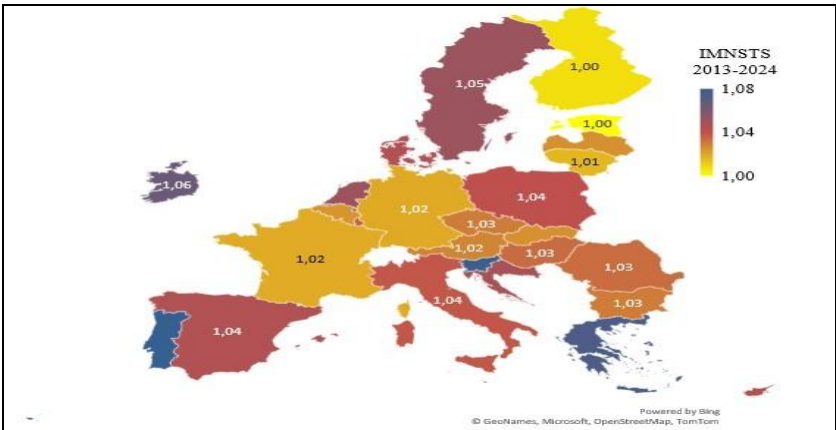
Place	State	$I_{24/05}$	Place	State	$I_{24/05}$	Place	State	$I_{24/05}$
1	Greece	3,7254	10	Bulgaria	1,9477	19	Austria	1,6639
2	Portugal	3,3500	11	Italy	1,9433	20	Czech Republic	1,6536
3	Slovenia	3,3311	12	Poland	1,8271	21	Luxemburg	1,4984
4	Croatia	2,6228	13	Denmark	1,8119	22	Belgium	1,4285
5	Lithuania	2,2355	14	Hungary	1,7740	23	Slovakia	1,4023
6	Malta	2,2113	15	Germany	1,7405	24	Finland	1,3960
7	Latvia	2,1738	16	Sweden	1,7269	25	France	1,3015
8	Netherlands	2,1259	17	Cyprus	1,7191	26	Estonia	1,2763
9	Spain	2,0763	18	Romania	1,6698			

Source: calculations performed by the author based on Eurostat ATAE data series, 2026

Important and relevant information on changes in foreign tourist arrivals in tourist accommodation establishments with lodging functions in the EU-27 is highlighted by the comparative analysis of the average annual indices of NSTS evolution (IMNSTS) and the average annual growth rates (RMNSTS).

From the perspective of IMNSTS, over the period 2013–2024 (a 12-year interval), all EU-27 Member States ($\bar{I}_{2024/2013}^{NSTS,i} = \sqrt[11]{\frac{NSTS_{t=2024}}{NSTS_{t=2013}}}$, $i = \overline{1,27}$) recorded values greater than or equal to 1 (100%), which shows that the crisis generated by the Covid-19 pandemic has been fully overcome (Figure 2). Correspondingly, the values of RMNSTS $\bar{R}_{2024/2023}^{NSTS,i} = \bar{I}_{2024/2023}^{NSTS,i} - 1 \geq 0$, $i = \overline{1,27}$, also confirm this recovery trend.

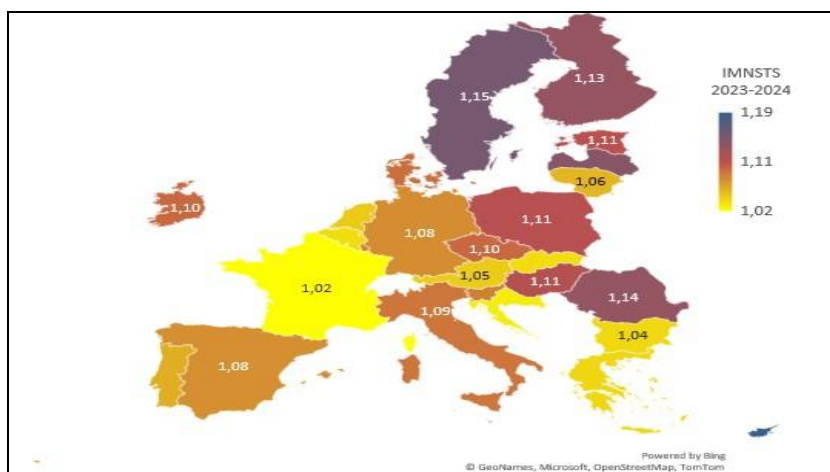
Figure 2. Geographical distribution of IMNSTS values in the EU-27 over the period 2013–2024



Source: Elaborated by the author; own calculations based on Eurostat ATAE data series, 2026

In the period 2013–2024, the lowest IMNSTS values were recorded in Estonia ($\bar{I}_{2024/2013}^{NSTS,EE} = 1,00 = 100\%$), Finland ($\bar{I}_{2024/2013}^{NSTS,FI} = 1,0034 = 100,34\%$) and Lithuania ($\bar{I}_{2024/2013}^{NSTS,LT} = 1,0128 = 101,28\%$), while the highest values were observed in Greece ($\bar{I}_{2024/2013}^{NSTS,GR} = 1,0719 = 107,19\%$) and Slovenia ($\bar{I}_{2024/2013}^{NSTS,SI} = 1,0772 = 107,72\%$).

Figure 3. Geographical distribution of IMNSTS values in the EU-27 over the period 2023–2024



Source: Elaborated by the author; own calculations based on Eurostat ATAE data series, 2026

Romania ranked 16th, with an IMNSTS value $\bar{I}_{2024/2013}^{NSTS,RO}$ of 1.0305 (103.05%), while Bulgaria ranked 17th with a value $\bar{I}_{2024/2013}^{NSTS,BG}$ of 1.0267 (102.67%), and Hungary 15th, with a value $\bar{I}_{2024/2013}^{NSTS,HU}$ of 1.0306 (103.06%). In relation to the average IMNSTS value at EU-27 level, 1.0350 (103.50%), 13 states recorded higher IMNSTS values, whereas the remaining 14 states – including Romania – recorded lower values.

Compared with the average IMNSTS value at EU-27 level, $\bar{I}_{2024/2013}^{NSTS,UE27}$ of 1.0350 (103.50%), 13 Member States recorded higher IMNSTS values, while the other 14 states – including Romania – recorded lower values.

If we focus only on the last two years (2023–2024), the positioning of the EU-27 Member States with respect to IMNSTS values changes fundamentally (Figure 2). Thus, over 2023–2024, the lowest IMNSTS values were recorded in France ($\bar{I}_{2024/2023}^{NSTS,FR} = 1,0221 = 102,21\%$) and Croatia ($\bar{I}_{2024/2023}^{NSTS,HR} = 1,0311 = 103,11\%$), while the highest were observed in Cyprus

($\bar{I}_{2024/2023}^{NSTS,CY} = 1,1943 = 119,43\%$) and Sweden ($\bar{I}_{2024/2023}^{NSTS,SE} = 1,1543 = 115,43\%$).

Table 3. Ranking of the EU-27 Member States by the number of foreign tourist arrivals in tourist accommodation establishments per 1,000 inhabitants ($DCTS_i^{NSTS}$) in 2024

Place	State	DCTS	Place	State	DCTS	Place	State	DCTS
1	Croatia	4.500	10	Estonia	1.349	19	Hungary	638
2	Malta	4.044	11	Italy	1.254	20	Denmark	609
3	Cyprus	3.136	12	Netherlands	1.186	21	Bulgaria	585
4	Austria	3.112	13	Czech Republic	961	22	Finland	518
5	Greece	2.632	14	Letonia	848	23	Lithuania	502
6	Slovenia	2.376	15	Belgium	816	24	Germany	448
7	Luxemburg	2.031	16	Sweden	799	25	Slovakia	387
8	Portugal	1.816	17	France	797	26	Poland	215
9	Spain	1.597	18	Ireland	785	27	Romania	125

Source: calculations performed by the author based on Eurostat ATAE and PJAN data series, 2026

Romania now records a significant leap, ranking 5th with an IMNSTS value $\bar{I}_{2024/2023}^{NSTS,RO}$ of 1.1355 (113.55%), while Bulgaria drops to 23rd place with a value $\bar{I}_{2024/2023}^{NSTS,BG}$ of 1.0410 (104.10%), and Hungary moves to 7th place, with a value $\bar{I}_{2024/2023}^{NSTS,HU}$ of 1.1142 (111.42%).

Compared with the average IMNSTS value at EU-27 level, $\bar{I}_{2024/2023}^{NSTS,UE27}$ of 1.0677 (106.77%), 16 states, including Romania, recorded higher IMNSTS values, whereas the remaining 11 states recorded lower values.

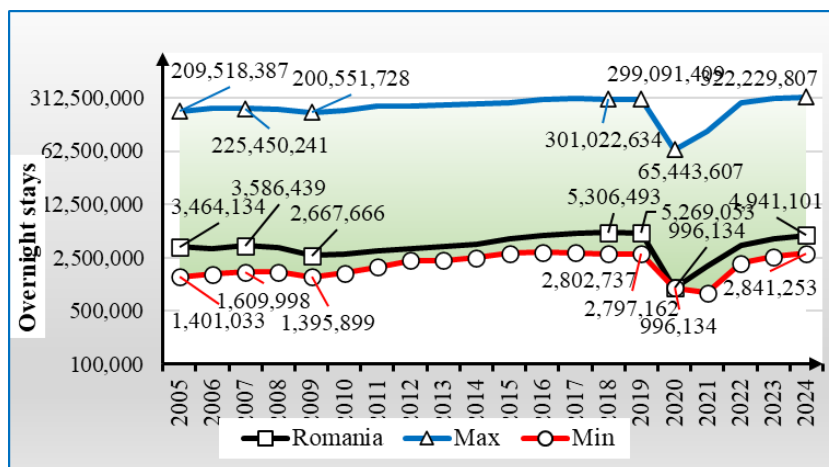
Another indicator that can be used to assess Romania's position among the EU-27 Member States in terms of international tourism is tourist traffic density (relation (6)), in this case the density of foreign tourist arrivals in tourist accommodation establishments per 1,000 inhabitants ($DCTS_i^{NSTS} = \frac{y_i}{L_i} \cdot 1000, i = \overline{1,27}$).

Unfortunately, for 2024 this perspective highlights even more clearly Romania's particularly poor performance in attracting foreign tourists (Table 3). Countries such as Malta and Cyprus, which ranked below Romania in terms of the absolute number of foreign tourist arrivals, move ahead when looking at arrivals per 1,000 inhabitants, occupying 2nd place (4,044 arrivals per 1,000 inhabitants) and 3rd place (3,136 arrivals per 1,000 inhabitants), respectively. In Romania's case, with only 125 arrivals per 1,000 inhabitants, the country ranks last (27th place) in the European Union, while neighbouring countries Hungary and Bulgaria rank 19th (638 arrivals per 1,000 inhabitants) and 21st (585 arrivals per 1,000 inhabitants), respectively.

4.3. Romania's position within EU-27 foreign tourist overnight-stay flows based on absolute indicators

From the perspective of the evolution of the number of overnight stays of foreign tourists in tourist accommodation establishments (NITS), compared with that of the number of foreign tourist arrivals (NSTS), the differences are insignificant, the only distinction lying in the orders of magnitude of the two indicators.

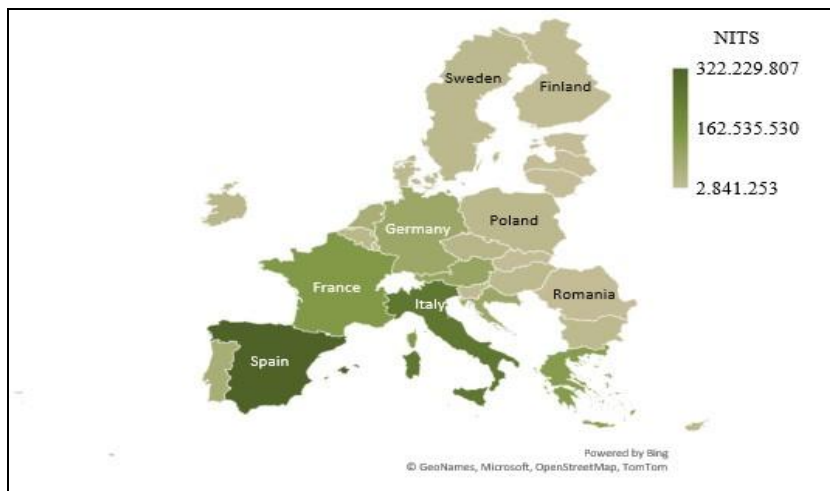
Figure 4. Evolution of NITS in Romania compared with the EU-27 Member States



Source: elaborated by the author based on Eurostat NSTA data series, 2026

This situation is highlighted by the evolution of NITS (Figure 4), which is similar to that of NSTS (Figure 4). In 2005, in terms of NITS, Spain ranked first with 209,518,387 overnight stays, followed by Italy with 148,290,126 and France with 107,951,866 overnight stays, while Romania (3,464,134 overnight stays) ranked 23rd, with the last places, as in the case of NSTS, occupied by Luxembourg (2,451,764 overnight stays), Latvia (1,612,671), and Lithuania (1,401,033 overnight stays). Compared with Bulgaria (11,624,051 overnight stays), in 14th place, and Hungary (10,778,899 overnight stays), in 15th place, Romania's NITS was 3.36 times and, respectively, 3.11 times lower.

By 2024, Spain still ranked first in terms of NITS (322,229,807 overnight stays), followed by Italy (253,948,443) and France (140,608,197 overnight stays), while Latvia ranked last (2,841,253 overnight stays). Romania, with 4,941,101 overnight stays, ranked 22nd, whereas Hungary ranked 17th with 15,224,253 overnight stays and Bulgaria 18th with 15,058,045 overnight stays, their values being 3.08 times and, respectively, 3.05 times higher than those recorded in Romania.

Figure 5. Geographical distribution of NITS in the EU-27 Member States in 2024

Source: elaborated by the author based on Eurostat NSTA data series, 2026

Analyzing comparatively the evolution of NSTS and NITS in terms of absolute indicators shows that, with respect to the ranking of the EU-27 Member States, there are no significant differences. This is also highlighted by the geographical distribution of NITS in 2024 (Figure 4), which is similar to the geographical distribution of NSTS (Figure 1).

5. Results and conclusions

From the analysis of the concentration of foreign tourist arrivals in tourist accommodation establishments in the EU-27 Member States, it appears that there is effectively no competition between countries belonging to different clusters in terms of NSTS values. Romania, both in 2009 and in 2024, was grouped together with 19 and, respectively, 17 other states in the clusters with the lowest NSTS values. Among these, five countries were selected – Bulgaria, Hungary, the Czech Republic, Slovakia, and Slovenia – together with their performance in terms of NSTS.

The results show that, assuming the annual growth indices of NSTS remain unchanged, it would take 5.26 years for Romania to close the gap with Bulgaria, 41.91 years with the Czech Republic, 49.84 years with Hungary, and 16.38 years with Slovenia.

Based on recent specialist literature on international tourism and on the economic realities reflected in quantitative data for the EU-27 Member States, international tourism plays an important role in a country's sustainable economic growth at national, regional, and local levels, at least from three perspectives: foreign currency earnings, employment, and the development of

tourism-related businesses and industries. All these outcomes, however, depend on the intensity of foreign tourist flows, which in turn is shaped by a series of factors: objective ones, such as geographical location, size, tourism potential, and tradition, and policy- and management-related ones, such as the priority given to international tourism, the degree of promotion of tourist attractions, the quality of tourism infrastructure and transport infrastructure in high-potential areas, the quality of services, and, not least, the price–quality ratio. Taken together, these elements make it impossible to expect a convergent trend towards similar tourism flows in all EU-27 countries.

