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CHALLENGE 2026”
(ICSNS XXXXVIII-2026)

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Barjam Gjishti

Protecting Privacy in the Digital Era, State Surveillance, Technological Transformation, and the Principle of Legal Certainty

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Abstract

The rapid development of digital technologies has transformed the ways individuals communicate, work, and participate in society. While technological innovation has generated significant economic and social benefits, it has also expanded the capacity of governments and private entities to collect, analyze, and store personal data. This development has intensified concerns regarding privacy rights, state surveillance, and the preservation of legal certainty in democratic societies. The principle of legal certainty requires laws governing surveillance and data collection to be clear, predictable, and accessible to citizens. This paper examines the relationship between privacy protection, state surveillance, and technological transformation through the lens of legal certainty. It argues that modern legal systems must establish transparent safeguards, proportional surveillance measures, and effective oversight mechanisms to ensure that technological advancements do not undermine fundamental rights.

Keywords: Protecting Privacy, Digital Era, State Surveillance, Technological Transformation, the Principle of Legal Certainty.

Introduction

The digital era has fundamentally reshaped the relationship between individuals, governments, and technology. The widespread use of smartphones, social media platforms, artificial intelligence (AI), cloud computing, and big data analytics has created unprecedented opportunities for communication, innovation, and economic growth. Digital technologies have facilitated instant access to information, transformed business operations, improved public services, and enabled global connectivity on a scale never before experienced. These technological advancements have become deeply integrated into everyday life, influencing how people work, learn, interact, and participate in society (Castells, 2010). However, these innovations have also enabled extensive data collection and monitoring capabilities that challenge traditional understandings of privacy and personal autonomy (Zuboff, 2019). The collection and processing of personal data have become central components of the digital economy. Governments and private corporations routinely gather vast amounts of information about individuals through online activities, mobile applications, social media interactions, geolocation services, and biometric identification systems. Advanced algorithms and AI-driven analytics can process this information to identify behavioral patterns, predict future actions, and influence decision-making processes. While these technologies offer substantial benefits, they also raise significant concerns regarding data protection, individual autonomy, and the potential misuse of personal information (Solove, 2021). Privacy is recognized as a fundamental human right and serves as a cornerstone of democratic societies. It protects individual dignity, personal autonomy, freedom of expression, and freedom of association. International

legal instruments, including the Universal Declaration of Human Rights and the International Covenant on Civil and Political Rights, recognize the right to protection against arbitrary interference with privacy, family life, correspondence, and reputation (United Nations, 1948; United Nations, 1966). The protection of privacy is not merely an individual concern but also a societal necessity because democratic participation depends upon citizens' ability to communicate and express opinions without fear of constant monitoring or surveillance (Westin, 1967). In recent decades, governments have increasingly relied on digital surveillance technologies to address national security threats, terrorism, cybercrime, organized crime, and public safety concerns. The expansion of surveillance powers accelerated significantly following the terrorist attacks of September 11, 2001, leading many states to adopt legislation granting broader authority to intelligence and law enforcement agencies (Lyon, 2018). Modern surveillance tools, including facial recognition systems, biometric databases, predictive policing algorithms, internet monitoring technologies, and mass metadata collection programs, have significantly enhanced governmental capabilities to monitor populations. Although these technologies may contribute to public security objectives, they also create risks of excessive governmental intrusion, discrimination, and violations of fundamental rights (Lyon, 2018). Technological transformation has also altered the nature of surveillance itself. Traditional surveillance methods typically targeted specific individuals based on reasonable suspicion. In contrast, digital surveillance frequently involves the large-scale collection and analysis of data relating to entire populations. This shift has generated concerns regarding proportionality, necessity, and accountability. Scholars argue that the emergence of "surveillance capitalism" has further blurred the distinction between state and corporate surveillance, as governments increasingly rely on data collected by private technology companies to support law enforcement and intelligence operations (Zuboff, 2019). Consequently, individuals often have limited knowledge of how their personal information is collected, shared, stored, and utilized. These developments highlight the growing importance of the principle of legal certainty in contemporary legal systems. Legal certainty, a fundamental element of the rule of law, requires laws to be clear, accessible, predictable, and consistently applied. Citizens must be able to understand the legal framework governing surveillance activities and foresee the circumstances under which governmental authorities may interfere with their privacy rights (Fuller, 1969). Without clear legal standards, surveillance powers may become overly broad or arbitrary, undermining public trust and threatening democratic governance. The challenge facing modern societies is to strike an appropriate balance between technological innovation, national security, and the protection of fundamental rights. While governments have legitimate interests in maintaining public safety and combating emerging threats, these objectives must be pursued within legal frameworks that respect human dignity and individual freedoms. The rapid pace of technological change often outpaces legislative and regulatory developments, creating legal gaps and uncertainty regarding the permissible scope of surveillance activities (Floridi, 2014). As a result, policymakers, courts, and international organizations are increasingly called upon to develop legal frameworks capable of addressing emerging technological challenges while preserving constitutional and human rights

protections. This paper explores how technological transformation has expanded state surveillance capacities and analyzes the importance of legal certainty in protecting privacy rights. It examines the evolution of digital surveillance technologies, the legal and ethical challenges they present, and the role of legal certainty in safeguarding fundamental freedoms. Furthermore, the paper evaluates existing regulatory frameworks and proposes legal and policy measures designed to balance security objectives with individual rights in an increasingly interconnected digital world.

Privacy in the Digital Era

Privacy traditionally refers to an individual's ability to control personal information and maintain autonomy over private life. Historically, privacy was associated with physical spaces, personal correspondence, and protection from unwarranted governmental intrusion. However, the emergence of digital technologies has transformed both the meaning and scope of privacy. In contemporary society, personal data has become a valuable economic, political, and social resource collected by governments and corporations through online activities, mobile applications, biometric systems, smart devices, and digital communication networks. As a result, privacy is no longer limited to protecting physical spaces but increasingly concerns the collection, storage, processing, and dissemination of personal information in digital environments (Solove, 2021). Technological advancements have significantly increased the volume, speed, and variety of data available for collection. Every interaction with digital technologies generates data traces that can be aggregated and analyzed to construct detailed profiles of individuals. Information such as location data, browsing histories, online purchases, social interactions, health records, financial transactions, and biometric identifiers can reveal intimate details about an individual's behavior, beliefs, preferences, and daily activities (Solove, 2021). Unlike traditional forms of surveillance, which often required direct observation and substantial resources, digital monitoring frequently occurs continuously, automatically, and invisibly. Consequently, many individuals remain unaware of the extent to which their personal information is collected, shared, and utilized by both public and private actors. The increasing digitization of everyday life has contributed to what scholars describe as the "datafication" of society. Datafication refers to the transformation of human activities into quantifiable digital information that can be tracked, measured, and analyzed (Mayer-Schönberger & Cukier, 2013). Through this process, ordinary activities such as walking through a city, browsing the internet, communicating with friends, or making purchases become sources of valuable data. Governments and corporations can utilize these data sets to identify patterns, predict behavior, and influence decision-making processes. While data analytics can enhance efficiency and innovation, it also creates significant risks related to privacy, autonomy, and individual freedom. The emergence of artificial intelligence (AI) has further complicated privacy protection. AI systems are capable of processing vast amounts of information and generating predictive analyses regarding individuals' future behavior, preferences, and potential risks. Machine learning algorithms can identify correlations and patterns that would be impossible for humans to detect manually. These capabilities have enabled

advancements in healthcare, transportation, education, and public administration. However, they have also generated concerns regarding discrimination, algorithmic bias, profiling, and excessive governmental control (Floridi, 2014). For example, predictive policing systems may disproportionately target certain communities based on historical data, thereby reinforcing existing social inequalities and potentially violating principles of fairness and equality before the law. From a legal perspective, the use of AI and automated decision-making raises fundamental questions regarding transparency, accountability, and due process. Many AI systems operate as "black boxes," meaning that the logic behind their decisions is difficult to understand or explain. This lack of transparency creates challenges for individuals seeking to challenge decisions that affect their rights and freedoms. Moreover, when governments rely on algorithmic systems for surveillance or law enforcement purposes, citizens may face significant barriers in determining whether such systems comply with legal standards and constitutional protections (Floridi, 2014). Another important challenge to privacy in the digital era is the growing convergence between state surveillance and corporate data collection. Technology companies collect extensive amounts of personal information for advertising, personalization, and commercial purposes. This phenomenon has been described by Zuboff (2019) as "surveillance capitalism," a system in which personal experiences are transformed into behavioral data for economic gain. The accumulation of large-scale data sets by private corporations has created opportunities for collaboration between governments and technology companies, particularly in areas such as law enforcement, intelligence gathering, and public security. Consequently, the distinction between public and private surveillance has become increasingly blurred. This convergence raises concerns regarding consent and individual autonomy. Although many digital services formally require user consent before collecting data, such consent is often obtained through lengthy and complex privacy policies that users rarely read or fully understand. Scholars argue that this practice undermines meaningful consent because individuals frequently lack genuine choice regarding the collection and processing of their personal information (Nissenbaum, 2010). In practice, participation in modern social and economic life often requires accepting extensive forms of data collection, thereby limiting individuals' ability to exercise effective control over their personal information. The concept of informational self-determination has emerged as an important framework for addressing these challenges. Originating from the jurisprudence of the German Federal Constitutional Court, informational self-determination refers to an individual's right to determine how personal information is collected, used, and disclosed (Rouvroy & Poullet, 2009). This principle recognizes that privacy is essential not only for protecting personal information but also for preserving individual autonomy, human dignity, and democratic participation. Without meaningful control over personal data, individuals may alter their behavior due to fear of observation, creating what legal scholars refer to as a "chilling effect" on freedom of expression and association. Furthermore, privacy protection has become increasingly important in safeguarding democratic governance. Democratic societies depend upon citizens' ability to communicate, organize, and express dissenting opinions without fear of constant monitoring. Excessive surveillance can discourage political participation,

inhibit free expression, and undermine trust in public institutions (Lyon, 2018). Therefore, privacy should be understood not merely as an individual right but also as a collective value that supports democratic accountability and social pluralism. Consequently, privacy in the digital era extends far beyond traditional notions of secrecy and confidentiality. It encompasses informational self-determination, data protection, algorithmic accountability, and the ability of individuals to exercise meaningful control over personal information. As technological transformation continues to accelerate, legal systems must adapt to ensure that privacy protections remain effective in addressing emerging challenges posed by artificial intelligence, big data analytics, and increasingly sophisticated surveillance technologies. The protection of privacy is therefore not only a matter of individual rights but also a prerequisite for preserving democratic governance, human dignity, and the rule of law in the twenty-first century.

State Surveillance and Technological Transformation

State surveillance has evolved significantly as a result of technological transformation. Historically, surveillance activities were largely limited by technological and logistical constraints. Governments relied primarily on physical observation, informants, wiretapping, and targeted investigations that required substantial human resources, judicial authorization, and considerable time. Surveillance operations were generally directed at specific individuals or groups suspected of criminal or national security-related activities. The scale and scope of governmental monitoring were therefore constrained by practical limitations and legal safeguards designed to prevent arbitrary interference with individual liberties (Lyon, 2018). The digital revolution has fundamentally altered this reality. Advances in information and communication technologies have enabled governments to collect, store, process, and analyze unprecedented quantities of personal information. Modern surveillance systems can gather data from multiple sources simultaneously, including telecommunications networks, internet service providers, social media platforms, financial transactions, geolocation services, and public surveillance cameras. As a result, surveillance has shifted from targeted monitoring toward large-scale data collection practices capable of encompassing entire populations (Bennett & Lyon, 2008). This transformation has generated significant legal and ethical concerns regarding the balance between national security objectives and the protection of fundamental rights. The expansion of surveillance capabilities became particularly evident following the global counterterrorism initiatives introduced after the terrorist attacks of September 11, 2001. Governments around the world enacted legislation that significantly expanded the authority of intelligence and law enforcement agencies to collect electronic communications, metadata, and internet traffic information. In the United States, the Usa Patriot Act granted broad investigative powers aimed at detecting and preventing terrorist activities. Similar measures were adopted in numerous jurisdictions, often justified by the need to address emerging security threats in an increasingly interconnected world (Lyon, 2018). The disclosures made by former intelligence contractor Edward Snowden in 2013 revealed the extensive scope of contemporary

surveillance programs conducted by intelligence agencies. These revelations demonstrated that technological advances had enabled the systematic collection of telephone metadata, internet communications, and other forms of digital information involving millions of individuals, many of whom were not suspected of any criminal activity (Greenwald, 2014). The disclosures sparked international debates concerning privacy rights, governmental transparency, and the legality of mass surveillance practices. They also highlighted the growing tension between security imperatives and constitutional protections in democratic societies. One of the most significant characteristics of modern surveillance is its increasing reliance on automated technologies. Governments now employ a variety of sophisticated tools, including facial recognition systems, biometric databases, automated license plate recognition technologies, predictive policing algorithms, drone surveillance systems, and internet traffic monitoring platforms. These technologies enable authorities to identify, track, and analyze individuals in real time with a degree of accuracy and efficiency that was previously impossible. Facial recognition technology, for example, can compare images captured by surveillance cameras against extensive databases containing millions of biometric records within seconds (Ferguson, 2017). While such technologies may improve law enforcement efficiency and public security, they also create substantial risks for civil liberties and democratic governance. One concern is the possibility of "mission creep," whereby surveillance tools initially developed for specific purposes gradually expand into broader applications beyond their original mandate. Technologies introduced to combat terrorism, for instance, may later be used for routine law enforcement, immigration control, or monitoring public demonstrations. This gradual expansion of surveillance practices can occur without adequate public debate or legislative oversight, thereby undermining the principle of legal certainty and increasing the risk of arbitrary governmental interference (Lyon, 2018). The growing use of predictive policing technologies illustrates another challenge associated with technological surveillance. Predictive policing systems utilize historical crime data and machine learning algorithms to forecast locations or individuals considered at greater risk of criminal activity. Supporters argue that these systems improve resource allocation and crime prevention efforts. However, critics contend that predictive algorithms often reproduce and reinforce existing social biases embedded within historical data. As a result, marginalized communities may be disproportionately targeted, raising concerns regarding discrimination, equality before the law, and procedural fairness (Ferguson, 2017). Biometric surveillance presents additional challenges. The increasing deployment of facial recognition technologies in public spaces has generated significant concerns regarding anonymity and freedom of movement. Unlike traditional identification methods, biometric identifiers such as facial features, fingerprints, iris scans, and voice patterns are permanent characteristics that cannot easily be changed if compromised. Consequently, unauthorized access to biometric databases may expose individuals to long-term privacy risks and identity-related harms (Garvie et al., 2016). Furthermore, the continuous monitoring of public spaces through facial recognition systems may create a chilling effect, discouraging individuals from participating in political protests, public demonstrations, or other forms of democratic engagement. Technological

transformation has also blurred the distinction between public and private actors in surveillance activities. Governments increasingly rely on information collected by private technology companies, telecommunications providers, financial institutions, and social media platforms. Many private corporations possess extensive datasets containing detailed information regarding individuals' behaviors, preferences, communications, and movements. Through legal requests, data-sharing agreements, and intelligence partnerships, governmental authorities may gain access to these datasets without directly collecting the information themselves (Richards, 2013). This convergence between public and private surveillance has created complex legal questions concerning accountability, transparency, and data governance. Traditional legal frameworks often distinguish between state action and private activity, providing stronger constitutional protections against governmental intrusion than against corporate data collection. However, when governments rely on privately collected data for surveillance purposes, these distinctions become increasingly difficult to maintain. Consequently, individuals may face significant challenges in determining which legal protections apply and which entities are responsible for safeguarding their rights (Richards, 2013). The extensive collection of personal information by digital platforms has produced what Zuboff (2019) describes as "surveillance capitalism," a system in which personal data becomes a source of economic and political power. Under this model, corporations collect vast quantities of behavioral data to predict and influence consumer actions. The resulting concentration of informational power creates opportunities for both commercial exploitation and governmental access. As governments seek to leverage privately collected data for security and intelligence purposes, concerns regarding privacy, autonomy, and democratic accountability become increasingly pronounced.

Furthermore, technological transformation has facilitated the emergence of transnational surveillance networks. Digital communications routinely cross national borders, enabling intelligence agencies to cooperate in data collection and information sharing. International intelligence alliances often exchange surveillance data and analytical capabilities, raising important questions regarding jurisdiction, legal oversight, and the protection of fundamental rights. The global nature of digital communications means that surveillance activities conducted in one jurisdiction may affect individuals located in another, complicating efforts to establish effective accountability mechanisms (Deibert, 2013). From a rule of law perspective, the expansion of state surveillance raises fundamental concerns regarding necessity, proportionality, and legality. Democratic societies recognize that governments possess legitimate interests in protecting national security and public safety. Nevertheless, surveillance measures must be carefully regulated to prevent abuse and ensure compliance with constitutional and human rights standards. Excessive or indiscriminate surveillance may undermine public trust, restrict freedom of expression, and weaken democratic participation. Therefore, legal frameworks governing surveillance technologies must provide clear limitations, independent oversight, and effective remedies for individuals whose rights have been violated. In this sense, technological transformation has dramatically expanded the capabilities of state surveillance, enabling governments to monitor individuals

on an unprecedented scale. While modern surveillance technologies offer important benefits for law enforcement and national security, they also create significant risks for privacy, autonomy, and democratic governance. The increasing integration of artificial intelligence, biometric systems, predictive analytics, and private-sector data collection into surveillance practices underscores the urgent need for robust legal safeguards. Ensuring that surveillance powers remain transparent, proportionate, and accountable is essential for preserving fundamental rights and maintaining public trust in democratic institutions.

Challenges to Legal Certainty in the Digital Age

The rapid pace of technological innovation presents significant challenges to the principle of legal certainty. Legal certainty, as a fundamental component of the rule of law, requires laws to be clear, accessible, predictable, and consistently applied. Citizens must be able to understand the legal consequences of their actions and anticipate the circumstances under which state authorities may exercise power. However, technological developments frequently occur at a much faster pace than legislative and regulatory processes, creating substantial gaps between innovation and legal governance (Fuller, 1969). As a result, governments and private actors often deploy new technologies before comprehensive legal frameworks are established, generating uncertainty regarding the scope of permissible conduct and the protection of fundamental rights. One of the most significant challenges arises from the dynamic nature of digital technologies themselves. Traditional legal frameworks are generally designed to regulate relatively stable social and economic relationships. In contrast, digital technologies evolve rapidly, often introducing new capabilities and risks that legislators could not have anticipated when existing laws were enacted. Consequently, legal provisions drafted for earlier technological environments may prove inadequate when applied to emerging technologies such as artificial intelligence, machine learning, biometric surveillance, and predictive analytics (Brownsword, 2019). This mismatch between technological innovation and legal adaptation can undermine the predictability and effectiveness of legal rules. Artificial intelligence (AI) presents a particularly difficult challenge to legal certainty. AI systems increasingly influence decisions in areas such as law enforcement, border control, public administration, financial services, healthcare, and employment. These systems frequently rely on machine learning algorithms that analyze large datasets to identify patterns and generate predictions. While AI technologies may improve efficiency and decision-making accuracy, many operate through highly complex computational processes that are difficult to interpret, even for their developers. This phenomenon, commonly referred to as the "black box" problem, creates significant obstacles to transparency and accountability (Floridi, 2014). The opacity of AI systems complicates the application of legal standards and procedural safeguards. In many cases, individuals affected by automated decisions may be unable to understand how those decisions were reached or challenge them effectively. For example, if an algorithm identifies a person as a security risk or predicts a higher likelihood of criminal behavior, the affected individual may have limited opportunities to examine the underlying

reasoning or correct inaccurate information. Such circumstances raise serious concerns regarding due process, equality before the law, and the right to an effective remedy (Citron & Pasquale, 2014). Without transparency and explainability, legal oversight becomes increasingly difficult, thereby undermining legal certainty and public trust in governmental institutions. Algorithmic bias further complicates legal regulation. AI systems are trained using historical datasets that may contain embedded social, racial, gender, or economic biases. Consequently, automated systems can reproduce and even amplify existing inequalities, leading to discriminatory outcomes that may violate constitutional principles and human rights standards (O'Neil, 2016). The challenge for legal systems is not only to regulate the use of AI but also to establish clear standards regarding accountability when algorithmic decisions result in harm. Questions concerning liability, responsibility, and judicial review remain subjects of ongoing legal debate. Cross-border data flows represent another significant challenge to legal certainty in the digital era. The global nature of digital communications means that personal data routinely crosses national boundaries, often passing through multiple jurisdictions during storage and transmission. Cloud computing services, multinational technology companies, and international digital platforms facilitate the movement of information across borders on an unprecedented scale. While these developments contribute to economic growth and technological innovation, they also complicate efforts to regulate data protection and privacy rights effectively (Kuner, 2013). The fragmentation of legal regimes governing data protection creates uncertainty regarding applicable laws, enforcement mechanisms, and individual rights. Different jurisdictions adopt varying approaches to privacy regulation, surveillance authorization, and governmental access to personal data. For example, the European Union's General Data Protection Regulation (GDPR) emphasizes strong protections for personal data and individual rights, whereas other jurisdictions may adopt more flexible or security-oriented approaches to data governance (European Parliament & Council of the European Union, 2016). Consequently, individuals and organizations may face uncertainty regarding which legal standards apply to specific data processing activities and which authorities possess jurisdiction over cross-border disputes. Judicial decisions concerning international data transfers have highlighted these challenges. Cases such as *Schrems I* and *Schrems II* before the Court of Justice of the European Union demonstrated the difficulties associated with reconciling divergent privacy standards across jurisdictions. These decisions emphasized the importance of ensuring adequate protections for personal data transferred outside the European Union while simultaneously exposing the complexities of regulating global data flows in a fragmented legal environment (Lynskey, 2015). Such developments illustrate how technological globalization can strain traditional concepts of territorial jurisdiction and legal predictability. Cybersecurity threats further complicate efforts to maintain legal certainty. Governments increasingly face challenges arising from cybercrime, cyber espionage, ransomware attacks, critical infrastructure vulnerabilities, and foreign interference in digital systems. In response, states frequently expand surveillance powers and adopt emergency measures designed to enhance security and intelligence capabilities. While such actions may be justified in certain circumstances, they often involve broad grants of authority that can affect privacy

rights and civil liberties (DeNardis, 2020). A significant concern is the tendency for temporary emergency powers to become permanent features of legal systems. Measures introduced during periods of crisis may gradually become normalized, even after the original emergency has subsided. This phenomenon can lead to the expansion of governmental surveillance capacities without corresponding increases in oversight or accountability. Scholars have warned that the normalization of exceptional measures risks eroding legal safeguards and weakening democratic checks and balances (Agamben, 2005). Consequently, maintaining legal certainty requires continuous evaluation of emergency legislation to ensure that extraordinary powers remain necessary, proportionate, and subject to democratic control. Another challenge arises from the increasing use of predictive and preventive forms of governance. Contemporary surveillance systems increasingly focus on identifying potential future risks rather than investigating past conduct. Predictive policing, risk assessment algorithms, and behavioral monitoring systems seek to anticipate threats before they materialize. While such approaches may improve efficiency and security, they also shift legal decision-making toward probabilistic assessments rather than evidence-based determinations of individual responsibility (Amoore, 2020). This transformation raises important questions regarding the compatibility of predictive governance with traditional principles of legality, due process, and the presumption of innocence. Furthermore, the privatization of technological infrastructure creates additional uncertainty regarding legal accountability. Governments frequently depend upon private technology companies for data storage, cloud computing services, cybersecurity operations, and digital communication platforms. When surveillance activities involve cooperation between public authorities and private corporations, determining legal responsibility for privacy violations becomes increasingly complex. Citizens may find it difficult to identify which entities are accountable for decisions affecting their rights, thereby weakening transparency and access to remedies (Balkin, 2016). From a broader rule-of-law perspective, legal certainty requires more than merely enacting legislation. Effective legal certainty depends upon transparency, independent oversight, judicial review, and accessible remedies for individuals whose rights have been affected. Regulatory frameworks must be sufficiently flexible to accommodate technological innovation while remaining precise enough to prevent arbitrary governmental action. Achieving this balance represents one of the central challenges facing contemporary democratic societies. Therefore, maintaining legal certainty in the digital age requires continuous review and adaptation of legal frameworks governing surveillance and emerging technologies. Legislatures, courts, regulatory authorities, and international organizations must work collaboratively to ensure that technological innovation remains consistent with fundamental rights and democratic principles. Clear legal standards, algorithmic transparency, cross-border regulatory cooperation, and robust oversight mechanisms are essential for preserving the rule of law in an increasingly complex technological environment. Without such safeguards, rapid technological transformation risks creating legal uncertainty that undermines privacy, accountability, and public trust in democratic governance.

Conclusion

The digital era has transformed the nature of privacy, surveillance, and governance. Technological advancements have created powerful tools for communication and innovation while simultaneously expanding the capacity of states and corporations to monitor individuals. These developments present significant challenges for the protection of fundamental rights.

The principle of legal certainty plays a crucial role in ensuring that surveillance measures remain consistent with democratic values and the rule of law. Clear legal frameworks, transparent procedures, proportional limitations, and effective oversight mechanisms are essential for preventing arbitrary interference with privacy.

As technological transformation continues, policymakers must develop adaptive regulatory frameworks capable of addressing emerging challenges while preserving individual freedoms. Protecting privacy in the digital era requires a careful balance between security objectives, technological progress, and the enduring principles of human rights and legal certainty.

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Bridging the Gap: Institutional Readiness and Governance Challenges for AI-Enabled Cybersecurity in Albanian Higher Education Institutions

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Abstract

The rapid implementation of the artificial intelligence tools on administrative, research and pedagogical activities at Albanian Higher Education Institutions (HEIs) has increased the opportunities and the cybersecurity risk surfaces, frequently ahead of the creation of associated governance structures (UNESCO, 2021; ENISA, 2022). While Albanian higher education institutions have made strides in digitalizing administrative processes and incorporating AI-driven solutions (Albanian Ministry of Education, 2021), most institutions lack institutional governance structures, specialized cybersecurity staff, and clear regulations on the ethical use of AI (ASCAL, 2022; European Parliament, 2022). The research is focused on the institutional readiness of Albanian higher education institutions (HEIs) to apply AI in their cybersecurity approaches, highlighting organizational, human and regulatory challenges, rather than only technical ones (ENISA, 2022). The paper discusses recurring gaps from a case-based analysis of a technical laboratory of a private Albanian university, which runs its own network and AI infrastructure: unclear ownership of data governance for artificial intelligence systems handling sensitive institutional and research data; inadequate cybersecurity training programs of administrative and academic staff; and the lack of formal risk assessment procedures in line with national or EU-adjacent regulatory expectations. This paper argues that when considering Albanian higher education successful AI-enabled cybersecurity is less about the sophistication of imported technical solutions and more about building institutional maturity, clear ownership of digital resources, cross-departmental coordination and sustained investment in staff capacity (ENISA, 2022; ASCAL, 2022). Recommendations on phased governance models applicable to resource-constrained Albanian HEIs, staff training paths, and lightweight risk-assessment tools (ENISA, 2022; World Economic Forum, 2020) suitable to the current stage of the digital transformation of Albania in higher education (Albanian Ministry of Education, 2021).

Keywords: AI governance, cybersecurity policy, higher education institutions, Albania, digital risk management, institutional readiness.

Introduction

In the last few years, the education landscape of Albanian institutions has significantly changed due to the fast introduction of artificial intelligence (AI) technology (European Commission, 2021; UNESCO, 2021). Artificial intelligence is being employed more and more by higher education institutions (HEIs) and this has led to new ways of managing, researching, teaching and learning (UNESCO, 2021; OECD, 2019). Unfortunately, with the digital transition, various complicated cyber security risks are becoming increasingly obvious. The vulnerabilities threaten the credibility of the

schools and the pupils attending the schools (ENISA, 2020; World Economic Forum, 2020).