6. Limitations and future research directions:

The study shows that, at least in terms of absolute indicators – namely the number of foreign tourist arrivals (NSTS) and the number of overnight stays of foreign tourists (NITS) in tourist accommodation establishments – there are very large differences between EU-27 Member States, as reflected in the high levels of concentration of both NSTS and NITS. Thus, in 2024, for NSTS, two countries – Spain and Italy – accounting for 7.41% of EU-27 Member States, concentrated 34.80% of total NSTS, and together with France and Germany (in total four countries, i.e. 14.82% of EU-27 states) they accounted for 55.93% of total NSTS, whereas at the opposite end of the spectrum, 18 countries (including Romania) with very low NSTS values (66.67% of EU-27 states) accounted for only 17.94% of total NSTS in the EU-27. A similar situation was observed for NITS.

By contrast, when Romania is compared with two neighboring countries, Bulgaria and Hungary, the values of the absolute indicators (NSTS and NITS) are very telling. In 2024, in terms of NSTS, Romania ranked 21st (2,387,632 arrivals), whereas Hungary ranked 14th (6,113,954 arrivals) and Bulgaria 17th (3,770,036 arrivals), with values 2.26 and, respectively, 1.57 times higher than Romania's. The relatively inefficient use of Romania's tourism potential compared with Bulgaria and Hungary is also highlighted by the amplitude of NSTS during the summer season: in August 2024, the number of foreign tourist arrivals in Bulgaria was 3.13 times higher than in Romania, while in Hungary – a country with a less diversified tourism potential and no seaside – NSTS was 2.87 times higher than in Romania.

The analysis presented in this study is subject to several limitations that should be considered when interpreting the results. First, the empirical approach relies exclusively on official statistical series (Eurostat, INS, etc.), which, although comparable and methodologically harmonized, may incorporate revisions, breaks in series or differences in data collection practices across countries that are only partially documented in the available metadata. Second, the focus on a limited set of quantitative indicators (foreign tourist arrivals, overnight stays, relative and average annual indices, density indicators) does

not fully capture qualitative dimensions of international tourism, such as visitor satisfaction, seasonality patterns beyond annual and monthly aggregates, or the structure of tourism expenditure by segment and product. Third, the analysis is essentially descriptive and comparative; causal relationships between tourism intensity and its potential determinants (infrastructure, policy measures, marketing, geopolitical risks, etc.) have not been formally tested econometrically in this paper.

Future research could therefore proceed in several directions. A first line of inquiry would be to extend the indicator system by integrating additional variables (tourism receipts, average expenditure per visitor, breakdown by purpose of trip and type of accommodation), as well as qualitative indicators derived from surveys or big data sources (online reviews, mobility data). A second direction would be the development of econometric or panel data models to assess the impact of structural and policy factors on the dynamics of international tourism flows, allowing for the identification of the main drivers behind cross-country differences within the EU-27. Third, further studies could adopt a more granular spatial scale (regional or local level) and a finer temporal resolution (seasonal or monthly data) to analyze intra-national disparities and the role of specific destinations or tourism clusters. Finally, scenario-based simulations or forecasting exercises could be used to evaluate alternative policy options aimed at improving Romania's position in the European tourism market, under different assumptions regarding investment in infrastructure, marketing efforts, or changes in global demand.

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PPP MODELS AND DIGITAL RISK MITIGATION IN THE RECOVERY OF UKRAINIAN PORT INFRASTRUCTURE

Eric Robins¹

Abstract

The 2022 invasion of Ukraine disrupted Eastern European logistics, shifting maritime traffic from blockaded Southern deep-water ports to the Danube River network (“Danube Cluster”). For post-war recovery, Ukraine must not only rebuild but modernize its maritime economy. Facing a multibillion-dollar financing gap due to defense spending, the state must rely on private capital. However, investors remain deterred by war-related and historical governance risks. This study investigates how technological innovation and economic theory can optimize Public-Private Partnerships (PPPs) for port reconstruction. The paper proposes a modified PPP model utilizing the AK growth theory, demonstrating that integrating technology with infrastructure capital creates a multiplier effect for sustained long-term growth. Findings suggest that traditional PPPs must evolve into tiered finance structures backed by international “first-loss” guarantees. Furthermore, integrating “Smart Port” technologies like Artificial Intelligence (AI) is essential. These technologies provide the radical operational transparency required to make high-risk investments feasible, enforce institutional integrity, and mitigate corruption risks.

Keywords: Public-Private Partnerships, Ukraine; Smart Ports, Post-War Recovery, Logistics Clusters, AK Growth Model

JEL Classification: H54, L32, O33, R42

1. Introduction

The 2022 invasion of Ukraine forced a critical shift in maritime logistics from Southern deep-water ports to the Danube River cluster, underscoring infrastructure as a matter of national sovereignty. As Ukraine plans for post-war recovery, the estimated billions required to reconstruct and modernize these ports cannot be met by its state budget. This paper addresses this financing gap by investigating how economic theory and digital innovation can transform Public-Private Partnerships (PPPs) to attract private capital. First, how can PPPs be structured to transform Ukrainian ports into drivers of regional economic recovery? Second, what role could technology play in this economic development to mitigate investment risk and enhance operational efficiency? Specifically, this study argues that integrating the AK Growth Model with “Smart Port” technologies can de-risk investments by ensuring operational transparency and sustaining long-term growth. To achieve this, the paper first reviews the literature on Ukrainian ports. Next, the methodology section

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outlines a qualitative synthesis of policy and technical data. The analysis then explores structural PPP reforms and the role of technology in mitigating corruption and financial risks. Finally, the discussion and conclusion offer policy recommendations for implementing a tech-enabled PPP framework to drive regional economic stabilization.

2. Literature Review

To understand the feasibility of a technology-driven PPP model for Ukraine, one must first analyze the existing academic and regulatory landscape. This covers the legal evolution of PPPs, the shifting geo-economic status of Ukrainian port infrastructure, and global technological benchmarks.

2.1 Public-Private Partnerships in Ukraine: Persistent Barriers

Early analyses of Ukraine's PPP framework highlighted structural weaknesses that continue to hamper port concessions. Soloviov (2016) examined the legal environment before the 2015–2016 reforms, noting excessive regulatory uncertainty, unpredictable price setting by the state, and the absence of independent arbitration.

Karpa et al. (2022) confirmed that many of these problems persisted into the early 2020s: weak risk allocation, lack of transparent tendering, and insufficient guarantees against non-commercial risks. The war has only vastly increased reconstruction needs while shrinking public resources.

Le Ber et al. (2025) cite Ukraine's Rapid Damage and Needs Assessment 4th Phase (RDNA4) showing US\$36.7 billion in direct transport-sector damage and US\$46.8 billion in losses as of end-2024.

Becker et al. (2025) offer the most comprehensive post-war policy synthesis to date. Although their review covers the entire economy, they explicitly identify transport infrastructure, notably ports, as a sector where well-designed PPPs with strong risk-sharing and credit-enhancement mechanisms could accelerate recovery.

2.2 Economic Models for Port Development

Several studies propose modeling approaches suitable for Ukrainian port PPPs under high uncertainty. Liashenko et al. (2021) develop a conceptual transport-logistics cluster framework for the Prydniprovsky economic region, arguing that integrating river and sea ports into regional innovative infrastructure can produce substantial GDP and employment multipliers. While their work predates the full-scale invasion, the cluster logic remains relevant for post-war recovery strategies built around PPP concessions.

Horoshkova et al. (2024) focus specifically on Danube ports during and after the war. They stress the need for adaptive development models that account for continuing security risks and shifting trade flows. Table no. 1 discussing the status of Ukrainian port clusters further elaborates on this. Similarly, Afanasieva and Pokora (2020) examine innovation policy for

Ukrainian seaports and propose strategic planning frameworks that incorporate PPPs.

Table no. 1: Comparative status of Ukrainian port clusters

Feature	Greater Odesa Cluster (Pre-War Dominance)	Danube Cluster (War-Time Pivot)
Primary Ports	Odesa, Chornomorsk, Pivdennyi	Reni, Izmail, Ust-Danube
Status	Blockaded / Damaged	Active “Lifeline” / Exponential Growth
Depth/Capacity	Deep-water (High Capacity)	Shallow draft (Limited Capacity); dredged to 6.5m
Challenges	Security risks; Naval blockade	“Technologically obsolete”; Congestion; Rail bottlenecks
Future Role	Primary export gateway (Restoration required)	Alternative route; Green logistics hub

Source: This table synthesizes the shift in logistics as described by Horoshkova et al. (2024).

2.3 The Role of Technology in De-Risking

A second theme in the literature is the transformative potential of digital technologies. HPC Hamburg Port Consulting (2024) provides evidence from global implementations showing that AI-driven predictive maintenance and digital twin platforms have delivered improvements in crane productivity and vessel turnaround times. The authors argue that such technologies are no longer optional add-ons but core enablers of certain port projects.

Waseem Al Rousan (2024) reinforces this message in the context of “smart ports,” documenting how AI, automation, and real-time analytics optimize container handling and improve safety. This directly increases the revenue potential of a concession. Furthermore, Manget and Alsina (2025) highlight big data, IoT, and AI applications in modern maritime operations, showing that predictive analytics can provide “all actors in the logistics chain” with transparent, real-time performance data.

2.4 Synthesis

The sources, despite their differences, converge on these key points:

- Traditional Ukrainian PPP frameworks have suffered from regulatory opacity and poor risk allocation. [Karpa et al., (2022); Soloviov, (2016)]
- The war has made private capital indispensable yet more risk averse. [Becker et al., (2025); Le Ber et al., (2025)]
- Regional economic recovery can be accelerated by clustering ports with logistics and industrial zones, using models that capture multiplier effects. [Horoshkova et al., (2024); Liashenko et al., (2021)]
- Advanced technologies (AI, “digital twins”, automation, and real-time data platforms) offer dual benefits: substantial operational efficiency gains and

reduced information asymmetry, both of which lower the risk premium demanded by investors. [HPC Hamburg Port Consulting GmbH, (2024); Al Rousan, (2024); Manget and Alsina, (2025)]

Thus, the literature strongly suggests that the next generation of Ukrainian port concessions must integrate three elements from the outset: (i) contractual structures that allocate risks transparently and include performance-linked payments, (ii) economic models (cluster-based, resilience-oriented) that demonstrate regional impact under uncertainty, and (iii) adoption of smart-port technologies that enhance both efficiency and investor confidence.

2.5 Remaining Gaps

Even within these sources, gaps persist:

- No study yet combines actual post-2022 Ukrainian port data with real-options or Monte-Carlo simulations tailored to these PPP structures.
- The precise magnitude of risk-premium reduction achievable through mandatory digital transparency in a wartime context remains unquantified for Ukraine.
- Empirical links between specific smart-port technologies and successful PPP bidding outcomes in comparable high-risk jurisdictions are still illustrative rather than Ukraine-specific.

3. Research Methodology

This research from the literature employs a qualitative methodology, utilizing a synthesis of legal analysis, economic case studies, and technical industry reports. The approach aligns with the method described by Becker et al. (2025), which focuses on aggregating policy proposals to determine optimal reconstruction strategies.

3.1 Data Collection

The study draws on primary legislative reviews [Soloviov, (2016)], recent empirical studies on Ukrainian logistics flows [Horoshkova et al., (2024)], and expert insights on maritime technology. [HPC Hamburg Port Consulting GmbH, (2024); Manget and Alsina, (2025)]

3.2 Analytical Framework

The analysis is structured around the two research questions. For the first research question, the paper employs a comparative legal and economic analysis, harmonizing Soloviov's concession frameworks with the cluster theories of Liashenko et al. For the second research question, the paper utilizes a techno-economic assessment, mapping the capabilities of AI applications (as defined by Al Rousan (2024)) directly to the risk factors identified by Karpa et al. (2022).

3.3 Scope

The study focuses on the Prydniprovsky Economic Region and the Danube Port Cluster as primary case studies for the proposed models.

4. Results (Analysis)

While the prevailing literature comprehensively identifies the critical structural and financing gaps facing Ukraine's reconstruction (specifically the need for infrastructure capital and the necessity of institutional anchors for EU accession), it does not explain the mechanism by which these inputs will generate sustained recovery. Existing studies treat reconstruction as a static accounting exercise of replacing lost assets, failing to sufficiently operationalize the dynamic economic growth mechanisms required to leapfrog a post-conflict stagnation trap. This theoretical gap justifies the introduction of an explicit economic growth lens as an interpretive framework. Consequently, this paper adopts the AK Growth Model ($Y=AK$) to demonstrate that reconstruction cannot rely solely on capital accumulation (K); rather, it must prioritize the technology multiplier (A), embedded through PPPs, to generate the non-diminishing returns essential for Ukraine's rapid economic modernization.

The results of the analysis are presented in two parts, corresponding to the research questions regarding the financial structure (PPP) and the technological enablers (AI).

4.1 Analysis of Research Question 1: Structuring the PPP for Recovery

To transform Ukrainian ports into drivers of regional recovery, the traditional concession model must evolve. Historically, PPPs in Ukraine have faced “legislative and regulatory issues” and “communication problems between partners.” [Soloviov, (2016)] A post-war framework must address these by adopting a different financial model for PPPs. A “one-size-fits-all” PPP model is no longer viable. The deep-water ports, while offering high capacity, face war risks that deter private capital. To address this, the findings propose a PPP Model that segments risk into tiered capital structures.

4.1.1 PPP Model: Operationalizing the “First-Loss” Guarantee

The core of this model is the segmentation of risk. Building on the reconstruction principles outlined by Becker et al. (2025), who advocate for grant-based funding to avoid debt traps, a tiered capital structure should be:

- **Tier 1 (Public/Donor):** International Financial Institutions (IFIs) like the EIB or World Bank provide “first-loss” guarantees or political risk insurance. This covers risks such as residual war risk or regulatory changes. [Becker et al., (2025); Soloviov, (2016)]
- **Tier 2 (Private Concessionaire):** Global port operators fund the operational equipment and management expertise. Because the donor tranche absorbs the catastrophic risk, the private operator is insulated from “force majeure” events. [Becker et al., (2025); Soloviov, (2016)]
- **Tier 3 (State):** The Ukrainian government contributes the land and basic dredging, retaining ownership while granting long-term usage rights.

4.1.2 Legal Reforms: Harmonizing Soloviov's Framework

To make this model viable, Ukraine's legal framework requires evolution to harmonize with the European Union. This, as noted later, has been partially

accomplished through the 2025 Ukrainian PPP Law No. 4510-IX. Still, Soloviov (2016) noted that while Ukraine had established the concept of concessions, the mechanisms for risk allocation remained immature. Specific amendments should formally include:

- **“First-Loss” Guarantee Clause:** A new amendment must explicitly legalize state-backed guarantees underwritten by international donors. The 2025 Ukrainian PPP law only enables “Minimum Revenue Guarantees (MRG)” to be written into individual contracts. But the guarantees must be negotiated on a case-by-case basis. In cases where the losses are due to the war, the Export Credit Agency’s war-risk program (Ukrainian Resolution No. 1541) provides compensation. This operationalizes Becker’s call for “grant-based funding” and thus makes grants a legal insurance policy.

- **Governance Transparency:** Becker et al. (2025) emphasize that “institutional quality” is the primary constraint on recovery. The legal framework must mandate the creation of Special Purpose Vehicles (SPVs) for port projects that are governed by mixed boards (rather than just authorizing the use of SPVs (as allowed under the 2025 Ukrainian PPP law)), shielding the project from local political interference. [Karpa et al., (2022)]

4.1.3 The “Cluster” Economic Model

A standalone port is vulnerable. Liashenko et al. (2021) propose a “Transport and Logistics Cluster” approach, using the Prydniprovsky Economic Region as a case study. By legally structuring the PPP to include not just the quay wall but also the hinterland rail connections and nearby industrial zones, the state creates a “network effect.” The economic model here shifts from simple transit fees to integrated logistics services, capturing more value within the Ukrainian economy.

4.1.4 Theoretical Framework: Application of the AK Growth Model

While not explicitly cited in the source texts, the findings of this research align with the AK model of endogenous growth ($Y=AK$). In standard neoclassical models (Solow), capital accumulation leads to diminishing returns. However, the AK model suggests that if technology (A) serves as a multiplier on capital (K), growth can be sustained indefinitely without diminishing returns.

Applying the literature to this equation:

- **K (Capital Accumulation):** Represented by the physical reconstruction of ports (quays, terminals) funded through the PPPs described by Becker et al., (2025) and Soloviov, (2016).

- **A (Technology/Efficiency):** Represented by the “Smart Port” innovations (AI, Digital Twins, JIT systems) described by HPC Hamburg Port Consulting GmbH, (2024) and Al Rousan, (2024).

In the context of Ukrainian recovery, simply rebuilding the old infrastructure (increasing K) would eventually lead to stagnation (diminishing returns). However, by mandating the “Smart Port” technologies (A) identified by Manget and Alsina (2025), the PPP ensures that the marginal product of capital remains high. The “Cluster Approach” proposed by Liashenko et al. (2021) acts as the transmission mechanism, ensuring that these efficiency gains (A) spill over into the regional economy, creating the permanent growth trajectory predicted by AK theory.

4.1.5 Real-World Data Verification (2021–2024)

Real-world data verified from recent logistics reports (2021–2024) for the Danube Cluster and Southern Ukraine/Greater Odessa Ports supports the application of the AK Growth Model. The data, as outlined in Table no. 2, reveals the stagnation of the pre-war period, the asymmetric shock of the invasion, and the divergent recovery paths of the deep-water versus riverine clusters.

Table no. 2: Cargo throughput by port (million tons)

Cluster / Port	2021 (Pre-War)	2022 (Shock)	2023 (Pivot)	2024 (Recovery)
Greater Odesa	~101.6	~20.0	~30.6	79.9
<i>Pivdennyi (Yuzhny)</i>	53.5	15.3	10.1	35.6
<i>Chornomorsk</i>	25.6	11.8	11.4	26.0
<i>Odesa</i>	22.6	7.7	8.4	18.3
Danube Cluster	5.4	16.5	32.1	17.3
<i>Izmail</i>	3.9	8.9	20.3	13.4
<i>Reni</i>	1.4	6.8	10.1	3.4
<i>Ust-Dunaisk</i>	0.06	0.8	1.7	0.5
TOTAL	153.3	59.0	62.0	97.2

Source: Ukrainian Sea Ports Authority Management Reports (2021, 2023, & 2024), GMK Center Report (2022), Ukrainian Shipping Magazine (2023), Interfax-Ukraine (2024), & Transport Strategies (CFTS) (2025).

4.1.6 Analysis by Port

Greater Odesa Ports

- **Pivdennyi (Yuzhny):** Historically, Ukraine’s largest port by volume, specializing in ore and chemicals. It suffered the sharpest decline in 2023 (dropping to ~10M tons) because the Black Sea Grain Initiative excluded its primary cargo (iron ore). Its 2024 resurgence to 35.6M tons follows the opening of the independent Ukrainian Sea Corridor, which allowed ore exports to resume. [Center for Transport Strategies (CFTS), (2025)]

- **Chornomorsk:** The most resilient deep-water port during the crisis. It maintained steady grain flows even during the restrictive “Grain Deal” phase (2022-2023), handling 11.4M tons in 2023. In 2024, it nearly recovered to pre-war levels (26M tons), effectively reclaiming its role as a key agricultural hub.

- **Odesa:** The oldest major port faced significant security constraints due to its proximity to the city center and passenger terminals. While it recovered to 18.3M tons in 2024, it remains below its pre-war levels, indicating lingering capacity constraints or prioritization of the more industrial Pivdennyi/Chornomorsk terminals.

The Danube Cluster

- **Izmail:** The clear winner of the AK Model's "Efficiency (A)" multiplier. With negligible physical expansion (K), it more than quintupled its output from 3.9M (2021) to 20.3M (2023). However, the drop to 13.4M in 2024 signals that as deep-water routes reopened, shippers abandoned the more expensive river logistics, reverting to the mean.

- **Reni:** This port serves as the volatility index for Ukrainian logistics. It jumped in 2023 to 10.1M tons only to rapidly decline in 2024 (down to 3.4M tons). This extreme fluctuation proves that Reni functions purely as an "overflow valve" and remains economically uncompetitive during peace without the "Smart Port" technologies to lower costs.

- **Ust-Dunaisk:** The smallest player saw the most dramatic relative rise (28x growth in 2023, .06M tons to 1.7M tons), driven by the desperate need for any available berth. Its rapid decline in 2024 suggests it is the first to be abandoned when normal trade routes resume. (It should be noted that the "Kiliia Port Point" is structurally part of the Ust-Dunaisk Commercial Sea Port, serving as the "upstream" collection point and that the Kiliia Shipbuilding-Ship Repair Yard (KSRZ) is a separate private legal entity.)

Another notable port in this region is Bilhorod-Dnistrovskyi. [GMK Center, (2022)] Just like the Danube Cluster ports, its use increased in the pivot from the Black Sea ports in 2022. Since it is a shallow-water port with fixed physical capital (K), it shifted its operational model to a "Dry Port" logistics hub. This resulted in about an 83x increase in cargo (from approximately 2.4 thousand tons to over 200 thousand tons) during the war (and was not caused by building new berths (K did not change). [Ukraine Business News, (2024); GMK Center, (2023)] It was caused entirely by the change in operational strategy (A). This was a pure efficiency gain (A), and the asset generated exponential output growth (Y). The 2025 privatization of this port confirms that for smaller assets, transferring ownership to the private sector is the most effective way to unlock this efficiency multiplier. [Ukrinform, (2025)] Hence this port demonstrated the AK model on a smaller scale. Furthermore, the successful privatization price (~UAH 90 million) reflects the market's belief that a private operator can maintain this high A permanently.

There are other ports in Southern Ukraine. But due to the war, many remain closed and have not been considered in this analysis.

Some further observations regarding the Danube Cluster:

A standard model would predict that pouring 32M tons of cargo into “technologically obsolete” ports would cause immediate congestion and a flat-lining of growth. That did not happen. Growth remained linear/exponential. There were physical investments (K) such as (1) dredging: deepening the Bystre Estuary draft from ~3.9m to 6.5m in February 2023; and (2) infrastructure: the opening of 23 new cargo terminals in the Danube region in 2023 alone. Also, there was a shift to 24/7 operations, new barge-to-ship transshipment schemes, and the strategic prioritization of grain corridors. This factor (A) multiplied the effectiveness of the shallow 6.5m draft, allowing it to handle volumes usually reserved for deep-water ports.

The Danube cluster provides empirical proof of the AK model: A capital investment (K) that merely deepened the draft to 6.5 meters should not have yielded about a sixfold increase or almost 500% increase in output (Y). The difference is accounted for by the radical shift in technological and operational efficiency (A), which allowed the Danube ports to handle 32+ million tons in 2023, a volume previously thought impossible for this infrastructure. But it is important to note that these ports require constant investment.

4.1.7 Implications for PPPs

The data confirms that while the deep-water ports are irreplaceable for volume, the Danube ports proved that efficiency is the critical variable for resilience.

- **For Investors:** The 2023 peak proves that “obsolete” infrastructure can generate massive returns if managed efficiently. PPPs in 2025 should target the Danube not for volume, but for high-value, low-draft cargo (e.g., fuel, container feeders) using the “Digital Twin” technology to maintain the efficiency gains won during the war. Investors should target Pivdennyi/Chornomorsk for high-volume bulk/ore concessions (high K) and Izmail for niche, high-tech logistics services (high A) that can remain profitable even with lower volumes.

- **For the Ukrainian State:** As Danube volumes recede from their emergency peak, technology must be the driver of efficiency to keep these ports competitive.

4.2 Analysis of Research Question 2: Technology as a De-Risking Tool

The second research question investigates the role of technology. While the operational benefits of “Smart Ports” are well documented, their role in financial risk mitigation as outlined in Table no. 3 is critical for Ukraine.

Table no. 3: Technology-enabled risk mitigation matrix

Identified Risk / Barrier	Technological Solution	Mechanism of Action
Information Asymmetry	Digital Twin (IoT + Big Data)	Provides “radical transparency” allowing remote auditing of physical assets by investors in safe locations.
Corruption / Admin Resistance	Blockchain Procurement	Removes “human factor” discretion from routine processing; creates audit trails.
High Insurance / Demurrage	AI-Driven JIT Arrival	Predicts precise arrival times to minimize dwell time and waiting fees, offsetting high insurance premiums.
Supply Chain Fragility	Predictive Maintenance	Uses sensors to predict failure <i>before</i> it occurs, maximizing uptime in resource-constrained environments.

Source: Mapping technological solutions to specific administrative and financial risks identified by Karpa et al. (2022) and Soloviov (2016).

4.2.1 “Digital Twins”

Investing in a post-conflict zone is plagued by information asymmetry. Manget and Alsina (2025) describe the “Digital Twin” as a virtual replica of physical assets updated in real-time via IoT sensors. Described as the “single source of truth,” a “Digital Twin” would allow an outside financier to audit the physical state of the port infrastructure without physical inspection. This level of transparency would lower the risk premium investors charge, directly making the project more financially viable. At the same time, this could increase investor confidence as use of this technology could mitigate “monitoring costs” for international backers.

4.2.2 AI-Driven Efficiency as a Competitiveness Buffer

Post-war Ukraine will likely face stiff competition from other international Black Sea ports. Afanasieva and Pokora (2020) note innovation policy is essential for seaports to remain competitive.

- **Just-in-Time (JIT) Arrival:** AI Rousan (2024) explains that AI-driven traffic management systems can predict arrival times with high precision and reduce “demurrage” (waiting fees).

- **Predictive Maintenance:** HPC Hamburg Port Consulting GmbH (2024) notes that AI can predict equipment failure before it happens. In a resource-constrained environment like post-war Ukraine, where spare parts may be difficult to import quickly, this is vital.

4.2.3 Institutional Integrity: The Anti-Corruption Ecosystem

Karpa et al. (2022) highlight “corruption risks” as a barrier to PPPs. Integrating blockchain-based procurement systems and automated customs processing removes human discretion from routine processes. When a port’s operational data is immutable and transparent, the risk of revenue leakage decreases, increasing investor confidence.

While financial guarantees and “digital twins” mitigate commercial and operational risks, the “institutional risk” of corruption remains a primary deterrent for private capital. To address this, there is a need for a multi-layered anti-corruption ecosystem that supports the PPP framework by enforcing transparency through digital procurement and legislative reform.

4.2.4 Digital Procurement and “Smart Contracts”

The cornerstone of this ecosystem is the removal of the “human factor” from financial transactions. This is in line with the 2025 Ukrainian PPP law, mandating all competitive procedures to be conducted through an electronic trading system both aligned with EU standards and integrated into Ukraine’s ProZorro platform (<https://prozorro.gov.ua/en>).

- **Mechanism:** Karpa et al. (2022) identify “administrative resistance” and “corruption risks” as primary barriers to PPP implementation. To counter this, the integration of digital procurement (as mandated by the 2025 Ukrainian PPP Law) ensures that tenders for construction materials or fuel are immutable and transparent.

- **Impact on PPPs:** By using “smart contracts,” the selection of private partners and the management of funds are conducted through visible, automated protocols. This “institutional straitjacket” removes human discretion from routine processes, directly addressing the communication and transparency problems identified in public administration. [Karpa et al., (2022)]

4.2.5 Automated Customs and Logistics

Beyond procurement, operational corruption is mitigated through the “Smart Port” technologies described by Al Rousan (2024) and HPC Hamburg (2024) and as further discussed in Table no. 4.

- **Automated Processing:** Integrating AI into customs and logistics flows minimizes the “gatekeeper” role of officials. If an AI algorithm determines inspection queues based on risk profiling rather than human choice, the opportunity to solicit bribes to “speed things up” vanishes. [Al Rousan, (2024)]

- **Efficiency as Integrity:** This automation not only speeds up logistics but creates a digital audit trail that is harder to manipulate than paper records, increasing investor confidence in the security of their revenue streams. [HPC Hamburg Port Consulting GmbH, (2024)]

Table no. 4: The anti-corruption “stack” for port PPPs

Corruption Risk	Anti-Corruption Mechanism	Impact on Investor
Rigged Tenders	Blockchain-based Procurement	Creates immutable, transparent tender records, reducing “administrative resistance.”
Bribery for Access	Automated Customs (AI)	Removes human discretion from routine processing; speeds up logistics.
Fund Misappropriation	Digital Twin Verification	Allows remote auditing of physical assets to verify capital expenditure.
Regulatory Capture	SPV Governance	Shields projects from local political interference through mixed-board governance structures.

Source: Karpa et al., (2022), Al Rousan, (2024), Manget and Alsina, (2025), & Becker et al., (2025).

5. Discussion

The findings of this study strongly support the working hypothesis that a “Tech-Enabled Hybrid PPP Model” is the optimal mechanism for post-war recovery, validating the theoretical application of the AK Growth Model ($Y = AK$) to infrastructure development.

The empirical data from the Danube Cluster’s “pivot” (2022–2023) provides a real-world stress test of this theory. While physical capital (K) in the form of channel depth was limited to 6.5 meters, the output (Y) increased exponentially, from 5.5 million tons in 2021 to 32 million tons in 2023. [Horoshkova et al., (2024)] This nearly 500% growth can only be explained by a radical increase in the efficiency variable (A), driven by the operational shift to 24/7 logistics and the “dry port” innovation at Bilhorod-Dnistrovskyi. [GMK Center, (2023); Ukraine Business News, (2024)] This contradicts the standard Solow growth model, which would predict diminishing returns due to the physical obsolescence of the Danube ports.

Furthermore, the legislative analysis confirms that Ukraine is moving toward the financial structures for PPPs proposed by Becker et al. (2025). Ukrainian Law No. 4510-IX in 2025 does not merely update technical procedures; it serves as the primary legal vehicle for integrating Ukraine’s infrastructure market with the European Union. First, the new law explicitly aligns Ukrainian PPP definitions and concession procedures with EU Directive 2014/23/EU. Second, to improve transparency in the bidding process and mitigate corruption risks, it mandates that by January 1, 2027, all competitive selection procedures for PPPs must be conducted through an electronic trading system integrated with the ProZorro platform. Third, the law legalizes different

types of PPPs by introducing the basis for “Minimum Revenue Guarantees” and allowing for donor grants to cover capital expenditures, directly addresses the war risks identified by Soloviov (2016) and Becker et al., (2025). The “first-loss” guarantee is no longer just a theoretical recommendation but a reality.

5.1 Broader Implications

In the broadest context, these findings suggest that the reconstruction of Ukrainian ports will serve as a global test case for “resilient logistics.” The successful privatization of the Bilhorod-Dnistrovskyi port in 2024 and Ust-Dunaisk port in 2023 demonstrates that private capital is willing to enter high-risk environments if the asset is priced correctly and the operational model allows for agility. [Ukraine Business News, (2024)]

This approach, where small, non-strategic assets are fully privatized to maximize efficiency (A), while large, strategic deep-water ports (Chornomorsk, Pivdennyi) utilize PPPs to fund massive capital upgrades (K), creates a diversified risk profile for the state. As Ukraine aligns its digital customs and procurement systems (ProZorro) with EU standards, its ports are transitioning from Soviet-legacy into the eastern gateway of the Trans-European Transport Network (TEN-T).