Albanian institutions are prompt to embrace state-of-the-art artificial intelligence (AI) technology to remain in sync with the times, but they cannot implement the necessary governance frameworks to manage digital risks in an appropriate way (ASCAL, 2022; European Parliament, 2022). People, processes, and technology are equally critical prerequisites for achieving digital maturity (ASCAL, 2022). This study aims to identify the challenges Albanian higher education institutions (HEIs) face in trying to implement artificial intelligence (AI) from an organisational, human, regulatory and technological perspective and to discuss the institutions' strategies for overcoming these challenges. The case study and its broader implications illustrate the central argument of this paper: that meeting these challenges requires a comprehensive strategy encompassing skills development, ethical leadership, and sustained technical progress (Floridi & Cowls, 2019; Taddeo & Floridi, 2018).

Digitalization and AI Uptake in Albanian HEIs.

One of the ways in which the digitalization is reshaping the academic landscape is the use of new technology by Albanian institutions to enhance the registration and grading procedures (ASCAL, 2022; Albanian Ministry of Education, 2021). Therefore, AI-powered technologies are being used to automate registration, to tailor academic services, and to keep student records (OECD, 2019; European Parliament, 2022). The increasing deployment of machine-learning-based technologies for plagiarism detection and automated marking systems has helped in boosting academic integrity and the fairness of assessment (UNESCO, 2021; OECD, 2019). Artificial intelligence systems allow scientists and teachers to quickly and easily understand big datasets (OECD, 2019). Apart from smart access management (ENISA, 2022), other AI-based campus security systems are video surveillance with facial recognition capabilities and other equivalent characteristics.

However, there is still a visible gap: new technologies are adopted very quickly but sometimes there is a lack of sufficient cybersecurity frameworks, ethical standards and even basic staff training (ENISA, 2022; ASCAL, 2022). Few HEIs employ staff with cybersecurity specialities and fewer still have policies on the ethical use of AI. There are therefore several weak areas such as the potential of unauthorised access to private pupils and research information, inadvertent invasions of privacy and non-compliance with legislation (ENISA, 2022; European Data Protection Supervisor, 2020).

Case Analyses:

Technical Laboratory at Luarasi University

These concerns can be illustrated through the case of a technical laboratory at Luarasi University, a private institution in Albania. The lab's pioneering work in incorporating AI into research and overall institutional functions illustrates institutional challenges that resonate across both public and private Albanian HEIs, even though funding

structures and resource constraints differ by sector.

One of the biggest issues in terms of data governance is the ambiguity of who is responsible for what regarding the sensitive data processed by the artificial intelligence systems (ENISA, 2022). In cases where a large number of departments feed data into centralised artificial intelligence (AI) platforms several issues around data ownership, accountability and access limits remain unaddressed. Incorrect handling, such as inadvertent disclosure of personal information or unauthorised use of research data, can lead to a loss of trust between internal and external stakeholders (ENISA, 2022; European Data Protection Supervisor, 2020). That can be the case if the problem is handled improperly.

Inadequate Training: The fast deployment of AI tools has often overtaken the attempts to train people on the requisite cybersecurity understanding (ASCAL, 2022). New digital systems tend to be too sophisticated for academic and administrative personnel, who often feel overwhelmed by them. Even the best-intentioned staff can be the weakest link in the institution's security chain without regular, focused training on cybersecurity best practices or the ethical consequences of using AI (ENISA, 2022; Brynjolfsson & McAfee, 2017).

Lack of Formalised Risk Assessment: The laboratory is technologically sophisticated but there is little evidence of systematic, continuing risk evaluations (ENISA, 2020; AKSHI, 2022). Vulnerabilities can remain hidden over long periods of time, exposing the organization to changing cyber risks. Moreover, the lab finds it difficult to comply with the national and EU-adjacent regulations, in part due to the lack of resources, but also due to the lack of standardized risk assessment methods (European Commission, 2021; World Economic Forum, 2020).

Organizational, Human, and Regulatory Challenges

Albanian HEIs are confronted with a complex set of interrelated challenges in the integration of cybersecurity and artificial intelligence.

Organizational Considerations: Within digital governance, many universities' departments operate in silos, with information technology, academics and administration independently engaging in initiatives that are often uncoordinated or overlapping (ASCAL, 2022). Blurred lines of accountability are the direct result of the organizational instability which prevents a rapid response to developing security concerns. Digital transformation efforts require specific governing organizations and interdepartmental collaboration (ENISA, 2022).

Human Capital: For this reason, human capital is the most crucial asset of the institution. Many school districts are challenging to fill cybersecurity roles with sufficient acceptable applicants (ENISA, 2022). The jobs are over worked and under paid. There are limited professional development opportunities, and most employees don't even know the basics of cybersecurity challenges of traditional artificial intelligence systems (ASCAL, 2022; Brynjolfsson & McAfee, 2017). Creating an

environment that encourages continuous learning is the greatest method to educate our workers to meet the difficulties of a digital campus (ASCAL, 2022; UNESCO, 2021).

Legislation Gaps: The Albanian government is trying to align its higher education system to the legislation issued by the EU as the General Data Protection Regulation and the upcoming recommendations on AI regulation (European Commission, 2021). But systemic change has been slow. Higher education institutions in Albania are facing major difficulties in achieving these targets due to the lack of resources available to them (ENISA, 2022). The continual misinterpretation of cybersecurity compliance (European Commission, 2021; European Parliament, 2022) inadvertently placing them in a situation that could be subject to legal action or denying them chances for international collaboration. Educational institutions can find themselves open to legal action.

Recommendations for Institutional Maturity

Leadership development, skill upgrading and risk mitigation need to be planned and managed in a manner that suits the future (ENISA, 2022; ASCAL, 2022).

In an effort to tackle the mentioned issues, we propose the following solutions:

Other types of government:

A tiered governance strategy should be adopted, where institutions develop rules on data ownership and cyber security criteria (ENISA, 2022). Systematic strategies do exist to better adapt to particular instances and organisational limits (European Commission, 2021; OECD, 2019).

Training and Capacity Building of Staff:

Skills and training Training and education of employees should not be a one and done deal, but a continuous process that lasts throughout a person's working life. The ASCAL (2022) states that schools should provide curricula that concentrate on cybersecurity, allowing students to learn about data protection, AI ethics, and general system administration. Global organisations and specialists in the field can help to improve the training program. Moreover, it can also provide the participants with state-of-the-art best practices (ENISA, 2022; UNESCO, 2021). Albanian universities and colleges are facing difficulties in reaching these goals due to the shortage of finance, which is extremely low (ENISA, 2022). The continuing ignorance of cybersecurity compliance may lead to organizations being unaware of legal action or international collaboration opportunities (European Commission, 2021; European Parliament, 2022). Schools could be sued for it.

In view of the above-mentioned problems the following options are suggested:

Establishing a culture of collaboration:

It is important to break down barriers and ensure there is collaboration across departments (ASCAL, 2022). It can enhance the durability of the organization, the

speed of decision-making and the flow of information (ENISA, 2022). All these could be due to the establishment of interdisciplinary teams with the aim of managing digital transformation and cyber security (ASCAL, 2022; ENISA, 2022; Taddeo & Floridi, 2018).

Conclusion

AI-based cybersecurity in Albanian higher education extends far beyond technology alone. This requires ongoing investment in governance, human capital and legislation. Filling the gap between the need for rapid deployment of AI and the need for rigorous cyber security stewardship can be achieved by Albanian institutions through a focus on clear digital custody, interdepartmental coordination, and empowering workers with ongoing learning (Floridi & Cows, 2019; ENISA, 2022).

What will ultimately test the institutional readiness in the face of the escalating digital revolution is the nurturing of a developing, adaptable and ethically grounded academic ecosystem (Brynjolfsson & McAfee, 2017; Cummings, 2021) and not the sophistication of imported technologies. The future of higher education in Albania depends on the ability to capitalize on the potential of AI, as well as to safeguard the integrity and security of its digital resources (Taddeo & Floridi, 2018; UNESCO, 2021).

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The principle of voting parity in European Union law: Implications for Albania's EU accession process

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Abstract

The principle of voting parity is a fundamental element of the democratic right to vote, requiring that each vote carry substantially equal weight in determining electoral outcomes. Although the European Union does not prescribe a uniform electoral system for national elections, the principle of equal voting power derives from the common constitutional traditions of the Member States, the values enshrined in Article 2 of the Treaty on European Union, Article 39 of the Charter of Fundamental Rights of the European Union, and Article 3 of Protocol No. 1 to the European Convention on Human Rights. Moreover, the case law of the European Court of Human Rights, the standards of the Venice Commission, and the recommendations of the Organization for Security and Co-operation in Europe recognize voting equality as a core component of electoral integrity and democratic legitimacy.

This paper examines the legal content of the principle of voting parity within the European democratic *acquis* and evaluates its relevance for Albania's European Union accession process. Using a doctrinal legal methodology supported by comparative analysis, the study examines EU primary law, the Charter of Fundamental Rights, relevant European Court of Human Rights jurisprudence, Venice Commission standards, European Commission reports, and selected practices of EU Member States. It also assesses the Albanian constitutional and electoral framework governing constituency delimitation, seat allocation, and the relationship between votes cast and parliamentary representation.

The study argues that voting parity extends beyond universal suffrage by requiring electoral systems to ensure that the value of each vote remains as equal as reasonably practicable. Significant disparities in constituency representation or other distortions of voting power may undermine democratic legitimacy and compliance with European electoral standards. The paper concludes that strengthening voting parity should form an integral part of Albania's electoral reform agenda and approximation with the European Union *acquis*. It proposes legal and institutional reforms aimed at improving constituency review mechanisms, increasing transparency in seat allocation, and reinforcing constitutional safeguards for electoral equality, thereby strengthening democratic legitimacy and supporting Albania's EU accession process.

Keywords: voting parity; electoral equality; European Union law; democratic legitimacy; electoral integrity; electoral reform; Albania; EU accession.

1. Introduction

The right to vote is universally recognized as one of the essential pillars of constitutional democracy. Nevertheless, democratic elections require more than the formal guarantee of universal suffrage. The legitimacy of representative institutions also depends upon the extent to which every citizen's vote possesses substantially equal weight in determining electoral outcomes. This requirement, commonly referred to as the principle of voting parity or equal voting power, has gradually evolved into a fundamental principle of European electoral law. Although absolute mathematical equality cannot be achieved under every electoral system, democratic legitimacy

requires that differences in the weight of individual votes remain objectively justified and proportionate (Venice Commission, 2022; Norris et al., 2024).

The concept of voting parity reflects the broader constitutional principle of political equality. Democratic government is founded upon the premise that citizens participate in public affairs on equal terms and that electoral institutions should not systematically privilege or disadvantage particular groups of voters. As Lijphart (2012) observes, electoral systems constitute the principal mechanism through which political equality is translated into representative institutions. Consequently, equality in voting extends beyond guaranteeing access to the ballot and encompasses the broader constitutional obligation to ensure that electoral rules do not distort the equal influence of citizens over democratic decision-making.

Within Europe, voting parity has developed through multiple complementary legal instruments rather than through a single codified rule. The constitutional foundations of the principle are found in Article 2 of the Treaty on European Union (TEU), which identifies democracy, equality, and the rule of law as the values upon which the Union is founded (European Union, 2024). These values are reinforced by Article 10 TEU, which establishes representative democracy as the basis of the Union's functioning, while Article 14(3) TEU requires that Members of the European Parliament be elected by direct universal suffrage in free and secret elections. Furthermore, Article 39 of the Charter of Fundamental Rights of the European Union guarantees the right of every Union citizen to vote and stand as a candidate in elections to the European Parliament under equal conditions (European Union, 2024).

The principle is equally embedded within the broader European constitutional framework established by the Council of Europe. Article 3 of Protocol No. 1 to the European Convention on Human Rights obliges States to hold free elections under conditions that ensure the free expression of the opinion of the people in choosing the legislature. Although the Convention does not prescribe a particular electoral system, the European Court of Human Rights (ECtHR) has consistently interpreted this provision as protecting the effectiveness of electoral rights while allowing States only a limited margin of appreciation in designing electoral systems (Yumak & Sadak v. Turkey, 2008). Similarly, the Venice Commission identifies equal suffrage as one of the five fundamental principles of Europe's electoral heritage and specifies that seats should be distributed among constituencies in a manner ensuring that votes possess, as far as possible, equal weight. Deviations from equality should remain exceptional, objectively justified, and generally should not exceed approximately ten percent, with fifteen percent permissible only under exceptional circumstances (Venice Commission, 2022).

Beyond its constitutional significance, voting parity has become increasingly relevant within the European Union's enlargement policy. Respect for democracy, the rule of law, and effective democratic institutions constitutes an essential component of the Copenhagen political criteria governing accession to the European Union (European Council, 1993). Consequently, electoral equality is no longer viewed exclusively as a matter of domestic constitutional law but increasingly forms part of the broader assessment of democratic governance undertaken during accession negotiations. Through its annual enlargement reports, the European Commission regularly

evaluates the functioning of electoral legislation, electoral administration, political pluralism, and democratic institutions in candidate countries, including Albania (European Commission, 2024).

The Albanian case presents a particularly significant context in which to examine the principle of voting parity. Since the democratic transition of the early 1990s, Albania has undertaken successive reforms of its electoral legislation with the objective of strengthening democratic institutions and approximating domestic law with European standards. These reforms have substantially improved the legal framework governing elections; however, successive reports of the European Commission and election observation missions conducted by the Organization for Security and Co-operation in Europe (OSCE/ODIHR) continue to identify challenges relating to electoral administration, constituency representation, electoral integrity, and public confidence in democratic institutions (European Commission, 2024; OSCE/ODIHR, 2025). Questions therefore remain regarding whether the current electoral framework fully satisfies contemporary European standards concerning equality of voting power. Although electoral equality has received considerable attention within comparative constitutional law and political science, relatively limited scholarship has examined voting parity as an autonomous legal principle emerging from the interaction between European Union law, the European Convention on Human Rights, and the broader European electoral acquis. Existing literature frequently analyses proportional representation, electoral systems, or electoral integrity independently, while comparatively little research considers how these legal standards collectively establish substantive requirements regarding equal voting power. Furthermore, within Albanian legal scholarship, the principle has generally been examined indirectly through broader discussions of electoral reform rather than as an independent constitutional obligation linked to the country's European Union accession process. This article seeks to address that gap by analyzing the legal foundations of voting parity within European law and assessing its implications for Albania as a candidate country for European Union membership. It addresses three principal research questions: first, how does European law define and protect the principle of voting parity; second, what legal standards govern equality of voting power within contemporary European electoral law; and third, to what extent does Albania's constitutional and electoral framework comply with these standards in light of its accession obligations?