By integrating AI and automation (A) into the reconstruction, Ukraine can sustain a linear growth trajectory. The “efficiency multiplier” provided by technologies like JIT arrival and predictive maintenance ensures that the marginal product of capital remains high, preventing the economic stagnation often seen in post-conflict zones.

5.2 Limitations of the Research

While the results are robust, several limitations must be acknowledged:

- **Data Volatility:** The analysis relies on operational data from a period of active conflict (2022–2025). As the deep-water ports reopen, the “efficiency” gains in the Danube may prove temporary without sustained investment.
- **Lack of Physical Verification:** Due to security restrictions, the study relies on mostly secondary data rather than onsite inspections.
- **Legislative Nascent Stage:** While Ukrainian Law No. 4510-IX has been adopted, its practical enforcement in a post-war environment remains untested. [Karpa et al., (2022)] The gap between *de jure* protections (legislative stability) and *de facto* enforcement remains a historical weakness in Ukraine.

5.3 Recommendations for Future Research

To address these unresolved questions, future research should focus on:

- **Quantitative Risk Modeling:** Researchers should apply Monte-Carlo simulations to the specific concession tenders in Ukraine. This would quantify the exact “first-loss” coverage required to achieve an internal rate of return (IRR) acceptable to international investors under different war-risk scenarios.

- **Digital Twin Efficacy:** Empirical studies are needed to measure the actual reduction in insurance premiums for ports that implement “Digital Twin” technologies. Does “radical transparency” translate into a measurable financial discount from war-risk insurers?
- **Comparative Post-Conflict Analysis:** Future studies should compare the Ukrainian PPP model with reconstruction efforts in other post-conflict zones (e.g., the Balkans or Iraq) to determine if the “Tech-Enabled” variable provides a statistically significant advantage in recovery speed.

6. Conclusion

The reviewed literature collectively indicates that Ukrainian ports can become engines of regional economic recovery only if future PPPs depart radically from past practice. Optimal frameworks must incorporate transparent risk-sharing mechanisms, regional cluster-oriented economic models, and deep integration of AI and digital technologies from the design stage. Technology is not merely an efficient tool; it has evolved into a critical instrument for de-risking private investment in an environment where traditional guarantees alone are insufficient.

The theoretical application of the AK Growth Model to these findings suggests that this approach offers more than just immediate recovery. Unlike standard reconstruction efforts where returns on capital (K) eventually diminish, the integration of “Smart Port” technologies (A) creates a multiplier effect. By embedding AI-driven efficiency and digital oversight into the concession structure, Ukraine can dismantle the “human factor” that drives corruption and sustain a linear growth trajectory, preventing the economic stagnation often seen in post-conflict zones.

6.1 Policy Recommendations

To operationalize this framework, Ukraine should implement two specific initiatives:

1. Create a “Digital Port Sandbox” in the Danube Region: The Ministry should designate the Danube cluster (Reni, Izmail) for Smart Port technologies. [Liashenko et al., (2021)] Using the “Cluster Approach” proposed by Liashenko et al. would allow for the expedited procurement of a unified “Danube Digital Twin” that integrates barge traffic and rail spurs. Success here provides the “proof of concept” needed to attract larger investors to the Black Sea ports.

2. Amend PPP Laws to Mandate “Digital Twin” Deliverables: An amendment to the Ukrainian Law on Public-Private Partnerships is needed to require the bidder to provide a “Digital Twin” strategy. This legal mandate would ensure that the private operator cannot value-engineer the technology out of the project, effectively codifying transparency into the contract. (It should be noted that in November 2025, the EU launched a “Digital Twin for the

Reconstruction of Ukraine” initiative, to track Ukrainian projects transparently and estimate costs.)

Looking beyond the immediate horizon of reconstruction, the integration of PPPs and AI positions Ukraine to redefine its role in the global supply chain. Unlike the established ports, which must retrofit legacy systems, Ukraine can build a “cloud-native” maritime sector from the ground up. As Ukraine moves toward European Union accession, its ports will transform into Green, Smart Logistics Hubs. The “Digital Twin” that today mitigates war risk will tomorrow serve as the platform for carbon tracking and environmental compliance, aligning Ukraine with the EU. [Manget and Alsina, (2025)] Lastly, the adoption of Law No. 4510-IX signals that Ukraine has moved beyond theoretical discussions of modernization. By legally embedding EU-standard transparency for its electronic trading system (ProZorro) and financial guarantees (MRGs) into the PPP framework, Ukraine has designed the standards necessary to attract European capital.

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AFFECTIVE AND COGNITIVE PATHWAYS TO PHYGITAL PURCHASE INTENTIONS: A CROSS-FORMAT SEM-ANN HYBRID INVESTIGATION

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Abstract

The blistering convergence of the physical and digital retail space, often called phygital retailing, has fundamentally changed the design of consumer decision-making. Although the omnichannel behavior has received considerable academic attention, there is a significant gap in the literature: the concomitant analysis of affective and cognitive predictors of purchase intentions in both physical store and online platform formats through methodologically complementary methods. This paper fills this gap by implementing a two-step analytical model that combines Partial Least Squares Structural Equation Modeling (PLS-SEM) with Artificial Neural Networks (ANN). Based on the Stimulus-Organism-Response (S-O-R) paradigm and dual-process theory, we construct and test a holistic model that considers hedonic motivation, utilitarian value, perceived interactivity, trust, consumer confusion, and sensory congruence as antecedents of phygital purchase intention. A multi-site cross-sectional survey was conducted to gather data on 624 consumers in both physical retail stores and online shopping sites. The results of PLS-SEM indicate that hedonic motivation (Beta = 0.341, $p < 0.001$), trust (Beta = 0.287, $p < 0.001$), and perceived interactivity (Beta = 0.219, $p < 0.01$) have a significant positive impact on phygital purchase intention, whereas consumer confusion (Beta = -0.198, $p < 0.001$). The results of the ANN analysis show that trust has the highest normalized importance (100%), then hedonic motivation (83.7%), and perceived interactivity (71.2%), which confirms and expands the results of the SEM analysis through a non-parametric, non-linear perspective. Multi-group analysis shows statistically significant format-based differences, with sensory congruence showing stronger effects in physical retail (Beta = 0.312) than in digital retail (Beta = 0.147). The innovative hybrid approach of this study, its phygital framing, and its cross-format comparative design all make it a valuable addition to the consumer behavior theory and retail management practice.

Keywords: phygital retailing; purchase intention; PLS-SEM; artificial neural network; hedonic motivation; utilitarian value; trust; dual-process theory; omnichannel

JEL Classification: M31

1. Introduction

The last ten years have seen a seismic shift in the retail industry due to the spread of mobile technologies, smart devices, and data-driven personalization engines. Consumers are no longer in discrete online or offline worlds, but rather in fluid, interconnected retail spaces that both invoke physical sensation and

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digital convenience. Phygital retailing is an emergent phenomenon that refers to the smooth coordination of physical and digital touchpoints in one consumer experience (Lemon and Verhoef, 2016; Melero, Sese, and Verhoef, 2016). Although the concept has received significant managerial interest, it is still theoretically under-specified in the academic literature, especially in terms of the psychological processes that convert phygital experiences into tangible purchase intentions.

Omnichannel behavior (Verhoeff et al., 2015), click-and-collect strategies (Gallino and Moreno, 2014), and hybrid retail formats (Brynjolfsson, Hu, and Rahman, 2013) have been studied, but the particular affective and cognitive processes by which consumers in phygital settings develop purchase intentions have not been sufficiently mapped. One of the least explored aspects relates to the moderating effect of retail format, i.e., whether a consumer is interacting in a physical store with digital augmentation, or in a digital platform that includes physical product features, on the relative salience of affective versus cognitive antecedents. This is a theoretically consequential and practically important gap. Theoretically, the linear, variable-by-variable nature of the previous studies does not reflect the non-linear interdependencies inherent in consumer psychology in enriched retail settings (Hair et al., 2021). Practically, retailers who invest in phygital infrastructure need subtle intelligence on which of the experiential levers of hedonic stimulation, utilitarian efficiency, interactivity, trust, or sensory engagement most effectively convert in various format settings. The current research addresses these requirements by a methodologically sound, theoretically based research that implements a hybrid PLS-SEM and ANN model. PLS-SEM is used to test theoretically-based hypotheses and measure directional path relationships, whereas ANN offers complementary non-parametric analysis of relative variable importance and identifies complex non-linear interactions that SEM fails to identify (Peng and Lai, 2012; Liébana-Cabanillas et al., 2017). This two-pronged strategy, which is gaining more and more supporters in the most reputable marketing journals (Leong et al., 2020; Sharma et al., 2022), provides a more comprehensive picture of the antecedents of phygital purchase intention than any of the two approaches would have provided.

The paper has four main contributions. To begin with, it develops a theoretically integrated framework of phygital purchase intention based on the dual-process theory and the Stimulus-Organism-Response (S-O-R) paradigm. Second, it presents a new construct in phygital purchase research, sensory congruence, or the correspondence between the multisensory expectations of a consumer and the real sensory provision of the retail space. Third, it shows the methodological usefulness of the SEM-ANN hybrid in consumer behavior studies by systematically triangulating results. Fourth, it creates format-specific

insights by using multi-group analysis, providing actionable advice to retailers operating hybrid touchpoint portfolios.

The rest of this paper is structured in the following way. Section 2 presents the theoretical framework and develops the research hypotheses. Section 3 outlines the measurement model, data collection process, and analysis. Section 4 reports the PLS-SEM and ANN results. The theoretical and managerial implications are discussed in section 5. Section 6 discusses limitations and future research directions.

2. Development of Hypothesis and Theory.

2.1 *Phygital Retail Environment.*

Phygital retailing is a type of retail setting where physical and digital components are co-implemented to form cohesive consumer experiences (Hagberg, Sundstrom, and Egels-Zandalen, 2016). In contrast to basic multichannel retailing, phygital spaces strive to achieve experiential continuity through touchpoints, i.e. consumers can start product discovery through a digital application, get a personalized in-store suggestion on a smart display, make a purchase digitally and physically present, and get post-purchase digital follow-up. This channel-fluid vision is what makes phygital retailing different than its omnichannel predecessor, which was mostly concerned with operational integration, but not experiential integration (Tyrvaainen and Karjaluoto, 2019).

The theoretical approach to phygital retail behavior in the study is based on two complementary theories: dual-process theory and the Stimulus-Organism-Response (S-O-R) paradigm. According to the dual-process theory (Kahneman, 2011; Evans and Stanovich, 2013), human cognition is divided into two qualitatively different systems: System 1 processing, which is automatic, associative, and affect-laden, and System 2 processing, which is deliberative, analytical, and cognitively effortful. System 1 processes are mainly involved in hedonic stimulation and sensory cues in retail settings, whereas utilitarian judgments of value and quality involve System 2 (Pham, 2004). The dual-process lens is especially suitable because phygital environments, by being able to provide both rich sensory input and information-rich digital interfaces, activate both systems simultaneously.

The S-O-R paradigm (Mehrabian and Russell, 1974; Jacoby, 2002) offers a structural framework through which the effects of retail stimuli (S) on internal organism states (O) (both affective and cognitive responses) are mediated to result in behavioral responses (R) (purchase intention and approach behaviors). The stimuli in this study are the retail format features and the interactivity features; the organism-level mediating states are hedonic motivation, utilitarian value, trust, consumer confusion, and sensory congruence; the behavioral response variable is the phygital purchase intention.

2.2 Hedonic Motivation and Phygital Purchase Intention

Hedonic motivation in the retail setting describes the enjoyment, thrill, and experience of the shopping experience that customers feel regardless of whether they get a utilitarian payoff (Babin, Darden, and Griffin, 1994; Arnold and Reynolds, 2003). The novelty of digital-physical integration, which is enhanced in phygital environments, increases hedonic motivation: augmented reality try-ons, interactive product visualization, gamified loyalty programs, and ambient digital atmospherics all lead to an increase in affective arousal. Previous studies in e-commerce (Childers et al., 2001; To, Liao, and Lin, 2007) and traditional retail (Jones et al., 2006) have consistently found hedonic motivation to be a strong antecedent of purchase intention. The relationship in the phygital context is theorized to be especially strong since phygital interfaces provide stimulation on several sensory and cognitive channels at the same time. Based on experiential consumption theory (Holbrook and Hirschman, 1982) and broaden-and-build model of positive affect (Fredrickson, 2001), we assume that hedonic motivation will positively and significantly predict phygital purchase intention.

H1: Hedonic motivation is positively associated with phygital purchase intention.

2.3 Utilitarian Value and Phygital Purchase Intention

The utilitarian value reflects the functional, goal-oriented, and efficiency-based aspect of consumer judgment (Babin et al., 1994; Batra and Ahtola, 1991). The utilitarian value is embodied in phygital retail with real-time inventory visibility, frictionless online checkout, personalized product suggestions, and time-saving self-service interfaces. Foregrounding efficiency in shopping orientation is a feature that is likely to be positively received by consumers. Technology Acceptance Model (TAM; Davis, 1989) and its variants have repeatedly shown that perceived usefulness, a cognitive appraisal that is closely related to utilitarian value, is a predictor of behavioral intention in technology-mediated situations (Venkatesh et al., 2003).

The utilitarian value in phygital environments is theorized to work in System 2 deliberative processes: consumers make a conscious decision about the degree to which the integrated physical-digital interface makes their lives easier and their tasks more efficiently completed. In line with expectancy-value theory (Feather, 1988), we will posit that there is a positive correlation between utilitarian value and phygital purchase intention.

H2: Utilitarian value is positively associated with phygital purchase intention.

2.4 Perceived Interactivity and Phygital Purchase Intention

Perceived interactivity is a subjective assessment of the extent to which the retail environment allows real-time, two-way communication and responsiveness by the consumer (Liu and Shrum, 2002; Yadav and Varadarajan, 2005).

Interactivity is a cardinal design principle in phygital spaces: touchscreen product explorers, AI-driven chatbots on-premises through QR code, digital associates with access to real-time inventory across all locations, and interactive fitting room mirrors all are high-interactivity phygital features. Theoretical support of the relationship between interactivity and intention is based on flow theory (Csikszentmihalyi, 1990; Novak, Hoffman, and Yung, 2000) which proposes that high-interactivity environments lead to states of deep absorption and engagement that increase positive behavioral consequences.

This relationship has empirical evidence in various retail settings: online (Song and Zinkhan, 2008), mobile (Bart et al., 2005), and new augmented reality retail (Hilken et al., 2017). Since phygital environments are theoretically interactive, we hypothesize:

H3: Perceived interactivity is positively associated with phygital purchase intention.

2.5 Trust and Phygital Purchase Intention

Consumer trust in retail situations involves cognitive trust (confidence in the competence and reliability of a retailer) and affective trust (sense of security and goodwill towards the retailer; McAllister, 1995; Gefen, Karahanna, and Straub, 2003). Trust acquisition in phygital settings is multidimensional: it is based on institutional credibility, data privacy guarantees, the reliability of cross-channel service delivery, and the genuineness of digital-physical integration. A customer can have confidence in the digital interface of a retailer because of the knowledge of the physical location of the brand, or may be distrustful of digital assertions that are not supported by physical evidence in-store. One of the most duplicated results in consumer behavior studies is the trust-intention relationship (Pavlou, 2003; Gefen and Straub, 2004; Bart et al., 2005). Trust becomes particularly important in phygital contexts because of the numerous vulnerability surfaces that data-sharing between physical and digital touchpoints, such as location data, browsing behavior, purchase history, and biometric data provided by in-store sensors, creates. Based on the transaction cost theory (Williamson, 1981) and the trust model developed by McKnight, Choudhury, and Kacmar (2002), we hypothesize:

H4: Trust is positively associated with phygital purchase intention.