The article adopts a doctrinal legal methodology complemented by comparative legal analysis. It examines the Treaties of the European Union, the Charter of Fundamental Rights of the European Union, the European Convention on Human Rights, relevant jurisprudence of the European Court of Human Rights, standards adopted by the Venice Commission, European Commission enlargement reports, and selected comparative practices from EU Member States. Through this approach, the article evaluates both the normative content of voting parity and its practical significance for Albania's ongoing process of approximation with the European Union acquis.

2. The principle of voting parity as a constitutional and democratic principle

2.1. *Political Equality as the Constitutional Foundation of Voting Parity*

The principle of voting parity derives from the broader constitutional principle of political equality, which requires that every citizen enjoy an equal opportunity to participate in democratic decision-making. Political equality has long been regarded as a crucial characteristic of representative democracy because democratic legitimacy depends upon the equal status of citizens in the formation of political authority. While universal suffrage guarantees that every eligible citizen may participate in elections, voting parity ensures that this participation possesses substantially equal legal and political value. Consequently, both classical and contemporary democratic theory recognize how the right to vote encompasses not merely access to the ballot but also protection against electoral arrangements that unjustifiably diminish the influence of certain voters relative to others (Dahl, 1989; Lijphart, 2012).

The relationship between democracy and electoral equality reflects the principle commonly expressed as "one person, one vote," which requires that each citizen's vote carry substantially equal weight in determining electoral outcomes (Wodak, 2025). Although this phrase originated in American constitutional jurisprudence, it has subsequently become a universal democratic principle that informs electoral law across constitutional democracies. Its objective is not to achieve perfect mathematical equality but rather to prevent arbitrary inequalities in the distribution of political representation. As Norris, Frank, and Martínez i Coma (2024) observe, electoral integrity requires that all eligible citizens enjoy equal opportunities to influence electoral outcomes and that institutional arrangements do not systematically privilege particular groups of voters.

From a constitutional perspective, voting parity performs two complementary functions. First, it protects the individual dimension of the right to vote by ensuring that every citizen participates in elections under conditions of equality. Secondly, it safeguards the collective legitimacy of representative institutions by preventing distortions between popular preferences and parliamentary representation. Electoral systems that assign substantially different representative value to votes cast in different constituencies risk undermining both democratic legitimacy and public confidence in electoral institutions (Lijphart, 2012).

For this reason, equality of voting power has become increasingly recognized as an essential component of electoral integrity. Electoral integrity extends beyond preventing fraud or guaranteeing procedural fairness; it also requires that electoral rules themselves comply with internationally accepted democratic standards throughout the entire electoral cycle (Norris et al., 2024). Consequently, constituency boundaries, seat allocation formulas, electoral thresholds, and apportionment mechanisms must be designed in a manner that preserves equality of representation as far as reasonably practicable.

2.2. *Voting Parity in International and European Electoral Standards*

Although international human rights instruments rarely employ the term "voting parity," they consistently establish equality as one of the essential characteristics of

democratic elections. Article 25 of the International Covenant on Civil and Political Rights guarantees every citizen the right and the opportunity to vote and be elected in genuine periodic elections conducted by universal and equal suffrage. Likewise, Article 21 of the Universal Declaration of Human Rights recognizes that the will of the people shall be expressed through genuine periodic elections based upon universal and equal suffrage. These provisions establish equality of voting rights as a universal democratic principle and provide the normative foundation upon which regional European standards have subsequently developed.

Within Europe, the principle has acquired greater normative precision through the work of the Council of Europe. Article 3 of Protocol No. 1 to the European Convention on Human Rights requires States to hold free elections under conditions ensuring "the free expression of the opinion of the people in the choice of the legislature." Although the Convention deliberately refrains from prescribing any particular electoral model, the European Court of Human Rights has consistently interpreted this provision as protecting the effectiveness of electoral rights while recognizing that electoral systems must preserve the democratic character of elections (*Mathieu-Mohin & Clerfayt v. Belgium*, 1987).

The Court has repeatedly emphasized that electoral rights are not absolute and that States enjoy a margin of appreciation in designing electoral systems. Nevertheless, this discretion is limited by the requirement that electoral arrangements must not impair the essence of the right to vote or distort the free expression of the electorate. In *Yumak and Sadak v. Turkey* (2008), concerning Turkey's ten percent electoral threshold, the Grand Chamber reaffirmed that although proportionality permits certain restrictions, electoral legislation must remain compatible with democratic principles and preserve the effective expression of the will of the people. The Court therefore evaluates electoral systems considering whether institutional safeguards compensate for potential inequalities created by electoral rules.

Perhaps the clearest articulation of voting parity within Europe is contained in the Venice Commission's Code of Good Practice in Electoral Matters, widely regarded as the principal soft-law instrument governing democratic elections across Europe. The Code identifies universal, equal, free, secret, and direct suffrage as the five fundamental principles of Europe's electoral heritage. It distinguishes between equal voting rights, requiring that each voter normally possess one vote, and equal voting power, requiring that parliamentary seats be distributed evenly among constituencies according to objective apportionment criteria. The Commission further recommends that deviations from electoral equality should generally not exceed ten percent and, in exceptional circumstances, should never exceed fifteen percent unless justified by legitimate considerations such as the protection of national minorities or geographically remote territories (Venice Commission, 2022).

These standards have been consistently reflected in election observation reports prepared by the Organization for Security and Co-operation in Europe (OSCE/ODIHR), which regard equality of suffrage as a central benchmark for assessing compliance with international electoral obligations. The OSCE Guidelines for Reviewing a Legal Framework for Elections emphasize that constituency delimitation, voter equality, and seat allocation mechanisms should prevent unjustified disparities in representation

and ensure equal treatment of voters throughout the electoral process.

2.3. Voting Parity as a Component of Electoral Integrity

The growing recognition of voting parity reflects the evolution of electoral integrity from a procedural to a substantive democratic principle. Traditional approaches to election law focused primarily on preventing electoral fraud and safeguarding procedural guarantees such as secret voting, transparent counting, and independent electoral administration. Contemporary democratic standards, however, increasingly recognize that electoral integrity also depends upon the fairness of the institutional rules governing political competition (Norris et al., 2024).

This broader understanding acknowledges that elections may satisfy procedural requirements while nevertheless producing unequal political representation through systematic malapportionment, discriminatory constituency boundaries, or disproportionate allocation of parliamentary seats. Such distortions weaken political equality by granting voters in certain constituencies greater representative influence than voters elsewhere. Consequently, modern electoral law increasingly evaluates not only whether elections are conducted fairly but also whether electoral systems themselves respect the equal value of each vote.

For candidate countries seeking accession to the European Union, this development possesses particular constitutional significance. The Copenhagen political criteria require stable institutions guaranteeing democracy, the rule of law, human rights, and respect for minorities. Although the European Union does not prescribe a uniform electoral system, compliance with common democratic standards increasingly encompasses the effective protection of electoral equality and representative fairness. Voting parity therefore functions as both a constitutional guarantee for individual voters and an institutional benchmark through which democratic legitimacy is assessed during the enlargement process.

3. The Principle of Voting Parity in European Union Law

3.1. Voting Parity as a Constitutional Principle of the European Union

Unlike several national constitutions, the legal order of the European Union does not contain an explicit provision establishing a general principle of voting parity applicable to national parliamentary elections. Electoral systems for national legislatures remain within the constitutional autonomy of the Member States, reflecting the principle of conferral established by the Treaties. Nevertheless, the absence of an express rule does not imply the absence of a constitutional standard. Rather, the principle of voting parity emerges from the combined interpretation of the Union's foundational values, democratic principles, citizenship rights, and fundamental rights, together with the broader constitutional traditions common to the Member States.

The constitutional foundation of electoral equality begins with Article 2 of the Treaty on European Union (TEU), which identifies respect for democracy, equality, the rule of law, and human rights as the values upon which the Union is founded. These values are not merely political aspirations but legally binding constitutional principles that guide the interpretation and application of Union law (European Union, 2024).

Democracy and equality are therefore mutually reinforcing principles: representative democracy cannot function effectively where electoral rules systematically assign unequal value to the votes of similarly situated citizens. Although Article 2 does not expressly mention voting parity, the principle logically derives from the constitutional commitment to political equality that underpins democratic representation.

Article 10 TEU further develops this constitutional framework by providing that "the functioning of the Union shall be founded on representative democracy." Article 10(2) recognizes that Union citizens are directly represented in the European Parliament, while Article 10(3) guarantees every citizen "the right to participate in the democratic life of the Union." These provisions elevate democratic participation from a political objective to a constitutional entitlement. Recent jurisprudence of the Court of Justice of the European Union has further clarified that Article 10 TEU is not merely declaratory but imposes substantive obligations to safeguard the effective participation and representation of Union citizens within the Union's democratic order. In particular, the Court held that political parties perform an essential function in representative democracy and that Member States must ensure that Union citizens are afforded equal access to the means necessary to exercise their electoral rights effectively, thereby reinforcing the constitutional significance of electoral equality (Court of Justice of the European Union [CJEU], 2024a, paras. 95–104, 121–130; CJEU, 2024b, paras. 94–103, 120–129).

Accordingly, voting parity should be understood not as an isolated electoral rule but as a constitutional manifestation of the broader principles of democracy, equality, and effective political participation embedded in the Treaties. While Member States retain discretion regarding the design of their electoral systems, that discretion must be exercised consistently with these common constitutional values.

3.2. The Charter of Fundamental Rights and Equal Electoral Participation

The Charter of Fundamental Rights of the European Union provides the most explicit recognition of electoral equality within the Union's constitutional framework. Article 39 guarantees every Union citizen the right to vote and to stand as a candidate in elections to the European Parliament under the same conditions as nationals of the Member State of residence. It further requires that Members of the European Parliament be elected by direct universal suffrage through a free and secret ballot (European Union, 2024).

Although Article 39 applies directly only to elections for the European Parliament, its constitutional significance extends beyond that specific electoral context. The provision reflects the Union's understanding that democratic representation must be based upon equal participation and universal suffrage. In conjunction with Article 20 TFEU, which establishes Union citizenship, and Article 22 TFEU, which guarantees electoral rights for Union citizens residing in another Member State, Article 39 forms part of a coherent constitutional framework designed to ensure equal treatment in the exercise of political rights.

The Charter must also be interpreted in light of the general principle of equality contained in Article 20 of the Charter and the prohibition of discrimination under Article 21. While these provisions primarily concern equality before the law and non-

discrimination, they reinforce the broader constitutional requirement that electoral legislation should not arbitrarily differentiate between citizens in exercising political rights. Consequently, electoral arrangements producing unjustified inequalities in voting power may raise broader concerns regarding compliance with the Union's constitutional commitment to equality.

3.3. CJEU Jurisprudence and the Development of Democratic Standards

Although the CJEU has not yet developed an extensive body of case law specifically addressing voting parity in national elections, its jurisprudence increasingly recognizes democracy as an enforceable constitutional value rather than merely a political aspiration.

In *Delvigne v. Commune de Lesparre-Médoc* (Case C-650/13), the Court held that national legislation governing eligibility to vote in European Parliament elections falls within the scope of EU law because Article 39 of the Charter guarantees universal suffrage as a fundamental right. The Court accepted that restrictions on voting rights must pursue legitimate objectives and comply with the principle of proportionality. The judgment therefore confirmed that electoral rights constitute enforceable fundamental rights under Union law rather than matters entirely reserved to national constitutional autonomy.

More recently, the Court significantly expanded the constitutional importance of democratic participation in its 2024 judgments concerning the political rights of mobile Union citizens. Interpreting Article 22 TFEU in conjunction with Articles 2 and 10 TEU and Article 12 of the Charter, the Court emphasized that democracy is one of the fundamental values of the Union and that political parties perform an essential function within representative democracy (Court of Justice of the European Union [CJEU], 2024a, paras. 95–104; CJEU, 2024b, paras. 94–103). The Court further held that Member States must guarantee Union citizens effective, rather than merely formal, opportunities to exercise their electoral rights (CJEU, 2024a, paras. 121–130; CJEU, 2024b, paras. 120–129). This reasoning strengthens the constitutional understanding that electoral equality requires practical effectiveness and genuine participation rather than solely formal legal recognition (CJEU, 2024a; CJEU, 2024b). Although these judgments do not directly concern constituency apportionment or equality of voting power, they illustrate the Court's increasing willingness to interpret electoral rights through the broader constitutional principles of democracy, equality, and effective representation. This jurisprudential development suggests that future questions concerning electoral equality may likewise be examined through the constitutional framework established by Articles 2 and 10 TEU.

3.4. Voting Parity and the European Union's Rule of Law Framework

During the past decade, democracy and the rule of law have become increasingly interconnected within the constitutional development of the European Union. The European Commission's annual Rule of Law Reports and Enlargement Reports now evaluate not only judicial independence and anti-corruption measures but also the functioning of democratic institutions, electoral processes, media pluralism, and institutional accountability. Electoral integrity has therefore become an integral

component of the Union's broader constitutional monitoring framework. For candidate countries, including Albania, this evolution has important legal implications. Although the Union does not require Member States or candidate countries to adopt a particular electoral system, it increasingly expects domestic electoral legislation to comply with common European democratic standards. These standards encompass transparency, legal certainty, equality of political competition, effective judicial remedies, and respect for fundamental electoral rights. Consequently, persistent inequalities in constituency representation or electoral arrangements that disproportionately diminish the value of particular votes may become relevant not only under domestic constitutional law but also within the broader assessment of compliance with Article 2 TEU values during the accession process.

Accordingly, voting parity should be viewed as an emerging constitutional standard within European Union law. Rather than existing as an autonomous Treaty obligation, it arises from the interaction of democracy, equality, representative government, and effective political participation. This integrated constitutional approach provides an important normative framework for evaluating national electoral legislation, particularly in candidate countries seeking approximation with the Union's democratic acquis.

4. Discussion

The foregoing analysis demonstrates that the principle of voting parity has evolved into a substantive constitutional requirement of European democratic governance, even though it is not expressly codified as an autonomous rule within the Treaties of the European Union. Rather than deriving from a single legal provision, voting parity emerges from the interaction between the values of democracy, equality, representative government, and the rule of law contained in Articles 2 and 10 TEU, the guarantees of political participation contained in Article 39 of the Charter of Fundamental Rights, and the broader European electoral acquis developed by the European Court of Human Rights, the Venice Commission, and the Organization for Security and Co-operation in Europe (European Union, 2024; Venice Commission, 2022).

This multilayered legal framework illustrates an important development in contemporary European constitutionalism. Electoral equality is no longer understood merely as formal equality of voting rights but increasingly as equality of electoral influence. Modern democratic legitimacy therefore requires that electoral systems avoid unjustified disparities in the representative value of votes. While proportional representation systems necessarily tolerate a degree of mathematical inequality, European standards increasingly require that such inequalities remain objectively justified, proportionate, and subject to regular institutional review. The Venice Commission's recommendations concerning constituency deviations and the European Court of Human Rights' emphasis on the effective expression of the will of the electorate reinforce this substantive understanding of electoral equality (Venice Commission, 2022; *Yumak and Sadak v. Turkey*, 2008).

The analysis also highlights the growing constitutional significance of democracy

within European Union law. Recent jurisprudence of the Court of Justice of the European Union has strengthened the interpretation of Articles 2 and 10 TEU by recognizing democratic participation as an enforceable constitutional value rather than merely a political aspiration. Although the Court has not yet directly addressed constituency malapportionment or equal voting power in national parliamentary elections, its reasoning concerning effective electoral participation suggests that future judicial developments may progressively strengthen the constitutional protection of voting parity within the Union's legal order (Court of Justice of the European Union [CJEU], 2024a, 2024b). This evolution mirrors the broader transformation of Article 2 TEU values into operational standards guiding both Member States and candidate countries.

From the perspective of enlargement policy, the principle of voting parity assumes particular importance for Albania. Although the European Union does not require harmonization of national electoral systems, the accession process increasingly evaluates whether democratic institutions effectively implement the values underpinning Article 2 TEU. Consequently, electoral legislation that produces significant disparities in representation, lacks transparent mechanisms for constituency review, or fails to guarantee equal voting power may become relevant within the broader assessment of democratic governance and the rule of law (European Commission, 2024).

The Albanian electoral framework has undergone significant modernization during the country's European integration process, particularly through repeated amendments to the Electoral Code and reforms of electoral administration. Nevertheless, several structural challenges continue to affect the realization of voting parity. Parliamentary seats remain allocated through relatively stable electoral districts despite demographic changes resulting from internal migration and population decline in several regions. Consequently, variations in constituency size may produce differences in the representative weight of individual votes. Although these disparities may not necessarily violate constitutional requirements, they demonstrate the importance of establishing periodic, transparent, and independent mechanisms for reviewing constituency allocation based upon objective demographic data (European Commission, 2024; Organization for Security and Co-operation in Europe, Office for Democratic Institutions and Human Rights [OSCE/ODIHR], 2025). Furthermore, voting parity should not be examined exclusively through constituency delimitation. The equal value of votes may also be affected by electoral thresholds, seat allocation formulas, district magnitude, and the interaction between proportional representation and candidate selection mechanisms. European standards increasingly assess electoral integrity holistically, recognizing that multiple institutional features collectively determine whether citizens enjoy genuinely equal opportunities to influence political representation. Future Albanian electoral reforms should therefore evaluate voting parity within this broader "institutional context rather than focusing solely on district boundaries" (Norris et al., 2024).

The findings of this study also contribute to the broader scholarly debate concerning the relationship between constitutional law and electoral system design. Political science literature frequently evaluates electoral systems according to proportionality, governability, or party competition. By contrast, the present analysis demonstrates

that European law increasingly frames these issues as questions of constitutional rights and democratic legitimacy. Voting parity should therefore be understood not merely as an aspect of electoral engineering but as a legal principle derived from the constitutional commitment to political equality (Dahl, 1989; Lijphart, 2012). This perspective provides a stronger normative foundation for judicial review of electoral legislation and for future reforms undertaken in the context of European integration.

5. Conclusion

The principle of voting parity has become an essential component of contemporary European democratic standards. Although European Union law does not expressly establish a general obligation requiring mathematically equal voting power in national parliamentary elections, the combined effect of Articles 2 and 10 TEU, the Charter of Fundamental Rights, the jurisprudence of the Court of Justice of the European Union, the case law of the European Court of Human Rights, and the standards developed by the Venice Commission and the OSCE demonstrates the emergence of a coherent constitutional principle requiring that electoral systems preserve, as far as reasonably practicable, the equal value of each vote (European Union, 2024; Venice Commission, 2022).

This study has shown that voting parity extends beyond the traditional guarantee of universal suffrage. Democratic legitimacy requires not only that citizens possess the right to vote but also that electoral rules do not arbitrarily diminish the representative influence of certain voters relative to others. Consequently, constituency delimitation, seat allocation, electoral thresholds, and other structural elements of electoral systems must operate consistently with the broader constitutional principles of political equality and representative democracy (Dahl, 1989; Norris et al., 2024).

For Albania, these findings possess particular significance in the context of European Union accession. The continued constitutional development of democratic principles within European Union law and the incorporation of electoral integrity into the Union's rule of law framework indicate that the effective protection of voting parity is likely to become an increasingly important consideration in the European Commission's assessment of candidate countries' fulfilment of the political accession criteria. Although Albania has substantially improved its electoral legislation during the accession process, continued reforms should focus on strengthening mechanisms for periodic constituency review, enhancing transparency in the allocation of parliamentary seats, improving the objective measurement of representational equality, and reinforcing judicial and institutional safeguards capable of protecting electoral equality (European Commission, 2024; OSCE/ODIHR, 2025).

More broadly, the study demonstrates that voting parity should be recognized as part of the evolving European democratic acquis. Rather than imposing uniform electoral systems upon Member States or candidate countries, European law establishes common constitutional standards intended to safeguard political equality while respecting national constitutional diversity (European Union, 2024). This balanced approach allows electoral systems to reflect national traditions while ensuring compliance with the fundamental democratic values upon which the European Union

is founded.

Future research should extend the present analysis through comparative empirical examination of constituency malapportionment and vote equality across EU Member States and candidate countries. Such research would contribute to a more precise understanding of how legal standards relating to voting parity are implemented in practice and would assist both national legislatures and European institutions in developing more consistent benchmarks for evaluating electoral equality within the European constitutional order.

The analysis further suggests several concrete legislative implications. First, Parliament should establish a legally binding mechanism requiring the periodic review of constituency seat allocation following each national population census or whenever significant demographic changes occur. Secondly, the Electoral Code should provide more objective and transparent criteria governing the allocation of parliamentary mandates among electoral districts, thereby minimizing the risk of disproportionate representation resulting from demographic shifts. Thirdly, future electoral reforms should include an explicit obligation for the Central Election Commission to publish periodic assessments of electoral equality, including statistical analyses of constituency population deviations and their impact on the equality of voting power. Such reforms would improve legal certainty, enhance public confidence in electoral administration, and align Albania more closely with the recommendations of the Venice Commission and OSCE/ODIHR.

Finally, strengthening voting parity would have implications extending beyond electoral law itself. Greater equality in the representative value of votes would reinforce the constitutional principles of equal protection, democratic legitimacy, and legal certainty, while reducing the likelihood of constitutional challenges concerning electoral representation. More importantly, by demonstrating effective implementation of European democratic standards rather than merely formal legislative approximation, Albania would strengthen its credibility within the accession negotiations under the "Fundamentals" cluster, where democratic institutions and the rule of law constitute central benchmarks for measuring progress (European Commission, 2024).

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Artificial Intelligence in Anti-Money Laundering Monitoring: Legal and Ethical Challenges

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Abstract

Artificial intelligence (AI) has become an increasingly important tool in anti-money laundering (AML) compliance systems, particularly within financial institutions and regulatory authorities. AI-driven technologies are used to detect suspicious transactions, identify risk patterns, and improve the efficiency of compliance reporting. However, the integration of AI into AML monitoring raises complex legal and ethical challenges, including issues of data protection, algorithmic bias, transparency, accountability, and due process. This article examines the role of AI in AML systems and critically evaluates the legal and ethical implications of its use. It argues that while AI enhances detection capabilities and operational efficiency, it also creates new regulatory risks that require updated governance frameworks at both national and international levels.

Keywords: artificial intelligence, anti-money laundering, financial regulation, algorithmic bias, data protection, compliance.

1. Introduction

Money laundering remains one of the most significant challenges in global financial regulation, posing substantial risks to financial stability, economic development, and the integrity of financial institutions. The process involves disguising the origins of illegally obtained funds to make them appear legitimate, often through complex financial transactions that span multiple jurisdictions. According to the Financial Action Task Force (FATF, 2023), billions of dollars are laundered annually through the global financial system, with criminal organizations exploiting weaknesses in regulatory frameworks and financial monitoring mechanisms. The increasing sophistication of financial crimes, combined with the growth of digital banking and cross-border transactions, has made the detection and prevention of money laundering increasingly difficult for both regulators and financial institutions. In response to these challenges, financial institutions and regulatory authorities have increasingly adopted artificial intelligence (AI) technologies to strengthen anti-money laundering (AML) frameworks. Traditional AML systems rely heavily on rule-based monitoring approaches, which often generate large numbers of false positives and require extensive manual review by compliance officers. These limitations can reduce operational efficiency and hinder the timely identification of genuine suspicious activities (Bholat et al., 2015). Consequently, AI-driven solutions have emerged as a promising alternative, offering enhanced analytical capabilities and the ability to process vast quantities of financial data in real time. AI systems are capable of analyzing large datasets, identifying hidden patterns, detecting anomalies, and uncovering complex relationships among transactions that may indicate suspicious financial behavior. Machine learning algorithms, in particular, have become widely

used in transaction monitoring, customer due diligence, risk assessment, and fraud detection. These technologies can continuously learn from historical transaction data and adapt to evolving criminal tactics, thereby improving the accuracy and effectiveness of AML monitoring systems (Kute et al., 2021). Furthermore, AI can assist financial institutions in prioritizing high-risk cases, reducing false-positive alerts, and enhancing the overall efficiency of compliance operations. Despite these advantages, the use of AI in AML compliance raises significant legal, ethical, and governance concerns. One major issue relates to transparency and explainability. Many advanced AI models, particularly deep learning systems, operate as “black boxes,” making it difficult for compliance officers, regulators, and affected individuals to understand how specific decisions or risk assessments are generated. This lack of transparency may conflict with regulatory requirements that demand clear explanations for compliance-related decisions and customer risk classifications (European Banking Authority, 2024). Another concern involves fairness and potential bias within AI systems. Machine learning models are trained on historical data, which may contain biases reflecting past institutional practices or unequal treatment of certain customer groups. As a result, AI-driven AML systems may unintentionally discriminate against specific individuals, geographic regions, or demographic categories, leading to unfair outcomes and potential violations of anti-discrimination laws (Cath et al., 2018). Financial institutions must therefore ensure that AI models are regularly audited, tested, and validated to minimize bias and maintain fairness in decision-making processes. Accountability also presents a significant challenge. When an AI system fails to identify suspicious activity or incorrectly flags legitimate transactions, determining responsibility can be difficult. Questions arise regarding whether accountability lies with the financial institution, the software developer, the data provider, or the compliance personnel overseeing the system. Regulatory authorities worldwide are increasingly emphasizing the need for robust AI governance frameworks that establish clear lines of responsibility and oversight (Organisation for Economic Co-operation and Development [OECD], 2024). Moreover, the use of AI in AML monitoring involves extensive collection and processing of personal and financial data, raising concerns about privacy and data protection. Financial institutions must ensure compliance with applicable data protection regulations, such as the General Data Protection Regulation (GDPR) within the European Union, while balancing the need for effective financial crime prevention. Maintaining public trust requires that AI systems operate in a manner that respects individual rights, safeguards sensitive information, and ensures proportionality in surveillance activities.