2.6 Consumer Confusion and Phygital Purchase Intention

Consumer confusion is a condition where the consumers do not form a clear and accurate perception of a product, service or retailing environment, which leads to poor quality of decisions and low probability of purchase (Mitchell and Papavassiliou, 1999; Turnbull, Leek and Ying, 2000). In phygital spaces, confusion may be caused by various factors: discrepancies between online and in-store pricing or availability data, interface overload due to too much digital stimuli, ambiguity in navigation between digital and physical interaction modes,

and information overload due to personalized recommendation engines that create too much proliferation of choice (Matzler et al., 2011).

Consumer confusion and purchase intention have a negative relationship, which is well-established in traditional retail (Walsh and Mitchell, 2010) and e-commerce (Jiang, Yang, and Jun, 2013). We extrapolate this to the phygital environment, where the intricacy of environment integration can create distinct confusion stimuli that are not found in either channel.

H5: Consumer confusion is negatively associated with phygital purchase intention.

2.7 Sensory Congruence and Phygital Purchase Intention

In this research, sensory congruence is presented as the extent to which the multisensory information provided by a phygital retail space matches the prior sensory expectations and brand or product category mental models of a consumer (Krishna, 2012; Spence, 2015). This construct is a continuation of the classical congruence theory (Mandler, 1982) to the multisensory retail sphere. Sensory congruence can be realized in a phygital store when digital visualizations, soundscapes, and haptic interfaces recreate or coherently extend the sensory experience of the physical presence of the brand, such as when the digital touchscreen interface of a luxury fashion retailer has the same ambient music, visual aesthetic, and tactile response characteristics as the physical store.

Its explicit multisensory focus and its phygital-specific theorization distinguish sensory congruence, which is the congruence of the digital and physical sensory registers, not just in one channel (Turley and Milliman, 2000). Based on the Multisensory Integration Framework (Stein and Meredith, 1993) and brand congruence theory (Park, Milberg, and Lawson, 1991), we hypothesize that the greater the sensory congruence, the less cognitive dissonance will be experienced and the greater the affective evaluation of the phygital environment will be, which will lead to increased purchase intention.

H6: Sensory congruence is positively associated with phygital purchase intention.

2.8 Format Moderation: Physical vs. Digital Retail

The last theoretical contribution of this paper is related to format-based moderation. We theorize that the retail format—physical store with digital augmentation versus digital platform with physical product elements—moderates the relative effect sizes of the above antecedents. In particular, we anticipate that sensory congruence will have a more positive impact in physical retail formats, where multisensory stimulation is more intense and immediate, than in digital formats where sensory delivery is mediated by screen-based interfaces. On the other hand, we anticipate that utilitarian value and perceived interactivity will have more pronounced effects in digital formats, where the efficiency and responsiveness of the interface are the main determinants of the experience.

H7: Retail format (physical vs. digital) moderates the relationships between the antecedents and phygital purchase intention, such that (a) sensory congruence has a stronger effect in physical retail, and (b) utilitarian value and perceived interactivity have stronger effects in digital retail.

3. Methodology

The research design and sampling will be described in 3.1. The research used a cross-sectional survey design that was conducted in two contexts of retail format, which included physical retail setting and online retail setting. The target population included adult consumers (age 18 and above) who had had at least one phygital retail experience (i.e., an experience that significantly involved physical and digital touchpoints) in the last three months. This eligibility criterion was measured using a screening question at the beginning of the survey and was intended to make sure that respondents had experiential referents to all constructs in the measurement model. The respondents were recruited by using a mix of intercept surveys at five large-format retail stores in two metropolitan regions and an online panel survey that was sent out by a trusted consumer panel provider. Trained research assistants approached physical retail respondents ($n = 312$) at the exit points of the stores after a phygital experience (e.g., after using an in-store digital kiosk or an app-linked smart fitting room). Digital retail respondents ($n = 312$) took the survey within 24 hours of a qualifying purchase on a digital-channel that involved a physical product verification or in-store pickup component. The final sample size was $N = 624$, which is enough to satisfy the minimum sample size criteria of both PLS-SEM (Hair et al., 2019) and ANN analysis with the number of input nodes (Delen, Walker, and Kadam, 2005).

The sample was composed of: 54.2% women, 45.8% men; mean age = 34.7 years ($SD = 9.3$); 67.4% had a bachelors degree or higher; 61.8% had a monthly household income that was above the national median. The Armstrong and Overton (1977) procedure was used to evaluate non-response bias, comparing early and late respondents on important constructs; no significant differences were found (all $p > 0.05$). The marker variable technique (Lindell and Whitney, 2001) and the unmeasured latent factors method (Podsakoff et al., 2003) were used to assess common method bias; neither method revealed an issue of problematic common method variance.

3.2 Measurement Instruments

Multi-item reflective scales based on validated instruments in the extant literature were used to measure all constructs. Hedonic motivation was assessed using five items based on Babin, Darden, and Griffin (1994) and revised by Arnold and Reynolds (2003), which included the dimensions of enjoyment, excitement, and experience of pleasure (e.g., Shopping in this retail environment is truly a joy; Cronbachs 0.891). The utilitarian value was assessed

using four items based on Babin et al. (1994) and Overby and Lee (2006) that included efficiency, accomplishment of tasks, and practical value (e.g., I achieved what I wanted to achieve in this retail setting; 0.873).

Perceived interactivity was assessed using five items based on Liu and Shrum (2002) and McMillan and Hwang (2002) and included responsiveness, speed, and control dimensions (e.g., This retail environment allows me to interact with it in real-time; 0.887). Trust was assessed using four items based on Gefen, Karahanna and Straub (2003) and McKnight et al. (2002) and included integrity, benevolence and competence dimensions (e.g., I trust this retailer to keep my personal information safe; 0.904). The scale of consumer confusion consisted of five items based on Mitchell and Papavassiliou (1999) and Walsh and Mitchell (2010) and included similarity confusion and overload confusion (e.g., I found the information in this retail environment confusing; 0.869). The new construct, sensory congruence, was operationalized using six items that were created in an iterative qualitative pre-study (five expert interviews, two focus groups with retail consumers) and then narrowed down using exploratory factor analysis on a pilot sample ($n = 75$). Examples of representative items are: The digital aspects of this retail experience were in line with the physical sensory attributes of the brand; The sounds, visuals, and touch points in the digital and physical aspects of my shopping experience were harmonious ($\alpha = 0.912$). Phygital purchase intention was assessed using four items based on Dodds, Monroe, and Grewal (1991) and Venkatesh et al. (2012) and anchored on the integrated phygital environment (e.g., I intend to buy this retailer in the near future, using its physical and digital channels; 0.926).

Everything was measured on seven-point Likert scales with anchors of 1 (Strongly Disagree) and 7 (Strongly Agree), which is similar to most previous PLS-SEM studies in retail settings (Hair et al., 2019). Data collection in non-English-speaking sites was done through the back-translation process (Brislin, 1970) to translate items into the local language.

3.3 Analytical Strategy: PLS-SEM

Three methodological considerations led to the choice of PLS-SEM as the main method of testing the hypothesis. To begin with, the research model includes a new formatively-conceptualized latent variable (sensory congruence), which is more easily estimated in PLS-SEM with its flexible reflective-formative estimation framework than in covariance-based SEM (CB-SEM; Hair et al., 2019). Second, the research purpose is essentially predictive in nature- the model is designed to maximize the explained variance in phygital purchase intention- which is more in line with the variance-based logic of PLS-SEM than the covariance-fitting logic of CB-SEM (Chin, 2010; Ringle, Sarstedt, and Straub, 2012). Third, PLS-SEM has better statistical performance when the data is non-normal and the model is complex with many latent variables (Reinartz, Haenlein, and Henseler, 2009), which are typical of the present dataset.

SmartPLS 4.0 was used to perform PLS-SEM analysis (Ringle, Wende, and Becker, 2022). The two-step procedure suggested by Anderson and Gerbing (1988) was used to assess the measurement model, including the assessment of indicator loadings, internal consistency reliability (composite reliability, CR), convergent validity (average variance extracted, AVE), and discriminant validity (HTMT criterion; Henseler, Ringle, and Sarstedt, 2015) before the structural model assessment. Path coefficients, R² values, predictive relevance (Q²; Stone, 1974; Geisser, 1975), and effect sizes (f²; Cohen, 1988) were assessed using structural models through 5,000-iteration bootstrapping (Hair et al., 2019). The SmartPLS permutation-based MGA procedure was used to test format-based moderation effects by performing multi-group analysis (MGA) (Sarstedt, Henseler, and Ringle, 2011).

3.4 Analytical Strategy: Artificial Neural Network.

ANN analysis was performed to supplement PLS-SEM with non-linear relationships and the production of normalized importance rankings that do not depend on the linear-additive assumptions of SEM. The ANN was defined as a multilayer perceptron (MLP) with a single hidden layer, which is the architecture suggested in social science behavioral studies (Huang, Chen, and Sharma, 2021; Leong et al., 2020). The six exogenous constructs of the PLS-SEM model were taken as input nodes; phygital purchase intention was the only output node. In line with the previous hybrid SEM-ANN research in the marketing field (Sharma et al., 2022; Liébana-Cabanillas et al., 2017), the ANN was fed with the latent variable scores produced by the PLS-SEM measurement model, which maintained the construct validity. The sensitivity analysis was used to determine the optimal number of hidden layer neurons by considering models with two to twelve neurons, and choosing based on the minimum mean squared error (MSE) on a held-out validation set. The data were randomly divided into 70 percent training, 15 percent validation and 15 percent testing subsets. The activation functions were defined as hyperbolic tangent in the hidden layer and identity in the output layer, which is in line with Leong et al. (2020). L2 regularization (0.001) was used to reduce the risk of overfitting. It was analyzed in Python 3.11 with scikit-learn 1.3 and repeated with ten random seed initializations; the reported results are the average of the ten initializations. The connection weight algorithm (Garson, 1991; Olden and Jackson, 2002) was used as the main technique to compute normalized importance scores, which were cross-validated with partial derivative sensitivity analysis.

4. Results

4.1 Measurement Model Assessment

All reflective constructs were tested on the measurement model before structural model testing. The statistics of the measurement model are given in Table 1. The indicator loadings were all above the 0.70 level suggested by Hair

et al. (2019), with a range of 0.731 to 0.924. The composite reliability (CR) values were between 0.869 and 0.928, which are above the 0.70 mark. The average variance extracted (AVE) values were between 0.531 and 0.712, which is greater than the 0.50 mark that is considered to be convergent validity (Fornell and Larcker, 1981). The alpha coefficients of Cronbach were between 0.869 and 0.926 (reported in Section 3.2), which are above the 0.70 mark.

Table 1. Measurement Model Statistics

Construct	Items (n)	CR	AVE	α	Min Load.	Max Load.
Hedonic Motivation (HM)	5	0.912	0.638	0.891	0.762	0.896
Utilitarian Value (UV)	4	0.901	0.695	0.873	0.783	0.884
Perceived Interactivity (PI)	5	0.908	0.662	0.887	0.749	0.891
Trust (TR)	4	0.921	0.712	0.904	0.798	0.924
Consumer Confusion (CC)	5	0.897	0.635	0.869	0.731	0.872
Sensory Congruence (SC)	6	0.928	0.649	0.912	0.763	0.903
Phygital Purchase Intention (PPI)	4	0.926	0.758	0.926	0.842	0.924

Note. CR = Composite Reliability; AVE = Average Variance Extracted; α = Cronbach's Alpha. All loadings exceeded the 0.70 threshold.

The Heterotrait-Monotrait (HTMT) criterion was used to evaluate discriminant validity (Henseler et al., 2015), with a conservative value of 0.85 (Gold, Malhotra, and Segars, 2001). The values of all HTMT were less than 0.85 (range: 0.321-0.782), which validates the discriminant validity of all construct pairs. The HTMT matrix is shown in Table 2.

Table 2. HTMT Discriminant Validity Matrix

Construct	HM	UV	PI	TR	CC	SC
HM	—					
UV	0.571	—				
PI	0.634	0.582	—			
TR	0.489	0.521	0.612	—		
CC	0.371	0.342	0.321	0.412	—	
SC	0.712	0.538	0.589	0.631	0.398	—
PPI	0.782	0.671	0.698	0.734	0.451	0.721

Note. HM = Hedonic Motivation; UV = Utilitarian Value; PI = Perceived Interactivity; TR = Trust; CC = Consumer Confusion; SC = Sensory Congruence; PPI = Phygital Purchase Intention. All HTMT values < 0.85.

4.2 Structural Model Results (PLS-SEM)

The results of the structural model are given in Table 3 in the form of standardized path coefficients (β), t-statistics, p-values, 95% bootstrap confidence intervals and effect sizes (f^2). The overall model showed good predictive validity, where the structural model accounted 63.7 percent of the variance in phygital purchase intention ($R^2 = 0.637$), which is significant in explaining the purchase intention. The phygital purchase intention Stone-Geisser Q^2 was 0.419, which validated the high predictive relevance (Geisser, 1975).

Table 3. Structural Model Results (Full Sample, N = 624)

Hypothesis / Path	β	t-stat	p-value	95% CI [LL, UL]	f^2	Decision
H1: HM $\rightarrow$ PPI	0.341	8.21	< 0.001	[0.261, 0.421]	0.142	Supported
H2: UV $\rightarrow$ PPI	0.173	3.87	< 0.001	[0.088, 0.258]	0.041	Supported
H3: PI $\rightarrow$ PPI	0.219	5.03	< 0.001	[0.129, 0.309]	0.063	Supported
H4: TR $\rightarrow$ PPI	0.287	6.94	< 0.001	[0.205, 0.369]	0.108	Supported
H5: CC $\rightarrow$ PPI	-0.198	4.52	< 0.001	[-0.284, -0.112]	0.051	Supported
H6: SC $\rightarrow$ PPI	0.231	5.38	< 0.001	[0.147, 0.315]	0.071	Supported

Note. β = standardized path coefficient; CI = confidence interval; LL = lower limit; UL = upper limit; f^2 = Cohen's effect size. R^2 (PPI) = 0.637; Q^2 (PPI) = 0.419. Bootstrap iterations = 5,000.

All the six hypotheses were accepted at $p < 0.001$. The highest positive impact was on hedonic motivation ($\text{Beta} = 0.341$), then trust ($\text{Beta} = 0.287$), sensory congruence ($\text{Beta} = 0.231$), perceived interactivity ($\text{Beta} = 0.219$), and utilitarian value ($\text{Beta} = 0.173$). The hypothesized negative effect was the consumer confusion ($= -0.198$). Cohen (1988)-classified effect sizes were: medium (hedonic motivation $f^2 = 0.142$) and trust ($f^2 = 0.108$); small-to-medium (sensory congruence $f^2 = 0.071$), perceived interactivity $f^2 = 0.063$, consumer confusion $f^2 = 0.051$, and utilitarian value ($f^2 = 0.041$).

4.3 Multi-Group Analysis (Format Moderation)

H7 was tested by applying multi-group analysis (MGA) with the SmartPLS permutation-based procedure (Sarstedt et al., 2011). Table 4 shows the format-specific path coefficients and the between-group difference tests.