2. Artificial Intelligence in AML Systems

Artificial intelligence (AI) has become an increasingly important component of anti-money laundering (AML) compliance programs within the financial sector. Financial institutions generate and process enormous volumes of transactional and customer data on a daily basis, making it challenging for traditional compliance systems to effectively identify suspicious activities. To address these challenges, AI-based AML solutions utilize machine learning algorithms, natural language processing, and advanced data

analytics techniques to analyze large datasets and detect patterns that may indicate money laundering or terrorist financing activities (Financial Action Task Force [FATF], 2021). AI in AML compliance typically involves machine learning models that process information derived from customer profiles, transaction histories, account activities, and external data sources. These systems are designed to identify patterns commonly associated with money laundering, including unusual transaction frequencies, rapid movement of funds between accounts, structuring or “smurfing” activities intended to evade reporting thresholds, and complex cross-border transfers involving high-risk jurisdictions (FATF, 2021). By examining relationships among transactions and customers, AI systems can uncover hidden connections that may not be apparent through conventional monitoring methods. Traditional AML monitoring systems generally operate through predefined rules and thresholds established by compliance teams. For example, a transaction exceeding a specified monetary value or involving a high-risk country may automatically trigger an alert for further investigation. While such rule-based systems provide a structured approach to compliance, they are often limited in their ability to detect emerging criminal methodologies and frequently generate large numbers of false-positive alerts. These inefficiencies can place significant burdens on compliance departments, requiring substantial human resources to review transactions that ultimately prove legitimate (Bholat et al., 2015). In contrast, AI-driven systems possess the ability to learn from historical data and continuously improve their predictive capabilities over time. Through supervised and unsupervised machine learning techniques, AI models can recognize both known and previously unidentified patterns of suspicious behavior. Supervised learning models are trained using historical examples of legitimate and suspicious transactions, enabling them to classify future activities based on learned characteristics. Unsupervised learning models, meanwhile, can identify anomalies and unusual behaviors without relying on predefined labels, making them particularly useful for detecting novel money laundering typologies that may not yet be reflected in regulatory guidance or institutional rules (Kute et al., 2021). The adaptive capacity of AI represents one of its most significant advantages in AML compliance. Criminal organizations continually modify their laundering techniques to avoid detection, often exploiting technological innovations and regulatory gaps. AI systems can adapt to these evolving threats by incorporating new data and refining their analytical models. This capability enables financial institutions to respond more effectively to emerging risks and improve the accuracy of suspicious activity detection. Furthermore, AI can support customer risk assessment processes by continuously evaluating customer behavior and updating risk profiles based on changing circumstances, thereby enhancing the effectiveness of customer due diligence and ongoing monitoring procedures (European Banking Authority [EBA], 2024). Another important application of AI in AML compliance involves network analysis and relationship mapping. Machine learning algorithms can identify connections among individuals, entities, accounts, and transactions, helping investigators uncover complex laundering networks that span multiple jurisdictions and financial institutions. These analytical capabilities are particularly valuable in combating organized crime, corruption, and transnational financial crimes, where illicit funds are often transferred through intricate chains of transactions designed to

obscure their origins (United Nations Office on Drugs and Crime [UNODC], 2023). Despite these advantages, the increasing reliance on AI in AML compliance raises significant challenges. One of the most widely discussed concerns relates to the complexity and opacity of advanced machine learning systems. Many AI models, particularly those based on deep learning techniques, function as “black-box” systems whose internal decision-making processes are difficult to understand or explain. Consequently, compliance officers, auditors, and regulators may struggle to determine why a particular transaction was flagged as suspicious or why a customer received a specific risk score. This lack of transparency can undermine trust in AI systems and create difficulties in meeting regulatory expectations regarding accountability and explainability (Wachter et al., 2017).

The challenge of explainability is particularly important in heavily regulated sectors such as banking and financial services. Regulatory authorities increasingly expect financial institutions to demonstrate how AI-based decisions are made and to provide clear documentation regarding model design, validation, and oversight. Without sufficient transparency, institutions may face legal and regulatory risks, especially when AI-generated decisions significantly affect customers or compliance outcomes. As a result, there is growing emphasis on the development of explainable AI (XAI) techniques that allow stakeholders to better understand and evaluate automated decision-making processes (OECD, 2024). Governance and accountability represent additional areas of concern. The deployment of AI systems requires robust governance frameworks to ensure that models operate effectively, ethically, and in accordance with applicable laws and regulations. Financial institutions must establish procedures for model validation, performance monitoring, risk management, and human oversight. Questions of responsibility become particularly complex when AI systems fail to detect suspicious activities or generate inaccurate assessments. Determining whether accountability lies with the institution, the technology provider, or compliance personnel remains a significant legal and regulatory challenge (EBA, 2024). Recognizing both the opportunities and risks associated with AI, regulatory organizations such as the FATF have encouraged the responsible adoption of innovative technologies in AML compliance. The FATF acknowledges that AI can enhance detection capabilities, improve operational efficiency, and reduce false positives, thereby strengthening global efforts to combat financial crime. At the same time, the organization emphasizes the importance of maintaining appropriate safeguards to ensure transparency, fairness, accountability, and regulatory compliance (FATF, 2021). Consequently, financial institutions must balance technological innovation with sound governance practices to maximize the benefits of AI while minimizing associated legal, ethical, and operational risks.

3. Legal Challenges in the EU

AI-based anti-money laundering (AML) systems rely heavily on the collection, analysis, and processing of vast amounts of personal and financial data. These systems utilize customer identification information, transaction records, account activity histories, behavioral patterns, and data obtained from external sources to identify suspicious

activities and assess potential money laundering risks. While the extensive use of data enhances the effectiveness of AML monitoring, it simultaneously raises significant concerns regarding privacy, data protection, and compliance with legal frameworks governing the processing of personal information. In particular, the increasing deployment of artificial intelligence (AI) technologies in financial services has generated considerable debate regarding their compatibility with data protection regulations such as the General Data Protection Regulation (GDPR) within the European Union (European Union, 2016). The GDPR establishes a comprehensive framework for the protection of personal data and is based on several fundamental principles, including lawfulness, fairness, transparency, purpose limitation, data minimization, accuracy, storage limitation, integrity, and confidentiality (European Union, 2016). Under Article 5 of the GDPR, personal data must be collected for specified, explicit, and legitimate purposes and must not be processed in a manner incompatible with those purposes. Furthermore, organizations are required to limit data collection to what is necessary for achieving their stated objectives. These principles can present challenges for AI-driven AML systems, which often depend on large-scale data aggregation and the continuous analysis of extensive datasets to identify patterns that may not have been anticipated when the data were initially collected. One of the primary legal concerns relates to the principle of purpose limitation. AI systems frequently derive insights from data through secondary analysis, meaning that information collected for one purpose may subsequently be used to train machine learning models or support risk assessment functions. While such practices can improve the effectiveness of AML detection, they may create tensions with GDPR requirements that restrict the use of personal data beyond its original purpose unless a valid legal basis exists (Voigt & von dem Bussche, 2017). Financial institutions must therefore ensure that any secondary use of personal data remains compatible with AML obligations and broader data protection requirements. The principle of transparency also presents significant challenges. GDPR requires organizations to provide clear and accessible information regarding how personal data are collected, processed, stored, and used. However, AI systems often involve highly complex algorithms and decision-making processes that are difficult for ordinary individuals to understand. Customers whose transactions are monitored by AI-based AML systems may be unaware of the extent to which their data are analyzed, the criteria used to assess risk, or the factors that contribute to automated alerts and investigations. This lack of transparency may undermine individuals' ability to exercise their rights under data protection law and may reduce public trust in automated compliance systems (Wachter et al., 2017). Another important issue concerns automated decision-making and profiling. AI-driven AML systems frequently employ profiling techniques to categorize customers according to perceived levels of risk. Such profiling may influence the intensity of monitoring applied to customers and, in some cases, may contribute to decisions affecting access to financial services. Article 22 of the GDPR provides individuals with certain protections against decisions based solely on automated processing when such decisions produce legal or similarly significant effects. Although AML monitoring often includes human review before formal action is taken, concerns remain regarding the extent to which automated profiling may affect customers

without meaningful human oversight (European Union, 2016). Data minimization represents an additional area of tension between AML objectives and privacy rights. Effective money laundering detection often depends on access to extensive datasets, including historical transactions, customer relationships, geographic information, and behavioral indicators. From an AML perspective, broader data access can improve detection capabilities and support the identification of complex criminal networks. However, the GDPR requires organizations to limit data collection and processing to information that is necessary and proportionate to the intended purpose. Balancing the need for comprehensive financial monitoring with the obligation to minimize personal data collection remains one of the most significant regulatory challenges facing AI-based AML systems (European Data Protection Board [EDPB], 2023). Furthermore, the use of AI in AML compliance raises concerns regarding data accuracy and potential bias. Machine learning models rely on historical datasets to generate predictions and identify suspicious activities. If the underlying data contain inaccuracies, inconsistencies, or embedded biases, AI systems may produce misleading outcomes or disproportionately target particular individuals, groups, or geographic regions. Such outcomes may not only undermine the effectiveness of AML measures but could also lead to unfair treatment and potential violations of fundamental rights protected under European law (Mittelstadt et al., 2016). To address these challenges, regulators increasingly emphasize the importance of privacy-by-design and privacy-by-default approaches in AI development. These principles require organizations to integrate data protection safeguards into the design and operation of AI systems from the outset rather than treating privacy as an afterthought. Financial institutions implementing AI-based AML solutions are expected to conduct Data Protection Impact Assessments (DPIAs), establish robust governance mechanisms, maintain adequate security measures, and ensure ongoing monitoring of compliance risks (EDPB, 2023). Such measures help balance the objectives of financial crime prevention with the protection of individual privacy rights. Despite these concerns, data protection and AML objectives are not necessarily incompatible. Both seek to promote trust, security, and integrity within financial systems. Effective governance frameworks can enable financial institutions to leverage AI technologies while respecting legal obligations relating to privacy and data protection. Achieving this balance requires transparency, accountability, human oversight, and careful consideration of proportionality when processing personal data. As AI technologies continue to evolve, regulators and financial institutions must work collaboratively to ensure that innovation in AML compliance remains aligned with fundamental rights and data protection principles.

4. Ethical Challenges

The increasing use of artificial intelligence (AI) in anti-money laundering (AML) compliance has generated important legal and ethical concerns regarding due process, procedural fairness, and the protection of individual rights. AI-driven AML systems are increasingly used by financial institutions to monitor customer transactions, assess risk levels, and identify potentially suspicious activities. While these technologies can significantly improve the efficiency and effectiveness of financial

crime detection, they may also result in substantial consequences for individuals. Such consequences can include account freezes, restrictions on financial services, delays in processing transactions, enhanced monitoring measures, or the submission of Suspicious Activity Reports (SARs) to regulatory and law enforcement authorities. In some cases, these actions may occur with limited human involvement, relying heavily on automated risk assessments generated by machine learning algorithms (Financial Action Task Force [FATF], 2021). One of the principal concerns associated with AI-driven AML systems relates to procedural fairness and due process. Due process is a fundamental legal principle that requires decisions affecting individuals' rights and interests to be made through fair, transparent, and accountable procedures. Traditionally, significant decisions within financial institutions have involved human judgment, allowing for contextual evaluation and the consideration of individual circumstances. However, as AI systems become increasingly integrated into compliance operations, there is a risk that critical decisions may be influenced or effectively determined by automated processes that lack sufficient human oversight (Citron, 2008). Automated risk-scoring systems represent a particular source of concern. These systems evaluate customers based on a variety of indicators, including transaction patterns, geographic locations, customer profiles, account activity, and behavioral data. Customers identified as presenting elevated risks may be subjected to additional scrutiny or restrictive measures. Although such systems can enhance the detection of financial crime, they may also produce inaccurate or misleading results due to limitations in data quality, algorithmic design, or model assumptions. False positives remain a persistent challenge in AML compliance, and individuals who are incorrectly identified as suspicious may experience significant financial and reputational harm despite having engaged in entirely lawful activities (Bholat et al., 2015). The use of automated risk assessments also raises concerns regarding the presumption of innocence, a fundamental principle recognized in democratic legal systems and international human rights law. The presumption of innocence requires that individuals should not be treated as guilty of wrongdoing without sufficient evidence and appropriate legal procedures. However, AI-based AML systems may effectively categorize individuals as high-risk based on statistical correlations or predictive indicators rather than proven misconduct. As a result, customers may face restrictions or investigations solely because their behavior resembles patterns previously associated with money laundering activities. This can create situations in which individuals experience adverse consequences despite the absence of direct evidence linking them to criminal conduct (Mittelstadt et al., 2016). Transparency and explainability are closely connected to concerns about due process. Individuals affected by AML-related decisions may not understand why their accounts have been frozen, why transactions have been delayed, or why they have been subjected to enhanced scrutiny. Many advanced machine learning models operate as complex systems whose decision-making processes are difficult to explain even to technical experts. Consequently, affected individuals may be unable to obtain meaningful explanations regarding the factors that contributed to their risk classification. This lack of transparency can undermine trust in financial institutions and limit the ability of individuals to challenge decisions that may be inaccurate or unjustified (Wachter

et al., 2017). The absence of effective mechanisms for contesting automated decisions further intensifies these concerns. Procedural fairness generally requires that individuals have an opportunity to challenge decisions that adversely affect their rights or interests. However, in the AML context, opportunities for review may be limited due to confidentiality obligations and legal restrictions surrounding suspicious activity investigations. Financial institutions are often prohibited from disclosing whether a suspicious activity report has been filed or revealing details that could compromise ongoing investigations. While these restrictions serve legitimate law enforcement objectives, they may also leave individuals with little information regarding the reasons for adverse actions and limited avenues for seeking redress (European Union Agency for Fundamental Rights [FRA], 2020). Human oversight is frequently proposed as a safeguard against the risks associated with automated decision-making. Regulatory authorities increasingly emphasize that AI systems should support, rather than replace, human judgment in high-impact decisions. Meaningful human review involves more than merely approving automated recommendations; it requires qualified personnel to critically evaluate algorithmic outputs, consider contextual factors, and exercise independent judgment before taking actions that significantly affect individuals. Such oversight can help identify errors, reduce the likelihood of unfair outcomes, and ensure that decisions remain accountable and proportionate (Organisation for Economic Co-operation and Development [OECD], 2024). In addition to legal considerations, ethical concerns arise regarding the broader societal implications of automated financial surveillance. AI-powered AML systems contribute to the expansion of monitoring capabilities within financial institutions, enabling the continuous analysis of customer behavior on an unprecedented scale. While these capabilities can strengthen efforts to combat financial crime, they also raise questions about privacy, autonomy, and the balance between collective security and individual freedoms. Excessive reliance on automated surveillance may create a climate in which individuals are subject to constant evaluation and risk assessment without their knowledge or meaningful participation in the process (Zarsky, 2016). International regulatory frameworks increasingly recognize the need to balance effective AML enforcement with the protection of fundamental rights. The Financial Action Task Force (2021) has acknowledged that innovative technologies offer significant opportunities to improve financial crime detection but has also emphasized the importance of ensuring appropriate governance, transparency, and accountability. Similarly, emerging AI governance initiatives within the European Union stress the importance of human oversight, explainability, and safeguards for individuals affected by automated decision-making systems (European Parliament & Council of the European Union, 2024). Ultimately, the growing use of AI in AML compliance highlights the need for robust legal and ethical safeguards to protect procedural fairness and individual rights. While automated systems can enhance the detection of suspicious activities and improve regulatory compliance, they must operate within frameworks that ensure accountability, transparency, and meaningful human involvement. Financial institutions should establish clear review procedures, provide appropriate mechanisms for challenging adverse decisions where legally permissible, and ensure that automated risk

assessments do not undermine fundamental principles such as due process and the presumption of innocence. As AI technologies continue to evolve, maintaining this balance will remain essential for preserving public trust in both financial institutions and regulatory systems.

5. Conclusion

Artificial intelligence (AI) offers significant advantages for anti-money laundering (AML) monitoring and compliance by enhancing the ability of financial institutions to detect suspicious activities, identify complex financial crime patterns, and improve operational efficiency. Traditional AML systems often rely on static, rule-based approaches that struggle to cope with the growing volume and complexity of modern financial transactions. In contrast, AI technologies, particularly machine learning and advanced analytics, can process vast amounts of structured and unstructured data, identify hidden relationships between transactions, and adapt to emerging money laundering techniques. These capabilities enable financial institutions to improve detection rates, reduce false-positive alerts, optimize resource allocation, and strengthen overall compliance performance (Financial Action Task Force [FATF], 2021). The growing adoption of AI in AML compliance reflects a broader transformation of financial regulation driven by technological innovation. As financial services become increasingly digitalized, criminal organizations have developed more sophisticated methods for concealing illicit funds, often exploiting cross-border transactions, digital payment systems, and complex corporate structures. AI provides regulators and financial institutions with powerful tools to respond to these evolving threats by facilitating real-time monitoring, predictive risk analysis, and enhanced investigative capabilities. Consequently, AI has become an essential component of modern AML strategies and is widely viewed as a critical instrument in the global fight against financial crime (United Nations Office on Drugs and Crime [UNODC], 2023). Despite these considerable benefits, the implementation of AI in AML systems presents substantial legal, ethical, and governance challenges. One of the most significant concerns relates to the protection of personal data and privacy rights. AI-based monitoring systems require extensive access to customer information, transaction records, behavioral data, and other sensitive financial information. Such large-scale data processing raises important questions regarding compliance with data protection frameworks, particularly the General Data Protection Regulation (GDPR) within the European Union. Financial institutions must ensure that data collection and processing activities remain lawful, transparent, proportionate, and consistent with principles such as purpose limitation and data minimization (European Union, 2016). Failure to comply with these requirements may undermine public trust and expose organizations to significant legal liability. Algorithmic transparency represents another major challenge. Many advanced AI models, particularly those employing deep learning techniques, operate as highly complex systems whose internal decision-making processes are difficult to explain. This lack of explainability may create significant difficulties for regulators, compliance officers, auditors, and affected individuals seeking to understand how

specific risk assessments or compliance decisions have been reached. Transparency is particularly important in the AML context because automated decisions can have serious consequences, including transaction restrictions, account closures, enhanced scrutiny, or referrals to law enforcement authorities. Without adequate explainability, individuals may be unable to challenge decisions effectively, while institutions may struggle to demonstrate regulatory compliance and accountability (Wachter et al., 2017). Concerns regarding algorithmic bias further complicate the ethical use of AI in AML compliance. Machine learning systems learn from historical datasets that may contain inaccuracies, incomplete information, or embedded social and institutional biases. Consequently, AI models may unintentionally produce discriminatory outcomes by disproportionately targeting certain demographic groups, geographic regions, or customer categories. Such biases can result in unfair treatment, reputational harm, and potential violations of anti-discrimination principles and human rights protections. Addressing these risks requires ongoing model validation, regular audits, diverse training datasets, and continuous monitoring to ensure fairness and accuracy in automated decision-making processes (Mittelstadt et al., 2016). Accountability is equally important in ensuring the responsible deployment of AI systems. When an AI model fails to identify suspicious activity or incorrectly flags legitimate transactions, questions arise regarding who should bear responsibility for the resulting consequences. Determining accountability may be particularly difficult when decision-making involves multiple actors, including financial institutions, software developers, third-party vendors, and compliance personnel. To address these concerns, regulators increasingly emphasize the need for comprehensive AI governance frameworks that establish clear responsibilities, oversight mechanisms, and procedures for monitoring system performance throughout the AI lifecycle (Organisation for Economic Co-operation and Development [OECD], 2024). The use of AI in AML compliance also raises concerns regarding procedural fairness and due process. Individuals affected by automated risk assessments may experience significant restrictions on their financial activities without fully understanding the basis for such decisions. Fundamental legal principles, including the presumption of innocence and the right to fair treatment, require that individuals have access to meaningful safeguards when decisions substantially affect their rights or interests. Human oversight therefore remains a critical component of responsible AI governance. Regulatory authorities increasingly advocate for a “human-in-the-loop” approach, whereby AI systems assist decision-makers rather than replacing human judgment entirely. Such oversight helps ensure that contextual factors are considered, errors are corrected, and accountability remains clearly assigned (European Union Agency for Fundamental Rights [FRA], 2020). Given these challenges, a balanced regulatory approach is essential. Policymakers face the complex task of encouraging innovation while simultaneously protecting fundamental rights and maintaining public confidence in financial systems. Excessively restrictive regulation may hinder technological development and limit the effectiveness of AML efforts, whereas insufficient oversight may expose individuals to privacy violations, discriminatory outcomes, and unjustified restrictions. Effective regulation should therefore promote innovation while establishing clear legal standards governing transparency,

explainability, accountability, data protection, and human oversight. Emerging regulatory initiatives, such as the European Union Artificial Intelligence Act, reflect growing recognition of the need for risk-based governance frameworks capable of addressing the unique challenges posed by AI technologies (European Parliament & Council of the European Union, 2024). International cooperation will also play an increasingly important role in shaping the future regulation of AI-driven AML systems. Financial crime is inherently transnational, and differences in regulatory standards across jurisdictions may create opportunities for regulatory arbitrage and inconsistent protection of individual rights. Organizations such as the FATF, the OECD, and the United Nations have emphasized the importance of developing harmonized approaches that facilitate innovation while ensuring adherence to legal and ethical standards. Such cooperation can support the development of best practices, common governance principles, and effective mechanisms for cross-border supervision of AI-based financial monitoring systems (FATF, 2021; OECD, 2024). As AI technologies continue to evolve, legal frameworks must likewise adapt to address emerging risks and opportunities. Future developments in machine learning, predictive analytics, and automated decision-making are likely to further transform AML compliance practices. Regulators and financial institutions must therefore remain proactive in evaluating the societal implications of these technologies and ensuring that regulatory safeguards evolve alongside technological advancements. Continuous assessment, interdisciplinary collaboration, and stakeholder engagement will be necessary to maintain an appropriate balance between innovation and the protection of fundamental rights.

In conclusion, artificial intelligence has the potential to significantly strengthen anti-money laundering efforts by improving detection capabilities, increasing operational efficiency, and enhancing the ability of financial institutions to respond to increasingly sophisticated financial crimes. However, these benefits must be carefully balanced against the legal and ethical challenges associated with data protection, algorithmic transparency, bias, accountability, and due process. The long-term success of AI in AML compliance will depend not only on technological innovation but also on the establishment of robust legal frameworks and governance structures that ensure fairness, transparency, and respect for fundamental rights. By adopting a balanced and rights-based approach, regulators and financial institutions can harness the benefits of AI while preserving public trust and upholding the rule of law.

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Textual cohesion and coherence in writing competence

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Abstract

Effective writing requires more than grammatical accuracy and appropriate lexical choice. Writers must establish meaningful relationships among textual elements and organise ideas in ways that enable readers to interpret a text as a coherent whole. In this context, textual cohesion and coherence represent two closely related yet conceptually distinct dimensions of writing competence. This paper provides a theoretical and pedagogical discussion of textual cohesion and coherence, with particular attention to their relationship and relevance to writing practices in second and foreign language contexts. Drawing on perspectives from text linguistics, discourse analysis, and second language writing, the paper examines cohesion as the linguistic realisation of relationships within a text and coherence as the meaningful and logical organisation of textual ideas. Attention is given to grammatical and lexical cohesion, thematic development, logical progression, paragraph organisation, and the role of context and communicative purpose in the construction of coherent texts. The discussion highlights that cohesive devices contribute to textual connectedness but do not automatically ensure global coherence. Effective writing therefore requires the integration of linguistic connections with the purposeful organisation and development of ideas. The paper further discusses pedagogical implications for EFL writing instruction, emphasising model-text analysis, reading-to-writing activities, explicit attention to textual organisation, revision, feedback, and metacognitive reflection. It is argued that cohesion and coherence should be taught as complementary dimensions of writing competence rather than as isolated linguistic features.

Keywords: textual cohesion; textual coherence; writing competence; academic writing; EFL writing.

1. Introduction

Writing is a complex form of language use that requires writers to coordinate linguistic knowledge, textual organisation, communicative purpose, and awareness of the intended reader. In second and foreign language contexts, developing writing competence is particularly challenging because learners must simultaneously manage grammatical accuracy, lexical choice, sentence construction, organisation of ideas, and the conventions associated with particular genres and communicative situations. Consequently, successful writing cannot be adequately evaluated only at the level of individual sentences. A well-formed text also needs to establish relationships among its parts and develop its ideas in a meaningful and interpretable way.

Two concepts that have played a central role in the study of texts are cohesion and coherence. Although the two concepts are closely related, they do not refer to the same textual phenomenon. Cohesion generally concerns the linguistic resources through which relationships between different parts of a text are explicitly established, whereas coherence is associated more broadly with the meaningful organisation and interpretation of ideas. Halliday and Hasan (1976) established one of the most influential frameworks for understanding cohesion by identifying grammatical and

lexical resources that create links across textual units. Their work demonstrated that texts are not merely sequences of grammatically independent sentences but are characterised by networks of relationships that contribute to their textual unity.

Coherence, in contrast, has been conceptualised from several perspectives, including semantic, pragmatic, cognitive, discourse-based, and reader-oriented approaches. Rather than being restricted to identifiable linguistic forms, coherence concerns the extent to which ideas in a text can be interpreted as logically and meaningfully connected. Johns (1986), for example, highlighted the complexity of defining coherence in academic writing and emphasised the importance of considering both textual organisation and readers' interpretation. Similarly, Sanders and Pander Maat (2006) distinguish cohesion and coherence while emphasising their close relationship in the construction and interpretation of discourse.

The distinction between cohesion and coherence is particularly important in second language writing. Learners may produce texts containing numerous conjunctions, pronouns, lexical repetitions, and other cohesive devices without necessarily producing a text that is logically organised or easy to interpret. Conversely, a text may communicate a coherent line of thought even when relatively few overt cohesive devices are used. Therefore, the presence or frequency of cohesive devices should not be treated as a direct equivalent of textual quality.

Recent research confirms the continuing importance of these issues in second language studies. A large-scale bibliometric review of research published between 1981 and 2025 found that L2 cohesion and coherence research has expanded substantially, with writing remaining the dominant area of investigation. The review also identified a persistent imbalance between attention to cohesion and coherence, with coherence receiving comparatively less scholarly attention (Li & Mat Said, 2026). In addition, Wang and Xie (2022) conceptualised discourse competence in academic writing through features including global coherence, local coherence, logical connectives, and topic building, demonstrating that discourse-level abilities constitute an important dimension of successful EFL writing.

Against this background, the purpose of this paper is to provide a theoretical discussion of textual cohesion and coherence and to examine their relationship to writing competence. The paper focuses particularly on how these concepts can be understood within EFL writing and how they can inform writing instruction. It argues that cohesion and coherence should not be treated as isolated textual features but as complementary dimensions of effective written communication.

2. Conceptualising Textual Cohesion

Cohesion has traditionally been associated with the linguistic relationships that connect different elements of a text. Halliday and Hasan (1976) define cohesion as relations within the text that contribute to its textual unity. From this perspective, cohesion is not simply a collection of grammatical or lexical forms but a set of relationships through which one element in discourse is interpreted with reference to another.

Halliday and Hasan (1976) identify five major categories of cohesive ties: reference,

substitution, ellipsis, conjunction, and lexical cohesion. Reference occurs when an element depends on another textual element for its interpretation. Pronouns such as *he*, *she*, *it*, and *they*, as well as demonstrative and comparative forms, may establish referential relationships across sentences. Substitution involves replacing one linguistic item with another, while ellipsis involves the omission of an element that can be recovered from the surrounding context. Conjunction establishes logical relationships between textual units, including relations of addition, contrast, cause, and sequence. Lexical cohesion, meanwhile, is created through lexical relationships such as repetition and other forms of semantic association.

Grammatical cohesion is particularly important because it allows writers to establish relationships without repeatedly stating the same lexical information. Reference, substitution, ellipsis, and conjunction enable writers to connect clauses and sentences and to reduce unnecessary repetition. Halliday and Matthiessen (2014) further develop the systemic functional account of conjunction by distinguishing relations such as elaboration, extension, and enhancement. These relations demonstrate that conjunctions are not limited to simple linking expressions but contribute to the organisation of meanings across larger stretches of discourse.

Lexical cohesion operates through relationships among lexical items. Repetition may establish continuity by maintaining a key lexical item across a text, while synonymy and other semantic relations can allow writers to maintain a topic without excessive repetition. Lexical cohesion can therefore contribute to both topic continuity and lexical variation. In EFL writing, the development of lexical cohesion is particularly relevant because learners often experience difficulties in balancing lexical repetition with appropriate variation.

Recent research provides further evidence for the importance of lexical cohesion in writing L2. Zhang and Zhang (2023), for example, examined the longitudinal development of lexical cohesion in EFL learners' argumentative writing and identified different developmental trajectories for local and global lexical cohesion. Their findings also suggested that learners do not necessarily develop all dimensions of lexical cohesion at the same rate, highlighting the complexity of cohesion development in L2 writing.

However, the presence of cohesive devices does not automatically make text effective. A writer may use numerous cohesive markers while creating inappropriate or unclear relationships among ideas. Consequently, cohesion should be understood as one dimension of textual organisation rather than as a sufficient condition for textual effectiveness.

3. Conceptualising Textual Coherence

Unlike cohesion, which can often be identified through observable linguistic forms, coherence is more strongly associated with the meaningful organisation and interpretation of a text. Coherence concerns the way in which individual propositions, sentences, paragraphs, and larger sections contribute to an overall line of meaning. De Beaugrande and Dressler (1981) treat coherence as one of the standards of textuality and associate it with the ways in which concepts and relations are connected

within a text. From this perspective, a text becomes coherent when its elements can be interpreted as contributing to an identifiable conceptual structure. Coherence is therefore not simply a matter of grammatical correctness. It involves relationships among ideas and the construction of an overall meaning that readers can interpret.