Table 4. Multi-Group Analysis: Physical Retail vs. Digital Retail

Path	Physical β (n=312)	Digital β (n=312)	$ \Delta\beta $	p-value (perm.)	Significant?
HM $\rightarrow$ PPI	0.358	0.327	0.031	0.341	No
UV $\rightarrow$ PPI	0.134	0.219	0.085	0.038*	Yes
PI $\rightarrow$ PPI	0.187	0.261	0.074	0.047*	Yes
TR $\rightarrow$ PPI	0.291	0.283	0.008	0.891	No
CC $\rightarrow$ PPI	-0.204	-0.192	0.012	0.712	No
SC $\rightarrow$ PPI	0.312	0.147	0.165	0.001***	Yes

Note. * $p < 0.05$; *** $p < 0.001$. Permutation-based multi-group analysis (SmartPLS 4.0); 5,000 permutations.

H7 was partially supported. As hypothesized, sensory congruence had a much stronger impact on physical retail (0.312) than digital retail (0.147; 0.165, $p < 0.001$), which supports H7a. H7b was supported by the significantly stronger utilitarian value ($|\Delta \beta| = 0.085$, $p = 0.038$) and perceived interactivity ($|\Delta \beta| = 0.074$, $p = 0.047$). There were no significant differences in trust, hedonic motivation, and consumer confusion among formats, implying that these constructs are format-neutral antecedents of phygital purchase intention.

4.4 Results of Artificial Neural Network.

The best ANN model was identified as a 6-10-1 multilayer perceptron (six input nodes, ten hidden neurons, one output node), which was chosen based on the minimum MSE on the validation set (MSE = 0.0312). The trained ANN had a total predictive accuracy (R^2 equivalent) of 0.701 on the test set, slightly higher than the PLS-SEM model ($R^2 = 0.637$), which is in line with the ability of ANN to capture non-linear components of variance that linear-additive SEM does not (Leong et al., 2020). The normalized importance scores are in Table 5.

Table 5. ANN Normalized Importance Scores

Construct	Importance Score	Normalized Importance (%)	Rank
Trust (TR)	0.312	100.0	1
Hedonic Motivation (HM)	0.261	83.7	2
Perceived Interactivity (PI)	0.222	71.2	3
Sensory Congruence (SC)	0.198	63.5	4
Consumer Confusion (CC)	0.171	54.8	5
Utilitarian Value (UV)	0.124	39.7	6

Note. ANN architecture: MLP 6-10-1; activation: tanh (hidden), identity (output); training/validation/test split: 70/15/15%; L2 regularization ($\lambda = 0.001$). Importance scores computed via Garson (1991) connection weight algorithm.

The ANN importance rankings show a somewhat different image compared to PLS-SEM. The second variable in the SEM model by standardized β is trust, which appears as the most significant variable in the ANN (normalized importance = 100%), indicating that trust has a significant non-linear element in its association with phygital purchase intention that is not well represented in the linear path coefficient of the SEM model. This can be explained in theory: trust can have threshold effects and interaction terms that cannot be seen in a linear analysis, such as a minimum trust threshold below which the purchase intention falls precipitously, non-linearly. The high salience of hedonic motivation (rank 2, 83.7%), which is consistent with the SEM result, is confirmed. Utilitarian value, although statistically significant in PLS-SEM, is the last in ANN importance (39.7%), which means that its linear impact explains the majority of its correlation with the outcome variable and that there is not much non-linear variance left.

5. Discussion

5.1 Theoretical Contributions

The research has a number of specific theoretical contributions to the literature on retail consumer behavior, phygital environments, and research methodology. The initial contribution is the creation and empirical confirmation of a theoretically integrated model of phygital purchase intention that fills the gap between the dual-process theory and the S-O-R traditions. Previous studies have been inclined to use either one of the two frameworks; the current model shows that a dual-framework architecture better explains the difference in phygital purchase intention ($R^2 = 0.637$) than models that focus on a single theoretical perspective, as well as offers a more detailed explanation of the affective (System 1 / hedonic-sensory) and cognitive (System 2 / utilitarian-evaluative) routes.

The second contribution is the introduction of the concept of sensory congruence as a construct into the phygital purchase research. The fact that our operationalization of sensory congruence is the correspondence between multisensory expectations and the actual delivery of sensory experiences through physical and digital channels fills a significant gap in the literature on retail atmospherics and brand experience. Atmospheric congruence has been previously studied in single channels (Turley and Milliman, 2000) and brand-consumer congruence in branding situations (Sirgy, 1982), but the cross-channel multisensory congruence construct has never been theorized or tested. The strong positive impact of sensory congruence on phygital purchase intention ($\beta = 0.231$, $f^2 = 0.071$) and its greater impact in physical retail formats ($\beta = 0.312$ vs. 0.147) offer preliminary empirical anchoring to this construct and open up further theoretical development.

The third contribution is related to the methodological demonstration of the SEM-ANN hybrid. Although previous research has championed the importance of this combination (Hair et al., 2021; Leong et al., 2020), most have implemented it as an add-on, as opposed to a dual-method study that is designed symmetrically. The current research pre-establishes both methods as triangulation-oriented and the findings indicate that the ANN recognizes the non-linear primacy of trust (normalized importance = 100%) and SEM provides it with the second-largest linear path coefficient, which creates a complementary image that neither of the two analyses can provide separately.

The fourth contribution is the illustration of format-based moderation by multi-group analysis. The observation that sensory congruence, utilitarian value, and perceived interactivity all differ in their relative salience between physical and digital retail formats undermines the implicit belief in much omnichannel research that purchase antecedents are format-independent. This has consequences on model generalizability across retail settings and suggests the inclusion of format as a moderating boundary condition as a matter of routine in future phygital purchase studies.

5.2 Managerial Implications

The results have a number of practical implications on retailers who design and operate phygital spaces. To begin with, the fact that the trust is the most significant predictor in the ANN analysis, as it has the highest normalized importance of 100 percent, suggests that trust-building is the prerequisite of phygital adoption and not a marginal factor. Retailers ought to invest in open data governance communication, uniformity of cross-channel service quality standards, and high-profile presentation of privacy certifications and service guarantees in both online interfaces and in-store settings. The non-linear trust effect that the ANN has identified implies that trust-building activities must focus on achieving minimum trust levels among all customer groups before investing in experiential improvements.

Second, the high impact of hedonic motivation ($\beta = 0.341$, position 2 in ANN) justifies the strategic focus on experiential aspects in the design of phygital stores. Retailers are advised to invest in sensory immersion technologies, such as spatial audio, haptic interfaces, immersive AR visualization, and digital art installations, which enhance affective experience in the phygital space. This suggestion is especially relevant to high-end and luxury brands where hedonic value propositions are the core of the brand. Third, the format-specific results directly apply to the channel investment prioritization. In the case of physical retail operators who have been digitally augmented, the high sensory congruence effect ($\beta = 0.312$) suggests that the aesthetic and sensory consistency of digital interfaces in-store and the overall physical brand environment should be carefully calibrated, without introducing digital touchpoints that are tonally or aesthetically incongruent with the physical environment. The greater impact of the utilitarian value ($\beta = 0.219$) and perceived interactivity ($\beta = 0.261$) in the case of digital platform operators suggests that the interface responsiveness, intelligent recommendation algorithms, and real-time customer service capabilities should be invested in to maximize the perceived efficiency and interactivity.

Fourth, the adverse impact of consumer confusion ($\beta = -0.198$) indicates the underestimated expenses of interface complexity in phygital settings. Retailers ought to test their phygital interfaces on possible sources of confusion, such as inconsistent pricing or availability cues across channels, over-personalization-induced proliferation of choices, and discontinuity in navigation between physical and digital modes of interaction, and apply clarity-by-design principles to reduce the impact of these factors.

5.3 Comparison with Previous Research.

The trend of the results of this study is generally consistent with but significantly extends the previous studies in the omnichannel and e-commerce settings. The hedonic motivation has a positive impact on purchase intention, which is similar to the results of Childers et al. (2001) in online shopping and

Arnold and Reynolds (2003) in hedonic shopping motivation studies. The positive trust-intention correlation is a replica of Pavlou (2003) and Gefen and Straub (2004) and generalizes their results to the phygital environment. The negative confusion-intention correlation is a replication of Walsh and Mitchell (2010) and its extension to an environment, phygital retailing, where the complexity of confusion is structurally heightened through channel integration.

New compared to previous studies is the ANN-based discovery that the non-linear significance of trust is greater than the linear path coefficient rank, indicating a qualitatively distinct kind of relationship between trust and intention in phygital settings than in purely digital settings, where the linear trust-intention relationship is already robust (Pavlou, 2003). The format-specific moderation of sensory congruence is also new and has no direct precedent in the omnichannel literature, which has not previously studied multisensory cross-channel congruence as a purchase antecedent.

6. Limitations and Future Research Directions.

This research is limited in a number of ways that must be recognized and which together constitute an effective research agenda in the future. To begin with, the cross-sectional design does not allow making causal inferences and fails to capture the temporal dynamics of the formation of phygital purchase intentions. The next generation of research must use longitudinal or experimental designs to determine the causal directionality and to investigate the alteration of the relative salience of antecedents at different stages of the consumer decision process and in various phygital interactions. Second, two metropolitan areas were used to collect data in one national context. The phygital retail infrastructure, consumer digital literacy and cultural orientations towards technology mediated shopping differ significantly across national settings (Hofstede, 2001; Venkatesh et al., 2003). Future studies ought to generalize the model to other cultural and economic settings, especially emerging market economies where phygital retail adoption is rapidly growing, and investigate the invariance of the model structure and parameter estimates across national samples. Third, the sensory congruence construct, although formulated in a theoretically based and empirically iterative manner, is an early operationalization that should be refined in the scale. Future studies ought to expose the sensory congruence scale to confirmatory bifactor analysis, test its discriminant validity with other related constructs like brand consistency and atmospheric congruence, and test its measurement invariance across retail product categories (e.g., fashion vs. electronics vs. grocery).

Fourth, although the ANN analysis offers useful non-linear complementation to PLS-SEM, it is a black box that does not produce interpretable parameter estimates. Future studies might use explainable AI (XAI) methods, including SHAP (Shapley Additive Explanations; Lundberg

and Lee, 2017) or LIME (Local Interpretable Model-agnostic Explanations; Ribeiro, Singh, and Guestrin, 2016), to break down the predictions of the ANN at the observation level, producing more detailed information about the circumstances in which non-linear

Fifth, the existing model fails to include the dimensions of social influence, namely, the importance of social proof, peer recommendation, and social media integration in phygital settings, as the antecedents of purchase intention. Subjective norms and social influence have always been found to be important predictors of technology adoption behavior in previous studies (Venkatesh et al., 2003; Cheung and Thadani, 2012). The current model needs to be expanded in future studies to include social influence as a direct antecedent and a possible moderator of the trust-intention and hedonic-intention relationships in phygital settings.

Conclusion

This paper examined the affective and cognitive predictors of phygital purchase intention using a methodologically unique hybrid PLS-SEM and ANN model in both physical retail and digital platform format settings. Based on the dual-process theory and S-O-R paradigm, we constructed and tested a six-antecedent model that accounts 63.7 percent of the variance in phygital purchase intention. The six hypotheses were all accepted: hedonic motivation, utilitarian value, perceived interactivity, trust, and sensory congruence have a positive influence on phygital purchase intention, and consumer confusion has a negative impact. Multi-group analysis indicates that sensory congruence is much higher in physical retail, whereas utilitarian value and perceived interactivity are higher in digital retail situations. The ANN analysis shows that the most significant non-linear predictor is trust, followed by hedonic motivation and perceived interactivity. The three main novelties of the study, the phygital framing, the introduction of sensory congruence as a validated construct, and the symmetrically designed SEM-ANN triangulation, all contribute to the knowledge on how consumers make purchase decisions in the more integrated retail settings of the modern digital-physical world. With phygital retailing still developing, with more and more of it using generative AI personalization, extended reality interfaces, and real-time biometric engagement measurement, the theoretical and methodological base developed in this study offers a fruitful platform to the future of consumer behavior research in integrated retail spaces.

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TAX HAVENS: REFUGE OR OPTIMIZATION? AN ANALYSIS IN THE CONTEXT OF THE EU'S FIGHT AGAINST TAX FRAUD AND EVASION

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Abstract

It is perfectly legal to conduct business through an offshore company registered in a tax haven if the legislation of that state is complied with. However, concerns regarding these tax havens are related to the possibility of hiding dirty money obtained from illegal activities (tax evasion, fraud or embezzlement of funds), since every year, at European level, billions of euro are lost when taxpayers do not declare and do not pay their tax liabilities, thereby undermining the economic stability of the European Union. In this context, tax havens represent a major challenge for the member states of the European Union, as they facilitate the shifting of profits, the concealment of the identity of beneficial owners and the artificial reduction of tax liabilities, with negative effects on the financing of public services, economic competitiveness and tax fairness.

Keywords: tax evasion and avoidance, business taxes and subsidies, international fiscal issues

JEL Classification: H26, H25, H87

1. Introduction

Tax havens and offshore financial centres have become a central concern for policymakers and scholars, as they sit at the intersection of tax justice, fiscal sustainability, and the integrity of global financial markets. By offering extremely low or zero tax rates, strict banking secrecy and flexible regulatory frameworks, these jurisdictions enable multinational companies and high-net-worth individuals to shift profits and assets across borders, often beyond the effective reach of domestic tax administrations. In the European Union, this dynamic undermines the financing of public services, distorts competition within the single market, and places a disproportionate tax burden on compliant taxpayers and small and medium-sized enterprises.

Against this backdrop, the EU has stepped up its fight against tax fraud and evasion, promoting greater transparency, tighter rules on aggressive tax planning and common lists of non-cooperative jurisdictions. This article examines the dual nature of tax havens as both legal instruments of tax

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optimisation and sources of fiscal risk, analyses the role of offshore companies in profit shifting, and discusses recent EU initiatives aimed at reducing the fiscal and economic imbalances generated by these practices.

2. Literature review

Among the factors that have contributed to the emergence and development of tax havens are the decline in trust in financial institutions, distrust in governments and the need for financial privacy. In other words, the purpose of using tax havens is simple: to pay as little as possible and earn as much as possible. This is why businesspeople set up companies in the territory of a tax haven, to protect their profits, the aim being to obtain a tax optimization of their business [Ungureanu, (2013)].

Most of the time, tax havens are perceived as a means of protecting income and wealth from the control of tax authorities. Thus, from a tax perspective, a tax haven can be seen as the territory of a state or part of the territory of a state within which certain facilities are granted: no taxes, duties or contributions are levied, or they are charged at reduced rates and apply only to specific categories of income, assets and activities; banking secrecy is guaranteed; there are no restrictions on foreign exchange transactions; and a simple and rapid system is in place for setting up a company [Minea, Costaş, (2006)].

Specialized literature groups tax havens as follows [<http://www.sfin.ro>]:

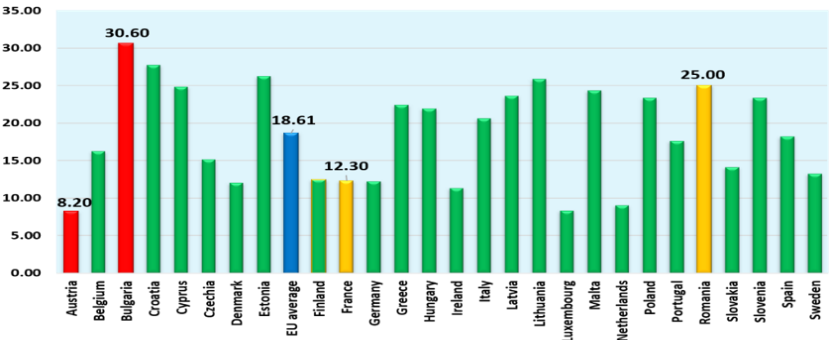
- *Tax Paradise*: States or territories of states that have not concluded any kind of tax treaty with other states and that do not levy income or wealth taxes.
- *Low Tax Haven*: States or territories of states that have concluded tax treaties with other states but have set very low tax rates on income and wealth and do not tax income from dividends and/or interest.
- *Tax Resort*: States or territories of states that have simplified procedures for incorporating a company and offer specific advantages in terms of the level of taxation for certain activities. This category of tax havens is particularly preferred by multinationals.
- *Tax Shelter*: States or territories of states that have very low tax rates or that have established the collection of income tax on a territorial basis, meaning that profits that do not originate in the territory of the respective state are not taxed.

Over time, tax havens have been a symbol of wealth, luxury, and sophisticated business, being the preserve of private banking. However, the financial crisis, terrorist threats, as well as the escalation of illegal activities and corruption at international level have revealed a darker side of these territories. Thus, countries around the world, especially developed ones, have begun to exert increasing pressure at international level to reduce the role of these

territories (tax havens) in fueling tax evasion and in financing illegal activities [Căpraru, (2017)].

The phenomenon of tax evasion deprives the EU every year of considerable amounts and distorts competition, to the detriment of taxpayers. Such behavior undermines the concept of a tax system that supports economic growth and hinders the integration of capital markets. Innovation and competitiveness also risk being stifled, since SMEs, the main source of jobs in the EU, end up paying more taxes than large companies that can resort to aggressive tax planning [International Tax Policy Forum, (2024)]. Furthermore, the avoidance of tax obligations may increase the tax burden on labor, as governments compensate for lost revenues by raising other taxes, to the detriment of employment.

Figure no.1: Underground economy in the EU as share in GDP



Source: Schneider (estimates of shadow economy in EU) University of Linz, Austria

Given the cross-border nature of tax evasion, actions to combat it taken at national level are, in general, ineffective [Alstadsæter et al., (2023)]. In fact, the adoption of uncoordinated measures to combat tax abuse at national level may worsen the situation, by fragmenting the single market, creating new burdens for taxpayers, and opening new loopholes that can be exploited by those resorting to aggressive tax planning.

In the current context, the notion of tax haven increasingly tends to be transformed into financial haven or international financial center or, more recently, offshore financial center. Thus, the tax haven constitutes a refuge for all types of companies, with the purpose of allowing their owners to minimize the tax obligations to which they are subject, in full compliance with the law and in a way that is beyond the control of the tax authorities in their home states, so as to generate high profits and protect their money and capital [EU Tax Observatory, (2026)].

At present, according to the OECD, there are approximately 50 tax havens worldwide, some of them located in the very heart of the European Union, such

as Andorra, Cyprus, Gibraltar, Guernsey, the Isle of Man, Jersey, Liechtenstein, Malta, Monaco or San Marino, which attract European taxpayers through banking secrecy, low tax pressure and few taxes, duties and contributions [EU Tax Observatory, (2024)].

Currently, more and more states and territories are in the process of giving up their status as tax havens, such as the Cayman Islands, Switzerland, Gibraltar, Liechtenstein and the Virgin Islands, by signing agreements under which they are willing to disclose, to a greater or lesser extent, information regarding resident offshore companies and to renounce fully or partially their status as tax havens. This process is explained by the international pressure exerted on them by the Financial Stability Board, a body established by the G20 group.

3. A brief introduction to the typology of offshore companies

In general, when tax havens and offshore companies are discussed, most people think of illegal business; however, contrary to this view, offshore companies are a legal instrument for organizing business, whose advantages are usually related to taxation. Therefore, it should be noted that when a taxpayer sets up an offshore company, the reason is to avoid paying certain, often burdensome, tax obligations in the state of residence; however, this is not an illegal option.

At present, the term tax haven has turned into offshore financial centre, due to the main instrument used for conducting business in a tax haven, namely the offshore company [Bişa, Costea, Capotă, Dăncău, (2005)], which is a company incorporated in a country or in a dependent territory of a country with autonomous legislation, but which does not carry out economic activities on that territory [Busiernesu, (2007)].

The offshore company is a financial instrument used for tax planning and tax avoidance, for increasing the profitability of the business, for participation (as shareholder or partner) in the management of the business, with full freedom of movement of financial resources and in complete anonymity.

Thus, depending on the operating conditions of offshore companies, tax havens can be grouped as follows [Chicoş, Drăghici, (2010)]:

- **Group 1** – Bahamas, Jersey, the Isle of Man, Delaware (USA) (the share capital does not have to be paid in, the financial statements do not have to be filed with any authority, and the company's profit is taxed annually with a fixed tax).
- **Group 2** – Hong Kong (companies must submit their financial statements to the authorities, certified by an authorized accountant).
- **Group 3** – Madeira, Cyprus, Switzerland, Liechtenstein (when the company is set up, the share capital must be paid in, filing financial statements is compulsory, but the company's profit is taxed at a reduced rate).

The disclosure of financial transactions is prohibited. If business activities are legal, financial secrets are protected. It is forbidden to disclose financial transactions and information on bank accounts without a court order. As a rule, a condition for granting tax exemptions is that the company does not carry out its economic activity on the territory in question (a condition imposed to protect the domestic economy from external influence). Offshore companies must be viewed in the correct context: they are set up in a jurisdiction where there are no taxes. They are by no means proven for money laundering since tax-haven states also have laws and monitor companies' activities whenever they seem suspicious.

In conclusion, an offshore company can represent both a valuable instrument for protecting profits, thereby increasing the profitability of investments made by the owners, and a nightmare for the tax authorities in the states of residence, whose main objective is to combat fraud and tax evasion and to reduce the loss of tax revenues caused by the way tax havens operate. In addition, tax havens offer confidentiality to individuals or to the beneficial owners of registered companies by not showing their identity, which allows money to be held in these areas, often unreported and untaxed

Types of offshore companies [Busiernescu, (2007)]:

- *Offshore trading companies* – used to reduce the profits of parent companies found in high-tax areas.
- *Offshore credit companies* – owning an offshore credit company provides opportunities to minimize taxes on granted loans and borrowed funds, as well as to improve the financial and credit services offered to clients.
- *Offshore investment companies* – in some tax havens, the authorities may offer tax facilities to entrepreneurs who invest in certain sectors. The purpose of granting these facilities is to develop specific areas, attract capital and technologies, rebalance the trade balance and stabilize the labor force.
- *Offshore banks* – captive banks are banks that operate under the cover of other banks. Following the model of captive insurance companies, a large group may set up its own bank, found in a tax haven and operating under an offshore regime. Thus, the main activity of the offshore bank may be the centralized management of the group's treasury.
- *Offshore holding companies* – used to finance the activities of subsidiaries found under various jurisdictions, offering them the possibility of reducing the taxes on interest for loans granted by the parent company. In this case, the holding companies are established in an offshore area where they do not pay other taxes. The profit thus obtained can be used to finance activities carried out by the holdings or to reinvest it for other purposes.

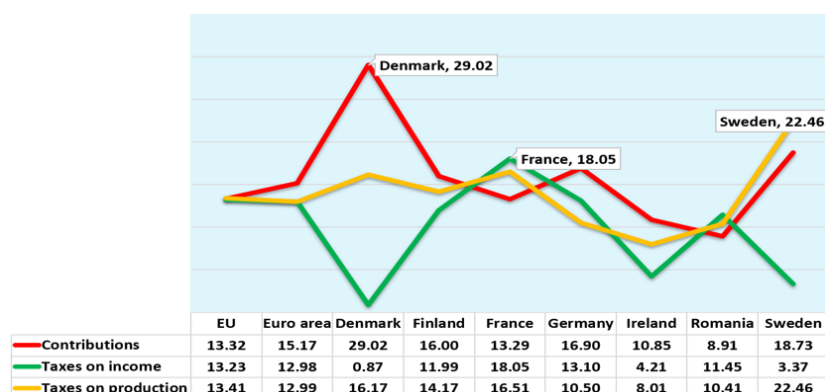
4. Definition, magnitude, and potential effects of fiscal pressure

Tax pressure implies certain limits of affordability on the part of taxpayers. These limits are imposed by taxpayers' reactions, as they may resist

increases in compulsory levies by resorting to evasion, fraud, reducing productive activity or even revolts. If, up to a certain point, the honest taxpayer makes the payment of tax voluntarily, when taxes exceed certain limits of affordability, phenomena arise that seriously undermine the state's intention to collect these revenues [Dobrotă, Chirculescu, (2010)].

Specialists use the concept of fiscal pressure to denote the magnitude of the redistribution of GDP through the payment and/or collection of taxes. Thus, fiscal pressure is defined as the relative expression of the tax burden borne by the taxpayer [Brezeanu, (2009)]. Some authors also consider that fiscal pressure signifies how onerous taxes are, or, in other words, how heavy the tax burden is on taxpayers' shoulders [Talpoș, Enache, (2001)]. In another sense, fiscal pressure represents an indicator for measuring the income extracted from production which passes through the budget by means of a compulsory and public allocation process, instead of being left at the free disposal of private initiative [Tulai, Șerbu, (2005)].

Figure no. 2: Fiscal pressure based on taxes and contributions in EU



Source: European Commission – DG TAXUD (Taxation Trends)

Regardless of how it is defined, fiscal pressure can be interpreted as follows:

- **From the taxpayer perspective**, it expresses the degree to which the taxpayer is subjected to bearing the tax burden established by law. In this case, the level of fiscal pressure shows how much of the income that constitutes the tax base will be taken for the general needs of society.
- **From the state as tax collector perspective**, it indicates what share of the income created by taxpayers is to become budgetary revenue. For the state, an increase in fiscal pressure means an improvement in the mechanism for financing public expenditure, while a decrease in fiscal pressure affects the budget deficit.

In the USA, fiscal pressure is determined by considering individual income taxes, sales taxes and excise duties, social security contributions, corporate profit taxes, and value added taxes. For the calculation of fiscal pressure at the level of federal states, the taxes and duties paid to these states are also taken into consideration: property taxes, inheritance taxes, certain sales taxes, sin taxes, etc. In some European countries, in fiscal practice, fiscal pressure is determined by considering tax revenues derived from: taxes related to production and imports, and taxes on income, wealth and capital.

Thus, in practice, three types of tax pressure rates can be used:

- *Low tax rate* – implies low pressure on taxpayers and therefore relatively low budget revenues. In the view of some neoliberal authors, such a tax rate may stimulate efforts to achieve stability in disposable national income, accelerate economic growth, and thus increase tax revenues to the budget.

- *High tax rate*, especially a rising marginal tax rate, may generate tax evasion, tax fraud, a decrease in GDP and a reduction in tax revenues to the state budget.

- *Optimal tax rate* – represents that threshold of taxation up to which, and beyond which, tax revenues are lower. A rate that exceeds the optimal level has a discouraging effect on investors and employees.

The level of fiscal pressure (the degree of taxation or tax rate) is influenced by numerous factors, among which we mention:

- Internal factors, for example:
 - the scale of progressivity of tax rates;
 - the method of determining the tax base.
- External factors to the system of taxes and duties:
 - the level of GDP per capita and the size of public debt;
 - the degree of development of the national economy;
 - the priorities set by public authorities regarding the allocation of resources (social protection and/or economic development);
 - the efficiency with which public resources originating from taxpayers' obligations are used;
 - the degree of taxpayers' adherence to government policy;
 - the degree of voluntary compliance of taxpayers with the declaration/payment of taxes.

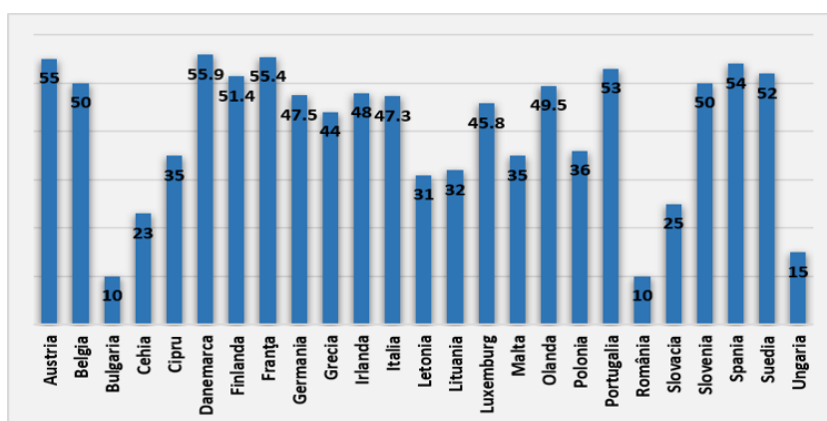
In the view of many specialists, the main cause of increasing fiscal pressure is the continuous growth of public expenditure, whose evolution is subject to certain economic, social, and political regularities.

Possible effects of high fiscal pressure may lead to:

- risk of tax-induced inflation (any increase in tax rates may influence price increases);

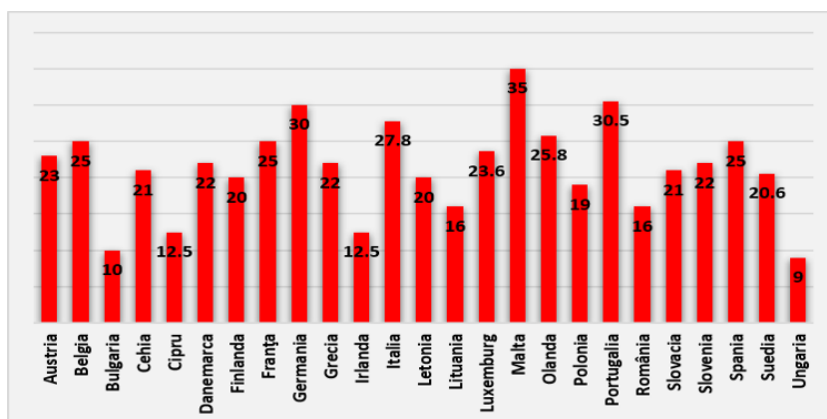
- tax evasion and tax fraud;
- a reduction in productive efforts (tax optimization through “fiscal abstinence”);
- political resistance (demands, positions taken for or against certain tax obligations);
- relocation of activities to countries where tax legislation is more favorable, with the corresponding consequences for the country of residence;
- deterioration of international competitiveness, which for developed countries with significant trade flows and companies able to face competition constitutes a key factor in economic growth and the level of employment.

Figure no.3: Income tax rates in 25 EU Member States

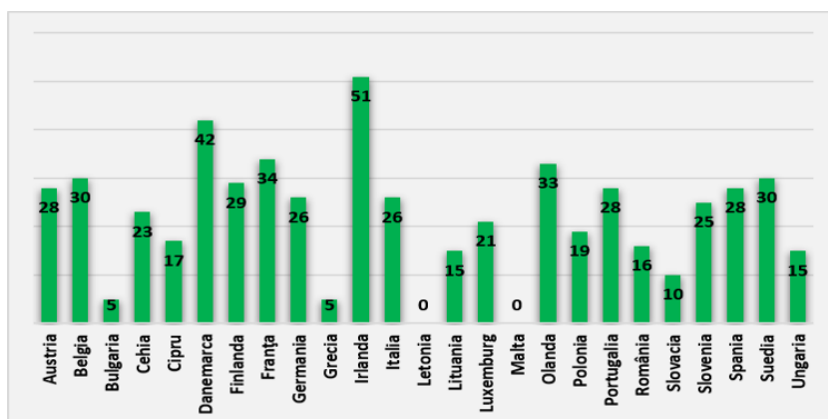


Source: European Commission – DG TAXUD (Taxation Trends)

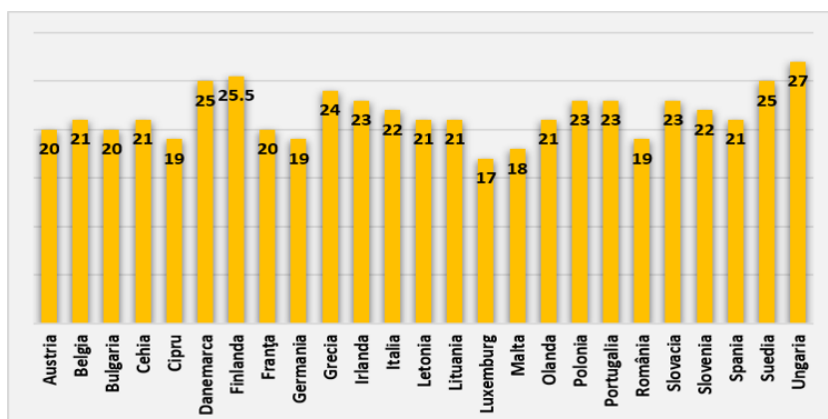
Figure no.4: Profit tax rates in 25 EU Member States



Source: European Commission – DG TAXUD (Taxation Trends)

Figure no.5: Dividend tax rates in 25 EU Member States

Source: European Commission – DG TAXUD (Taxation Trends)

Figure no.6: VAT rates in 25 EU Member States

Source: European Commission – DG TAXUD (Taxation Trends)

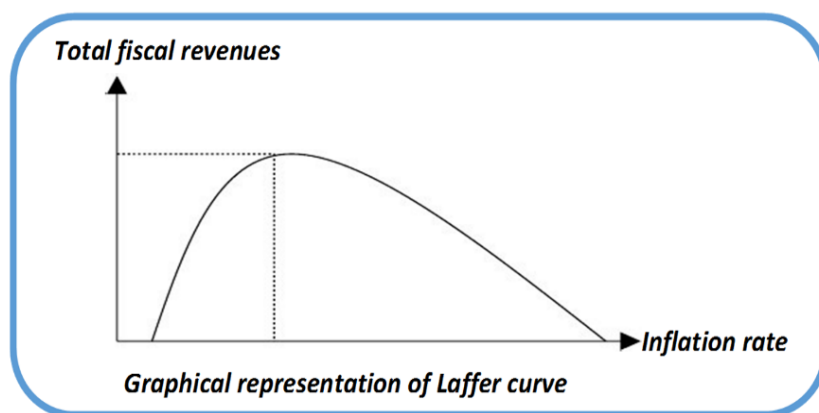
Any significant increase in the degree of taxation and, implicitly, in compulsory levies may generate a risk to competitiveness, namely price increases, a reduction in self-financing capacity, in investment and in modernization. The extent of taxation in EU member states is illustrated in Figures 3–6.

Opinions in the literature are mixed. Thus, J.B. Say proposed the *minimum tax*, while D. Ricardo considers that *any tax levy reduces the power of capital accumulation*. Likewise, supporters of Keynesian theory argue that a limit imposed on tax levies would be linked to certain confusions or technical purposes, since it would fail to consider the advantages taxpayers derive from the contribution of taxes to the formation of public financial resources.

Optimal fiscal pressure particularly concerned the economist Laffer, who in 1974 graphically represented the relationship (the Laffer Curve), starting from an idea of A. Smith (1776) on “tax rates”, according to which, if they are too high, they may destroy the very base on which taxation operates. Thus, Laffer estimates that there is a threshold of fiscal pressure which, if exceeded, can reduce tax yield and may discourage taxpayers from investing, producing, and saving [Alstadsæter et al., (2023)].

According to the Laffer curve (Figure 7), the amount of compulsory levies is an increasing function of the tax pressure rate only up to a threshold corresponding to the maximum level of the curve, after which it becomes a decreasing function, tending towards zero if the rate were to reach the theoretical level of 100%.

Figure no.7: Laffer curve



Source: authors' own illustration

5. Tax evasion in EU member countries

Tax evasion is a socio-economic phenomenon of utmost importance that states are currently facing and whose negative consequences they seek to limit, its eradication being impossible. The effects of tax evasion directly affect the level of tax revenues, lead to distortions in the functioning of the market mechanism and may contribute to social inequities arising from taxpayers' different access and inclination to engage in tax evasion. Nevertheless, the state, through its public authority, may incite tax evasion, thus pursuing two objectives [Moraru, (2008)]:

- a positive one, justified by the stimulation of capital formation;
- a negative one, reflected in supporting mafia-type interest groups, with all the risks arising from such practices.

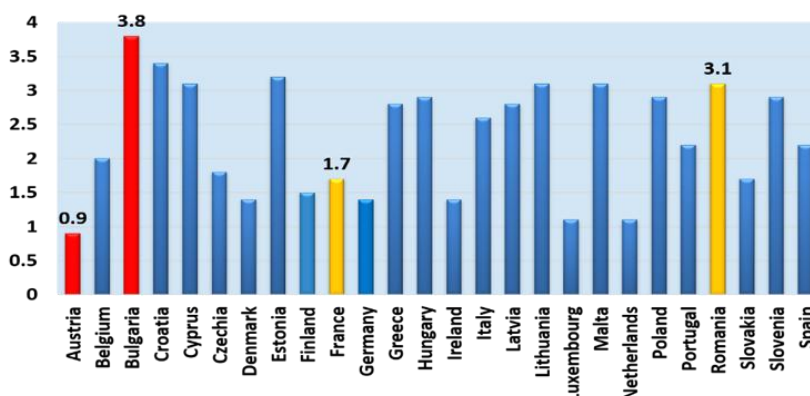
Hence, we can identify the very role of tax evasion as a desired or undesired element of fiscal policy, deriving directly from the role of taxation in general. One of the “secrets” of the Japanese regarding capital formation is tax evasion, which is officially encouraged. Legally, an adult Japanese citizen is exempt from taxes on an average savings account. Japan has five times more such accounts than the number of its population, including children. As a result, it has the highest capital formation rate [Moraru, (2008)].

Referring to some government measures aimed at changing the distribution of income in the USA, Milton Friedman noted that “the effect of high and strongly progressive tax rates has disappeared also because they have stimulated the emergence of legal provisions and other measures that support tax evasion, namely the so-called legal loopholes that allow a percentage reduction of tax rates. As a result, the effective tax rates have been much lower than the nominal rates and, what is very important, the incidence of taxes has become capricious and unequal. People in the same economic situation pay different taxes depending on the nature of their income source and on the opportunities, they must engage in tax evasion.” Thus, tax avoidance may have been essential for economic welfare. If this was the case, the gain was achieved at the cost of a great waste of resources and by introducing widespread inequity [Moraru, (2008)].

The state’s intervention in maintaining a certain degree of tax evasion, for the purposes mentioned above, must be analyzed through the lens of the direct relationship between the effect (capital formation) and the efforts (waste of resources, creation of inequality in taxpayers’ incomes).

It must also be borne in mind that the beneficial effect of state intervention, especially in legislative terms, is direct, immediate, and visible, while the effects of tax evasion are gradual, indirect, and difficult to perceive. Figure 8 shows the size of tax evasion in 2023 in EU member states.

Figure no.8: Tax evasion in EU (2023)



Source: Schneider, University of Linz, Austria

Table no.1: Definitions of Tax Evasion and Tax Fraud in Selected EU Member States

Country	Definitions
Franța	Tax fraud is defined as “the attempt to evade or the fraudulent evasion of the assessment or payment of taxes regulated by the General Tax Code; the intentional omission to declare within the limitation period, the intentional concealment of amounts that should have been taxed, the organized creation of insolvency or the obstruction by other means of tax collection is considered tax fraud.”
Germania	Tax fraud is the deliberate omission to provide the tax administration with the information necessary for determining the tax, or the submission of inaccurate or false documents where this would reduce the tax due or lead to the obtaining of unjustified tax advantages.
Irlanda	Tax fraud is defined as any intentional criminal activity in the fiscal sphere aimed at evading the payment of tax. Penalties are harsher where tax offences concern all taxes and duties levied. This is the case of offences considered very serious and liable to severe sanctions, such as: filing an inaccurate tax return or submitting inaccurate documents, obstructing tax audits, refusing to keep or to provide the documents required by law.
Luxemburg	Tax fraud is divided into two concepts: simple fraud and international fraud. Simple fraud is of an unintentional nature and is committed through negligence by any person who has the status of taxpayer. This offence may be punished only with a fine. International fraud is punishable by fines that are not limited by law and may also be punished with imprisonment.
România	Tax evasion represents the avoidance, by any means, in whole or in part, of the payment of taxes, duties and other amounts owed to the budget by Romanian or foreign natural and legal persons having the status of taxpayer.
Țările de Jos	Tax evasion is defined as the deliberate filing of an inaccurate tax return, the submission of false documents, or the failure to comply with the legal obligation to provide the tax administration with certain information at the time of tax inspection. Tax fraud is punishable by imprisonment.

Source: Ungureanu, 2013

The significant differences between the definitions and sanctions on tax fraud and tax evasion in EU member states (Table 1) prove the absence of genuine harmonization, making it easier for taxpayers seeking to avoid tax obligations to exploit legislative loopholes.

In parallel with efforts towards tax harmonization and coordination, the EU has intensified its fight against tax evasion and tax fraud, which threaten fair competition and are a cause of major budget deficits. Combating aggressive tax planning also constitutes a challenge of utmost importance. Improving cooperation and fiscal coordination and increasing transparency in relations between member states in the field of tax policy enables them to avoid losses and, at the same time, contributes to ensuring a high level of fairness.

In addition to the progress made, the EU has proposed to relaunch the initiative on a common corporate tax base and to finalize the list of tax havens. In this context, **the European Union has drawn up a list of non-cooperative**

jurisdictions for tax purposes (Table 2), consisting of states that have not fulfilled their commitments to comply with the criteria of good tax governance within a given period or that have refused to do so.

Table no.2: Non-cooperative jurisdictions for tax purposes

States that do not cooperate with the EU or have not fulfilled their commitments.	
American Samoa, Anguilla, Fiji, Guam, Palau, Panama, Russia, Samoa, Trinidad and Tobago, US Virgin Islands, Vanuatu	
States that do not yet comply with all international tax standards but have committed to implementing reforms.	
States that cooperate with the EU and have ongoing commitments	States that cooperate with the EU and have no ongoing commitments
Antigua and Barbuda, Belize, British Virgin Islands, Brunei, Eswatini, Seychelles, Turkey, Vietnam	Albania, Andorra, Argentina, Armenia, Aruba, Australia, Bahamas, Bahrain, Barbados, Bermuda, Botswana, Bosnia and Herzegovina, Brazil, Cabo Verde, Canada, Cayman Islands, Chile, China, Colombia, Cook Islands, Costa Rica, Curaçao, Dominica, Faroe Islands, Georgia, Greenland, Grenada, Guernsey, Hong Kong, Iceland, India, Indonesia, Isle of Man.

Source: European Council, 17 February 2025,

<https://www.consilium.europa.eu/ro/policies/eu-list-of-non-cooperative-jurisdictions/>

Tax fraud and tax evasion can take different forms, each with distinct characteristics and implications, the most harmful being:¹

- **Tax avoidance.** Involves the use of legal instruments and strategies to minimize tax liabilities. Common practices include shifting profits to countries with low tax rates or deducting interest payments on loans with artificially inflated interest rates. Although formally legal, these tactics exploit loopholes and inconsistencies in legislation to reduce the amount of tax paid.

- **Aggressive tax planning.** This occurs when large enterprises and wealthy individuals push the limits of the law to minimize the amount of tax they pay. While such actions may be technically legal, they are ethically questionable and contribute to an overall loss of tax revenues.

Tax fraud has several major consequences:²

- **Economic consequences.** It reduces public revenues needed to finance essential public services.

- **Inequity.** It creates an unfair and disadvantageous burden for honest taxpayers.

- **Erosion of trust in public institutions.** It undermines public trust in the rule of law and in public institutions.

¹ <https://www.consilium.europa.eu/ro/policies/combating-tax-avoidance-in-the-eu/>

² <https://www.consilium.europa.eu/ro/policies/combating-tax-avoidance-in-the-eu/>

- **Criminal activity.** It finances criminal or illegal activities, endangering citizens and even states themselves.
- **Global implications.** It distorts competition, grants unfair advantages, and contributes to the growth of cross-border crime.

Furthermore, the **blacklist of tax havens** (Table 3) drawn up by the European authorities includes approximately 50 states or territories of states from:

Table no.3: The blacklist of tax havens

Africa	Liberia, Mauritius, Seychelles
Asia	Bahrain, Hong-Kong, Macao, Maldives, Singapore
America de Nord și de Sud	Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Costa Rica, Dominican Republic, Delaware, British Virgin Islands, Cayman Islands, Grenada, Montserrat, Netherlands Antilles, Panama, Saint Vincent and the Grenadines, Saint Kitts and Nevis, Saint Lucia, Turks and Caicos Islands, United States Virgin Islands
Europa	Andorra, Cyprus, Gibraltar, Guernsey, Jersey, Liechtenstein, Isle of Man, Madeira, Malta, Monaco, San Marino
Oceania	Cook, Nauru, Niue, Marshall, Samoa, Vanuatu

Source: European Council, 17 February 2025,

<https://www.consilium.europa.eu/ro/policies/eu-list-of-non-cooperative-jurisdictions/>

The EU's efforts to **combat aggressive tax planning**, to draw up lists of non-cooperative jurisdictions and to intensify the exchange of tax information are essential steps towards strengthening tax fairness and integrity; however, their effectiveness depends on global cooperation and the uniform implementation of standards.

Conclusions

Tax fraud and tax evasion undermine the functioning of the member states, distort decision-making processes at the level of the economy, erode trust between citizens and governments, and limit the capacity of member states to raise the resources needed to implement economic and social policies and to support public services. Tax fraud and tax evasion also have negative structural effects on European economies, generating inequalities, market distortions, and a reduction in public resources.

Regarding tax havens, these represent both a legal instrument for tax optimization and a risk factor for the proliferation of tax fraud and tax evasion, affecting the capacity of EU member states to collect essential budgetary resources. Offshore companies, although legitimate in principle, can generate significant tax losses for the states of residence, especially when they are used for profit shifting or for concealing the identity of beneficial owners. The

process of capital and labor migrating to low-tax countries (tax havens) makes it necessary to adopt new taxation mechanisms at EU level.

Therefore, at EU level, we consider that it is necessary to initiate concrete actions regarding:

➤ **Harmonizing legislation** on tax fraud and tax evasion at EU level. Member states should adopt a common framework regarding the definitions, sanctions and procedures for combating tax evasion and tax fraud, to eliminate legislative differences that allow loopholes between jurisdictions to be exploited.

➤ **Strict regulation** of offshore companies and financial intermediaries. Introducing additional transparency requirements for consultancy firms, lawyers and financial institutions that facilitate the establishment of offshore companies would limit their use for illicit purposes.

➤ **Strengthening the administrative capacity** of tax authorities. Investment in digitalization, data analytics, artificial intelligence, and the training of tax inspectors would increase the effectiveness of audits and allow the rapid detection of suspicious transactions.

➤ **Enhanced international cooperation** with offshore jurisdictions. The EU should continue to exert diplomatic pressure on non-cooperative states, making access to European markets conditional on compliance with tax transparency standards.

➤ **Ongoing monitoring** of cross-border financial flows. Creating a European monitoring system for tax risks, analyzing trends in capital relocation, and issuing early warnings would support the design of proactive policies.

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