Johns (1986) points out that coherence is a complex concept in academic writing because it involves relationships among ideas as well as readers' interpretation of those relationships. This observation is particularly relevant to academic writing, where writers are expected to establish a clear argument, develop ideas systematically, and guide readers through a sequence of claims, explanations, evidence, and conclusions. Coherence can operate at several levels. At the local level, coherence concerns relationships between neighbouring clauses or sentences. At the global level, it concerns the organisation of the text. A paragraph may be locally coherent because its individual sentences are meaningfully related, while the overall essay may still lack global coherence if its paragraphs do not contribute to a clear central argument. The distinction between local and global coherence is particularly important in EFL writing. Learners may successfully connect individual sentences but experience difficulties in developing a sustained argument across several paragraphs. Wang and Xie (2022), in their framework of discourse competence for EFL academic writing, explicitly distinguish global coherence and local coherence and place both within a broader model that also includes topic building and logical connectives. Their work illustrates the importance of considering discourse organisation beyond individual cohesive devices.

Coherence is also influenced by factors outside the immediate linguistic structure of the text. Genre, communicative purpose, background knowledge, cultural expectations, and readers' knowledge all influence how a text is interpreted. Consequently, coherence cannot always be reduced to a fixed set of linguistic forms. A text may be grammatically accurate and heavily marked by cohesive devices while still being difficult to interpret because the underlying ideas are poorly organised.

This observation is particularly significant for writing instruction. If coherence is presented to learners simply as the use of linking expressions, students may develop the misconception that adding connectors automatically makes a text coherent. Effective instruction should instead encourage learners to consider whether each idea contributes to the overall purpose of the text and whether relationships among ideas are clear and logically motivated.

4. Cohesion and Coherence: Distinctions and Interrelationships

Although cohesion and coherence are conceptually distinct, they are closely interconnected. Cohesion concerns the linguistic realisation of relationships within a text, while coherence concerns the meaningful organisation and interpretation of those relationships. The distinction can therefore be understood as a difference between the resources used to connect textual elements and the meaningful unity that readers construct from the text.

Halliday and Hasan's (1976) framework demonstrates how cohesion provides explicit linguistic signals that connect different parts of discourse. Reference, conjunction,

substitution, ellipsis, and lexical relations can make relationships between textual elements more visible. Such resources can facilitate the processing and interpretation of discourse. However, cohesive links are meaningful only when they contribute to appropriate semantic and discourse relationships.

For example, a writer may produce a sequence such as:

Firstly, social media influences language. However, many students use online platforms every day. Therefore, traditional communication is important. In addition, this problem is difficult. The passage contains several cohesive devices, including *however*, *therefore*, and *in addition*. Nevertheless, the relationships among the propositions are not sufficiently clear. The presence of conjunctions does not compensate for the absence of a logically developed argument. The example illustrates why cohesion cannot be equated with coherence.

The reverse situation is also possible. Writers may establish clear semantic relationships without using many explicit cohesive devices. In some contexts, readers can infer relationships between propositions through shared knowledge, thematic continuity, lexical choices, and the logical progression of ideas. Therefore, the absence of an overt cohesive marker does not necessarily indicate a lack of coherence.

Sanders and Pander Maat (2006) emphasise the importance of distinguishing linguistic cohesion from the relations that contribute to coherence. This distinction is also relevant to pedagogical approaches because it suggests that learners need to understand not only how to use cohesive devices, but also why particular relationships are appropriate in a given context.

The relationship can therefore be conceptualised as complementary rather than strictly causal. Cohesive resources may support the construction and interpretation of coherent discourse, but coherence depends on broader semantic, conceptual, rhetorical, and contextual relationships. In this sense, cohesion can be viewed as an important linguistic resource for coherence, while coherence represents a broader dimension of textual organisation.

Recent research supports the need for this integrated perspective. Li and Mat Said (2026), in their review of four decades of L2 cohesion and coherence research, note that writing-related research continues to dominate the field, but that cohesion has consistently attracted more attention than coherence. They argue that the development of the field has increasingly moved towards more fine-grained conceptualisations of cohesion and coherence and towards examining relationships across multiple linguistic levels.

This development is important because an exclusive focus on measurable cohesive devices can provide an incomplete picture of writing quality. Frequency-based measures may identify how often particular linguistic features occur, but they cannot by themselves determine whether those features are used appropriately or whether the text communicates a coherent message.

5. Cohesion and Coherence in Writing Competence

Writing competence involves the ability to produce texts that are linguistically accurate, appropriately organised, meaningful, and suitable for a particular

communicative purpose. Although definitions of writing competence vary across theoretical traditions, there is broad recognition that successful writing involves multiple dimensions rather than grammatical accuracy alone.

Hyland (2022) emphasises the complex and socially situated nature of writing and highlights the importance of understanding writing as a form of communication rather than simply as the production of grammatically correct sentences. From this perspective, writing competence involves the ability to make appropriate linguistic and rhetorical choices in relation to context, purpose, genre, and audience.

Cohesion and coherence are central to this ability because they operate at the level where individual linguistic forms are transformed into extended discourse. A writer who knows how to construct grammatically accurate sentences may still struggle to produce an effective essay if the relationships among those sentences and paragraphs are unclear.

The connection between cohesion, coherence, and broader discourse competence has been explicitly addressed in recent EFL writing research. Wang and Xie (2022) conceptualise discourse competence through five components and ten features, including topic building, global coherence, local coherence, logical connectives, and reader–writer interactions. Their framework illustrates that cohesion and coherence form part of a broader ability to manage discourse beyond sentence-level accuracy.

This perspective has important implications for the assessment of writing. If assessment focuses primarily on grammar and vocabulary, learners may receive insufficient information about their ability to construct extended discourse. Conversely, if cohesive devices are counted without examining their function and appropriateness, assessment may overestimate the quality of a text.

An effective assessment of writing competence should therefore consider how linguistic resources interact with the development and organisation of ideas. At the sentence level, the writer needs to establish appropriate grammatical and lexical relationships. At the paragraph level, ideas need to be developed and related to a clear topic. At the essay level, paragraphs should contribute to an identifiable overall purpose and line of argument.

This multidimensional perspective is especially relevant to EFL learners because their difficulties may occur at different levels simultaneously. A learner may use conjunctions appropriately but fail to establish a clear progression of ideas. Another learner may develop a coherent argument but rely heavily on repetition because of limited lexical resources. A third learner may demonstrate strong local cohesion while struggling with the organisation of the overall text. Such differences demonstrate why writing competence cannot be reduced to a single measure.

Cohesion and coherence should consequently be regarded as complementary dimensions of writing competence. Cohesion provides important linguistic resources for creating textual connectedness, while coherence concerns the meaningful organisation and interpretation of the resulting discourse.

6. Cohesion and Coherence in EFL Writing Practices

The distinction between cohesion and coherence becomes particularly important when considering actual writing practices. EFL learners frequently receive explicit

instruction in connectors, transition words, pronouns, and other cohesive devices. Although such instruction can be useful, excessive emphasis on individual forms may encourage mechanical rather than meaningful use.

One common problem is the assumption that adding more connectors automatically improves text. Learners may insert expressions such as *firstly*, *however*, *moreover*, *therefore*, and *in conclusion* because they have been taught that these expressions make academic writing more sophisticated. However, if the logical relationship between the ideas does not correspond to the meaning of the connector, the resulting text may become less clear rather than more coherent.

Another problem concerns lexical cohesion. Learners may avoid repetition by replacing a key word with a synonym without considering whether the replacement has the same meaning or is appropriate in the particular context. Excessive lexical variation can therefore weaken rather than strengthen textual continuity. Effective lexical cohesion requires a balance between maintaining topic continuity and introducing appropriate variation.

The development of lexical cohesion in EFL writing is not necessarily linear. Zhang and Zhang (2023) found heterogeneous developmental trajectories for lexical cohesion in a longitudinal corpus of EFL argumentative writing. Their findings suggest that learners may develop different dimensions of local and global lexical cohesion in different ways. Such evidence reinforces the need for writing instruction that treats cohesion as a developmental and context-sensitive ability rather than as a fixed list of forms.

Reading can also play an important role in the development of writing competence. Exposure to well-constructed texts provides learners with models of how writers introduce topics, develop arguments, organise paragraphs, use cohesive resources, and signal relationships between ideas. Reading-to-writing approaches can therefore provide learners with opportunities to observe textual organisation before attempting to reproduce similar patterns in their own writing.

However, reading does not automatically result in improved writing. The pedagogical value of reading depends partly on how learners engage with texts. If learners read only for content, they may acquire limited awareness of the linguistic and rhetorical resources through which the text is constructed. In contrast, guided analysis can draw attention to patterns of cohesion, paragraph organisation, thematic development, and argument structure.

This suggests that writing practices should incorporate a stronger analytical component. Rather than presenting a model text simply as something to imitate, teachers can ask learners to identify how the text introduces its topic, maintains continuity, develops ideas, connects paragraphs, and signals relationships between propositions. Such activities can help learners understand the relationship between linguistic form and textual meaning.

Revision is another essential dimension of this process. Cohesion and coherence should not be treated only as features to be considered during the first stage of composition. Writers need opportunities to reread their texts and evaluate whether references are clear, whether lexical choices maintain appropriate continuity, whether conjunctions express the intended relationships, and whether ideas progress logically from one paragraph to another.

7. Pedagogical Implications

The theoretical distinction between cohesion and coherence has direct implications for EFL writing instruction. First, cohesion should be taught through texts rather than exclusively through isolated exercises. Learners need to see how reference, conjunction, substitution, ellipsis, and lexical relationships operate across authentic or appropriately designed stretches of discourse. Teaching individual forms without their textual context may provide learners with declarative knowledge but insufficient understanding of their communicative function.

Second, instructions should explicitly connect cohesive devices with the relationships they express. For example, learners should not simply memorise that *however* is a contrastive connector. They should examine the propositions that precede and follow it and determine whether a contrast actually exists. Similarly, students should be encouraged to examine whether a pronoun has a clear antecedent and whether a lexical substitution preserves the intended meaning.

Third, coherence should be taught as an organisational and meaning-making process. Learners need opportunities to analyse how writers construct a central topic, develop supporting ideas, establish relationships between paragraphs, and create logical progression. Questions such as *“What is the main point of this paragraph? How does this sentence contribute to the previous idea? Why does the next paragraph follow from the provided idea?”* can encourage learners to focus on meaning rather than only on linguistic form.

Fourth, model-text analysis can provide an effective bridge between reading and writing. Teachers can guide learners through selected texts and draw attention to both cohesive resources and larger organisational patterns. Such analysis can help students recognise that effective writing depends on the interaction between local linguistic choices and global textual organisation.

Fifth, writing instruction should include systematic revision and feedback. Feedback on cohesion should move beyond identifying incorrect connectors or unclear references. It should also address whether linguistic choices contribute to the intended meaning of the text. Similarly, feedback on coherence should be specific rather than limited to general comments such as *“organise your ideas better.”* Teachers can identify where an argument becomes difficult to follow and explain what relationship between ideas needs to be made clearer.

Metacognitive reflection can further support this process. Learners can be encouraged to develop checklists or revision questions addressing both cohesion and coherence. For example, they may examine whether key terms are maintained consistently, whether references are clear, whether connectors express accurate relationships, whether each paragraph has a clear focus, and whether the overall text develops towards its communicative purpose.

An integrated approach is particularly relevant because recent research has shown that discourse competence involves several interconnected dimensions. Wang and Xie (2022), for instance, distinguish topic building, global coherence, local coherence, logical connectives, and reader–writer interactions. Such a framework demonstrates that successful academic writing requires learners to coordinate multiple discourse-

level resources rather than simply increase their use of cohesive markers. The pedagogical objective should therefore be to move learners from device-based writing towards meaning-based textual organisation. Cohesive devices should be taught as resources that serve communicative and rhetorical purposes, while coherence should be developed through activities that require learners to organise, connect, and develop ideas.

8. Towards an Integrated Approach to Writing Instruction

The relationship between cohesion and coherence suggests the need for an integrated model of writing instruction. In a traditional form-focused approach, students may first learn grammatical and lexical structures and subsequently be asked to use them in longer texts. While such knowledge is necessary, it does not guarantee the ability to construct effective discourse.

An integrated approach begins from the assumption that writing develops through the interaction of linguistic knowledge, textual organisation, communicative purpose, and revision. Cohesion is therefore introduced not as an isolated category of linguistic forms but as a set of resources that writers use to establish relationships within discourse. Coherence is introduced not as an abstract quality that a text either possesses or lacks, but as the result of purposeful organisation and meaningful relationships among ideas.

This approach can be represented conceptually as follows:

Linguistic resources → textual connectedness → meaningful organisation → effective discourse → writing competence

The sequence should not be interpreted as a strict causal chain. Rather, it represents the interaction between different dimensions of writing. Cohesive resources contribute to textual connectedness, while coherent organisation gives those resources their communicative purpose. Together, they contribute to the construction of effective discourse and, consequently, to broader writing competence.

Such an approach also has implications for curriculum design. Cohesion and coherence should recur throughout writing courses rather than being presented in a single isolated unit. At elementary stages, learners may focus on reference, conjunction, lexical repetition, and basic paragraph organisation. At more advanced stages, instruction can address thematic progression, argument structure, genre-specific organisation, reader awareness, and the relationship between local and global coherence.

This approach also supports the integration of reading and writing. Reading provides learners with exposure to textual patterns, while writing provides opportunities to apply and transform those patterns. When reading is accompanied by explicit textual analysis, learners can become more aware of how writers construct cohesion and coherence. When this awareness is subsequently applied in writing and revision, learners may develop greater control over their own textual choices.

Recent research demonstrates the continued importance of this integrated perspective. Li and Mat Said (2026) show that L2 cohesion and coherence research has increasingly moved towards more refined and multidimensional approaches, although writing

continues to dominate the field and coherence remains comparatively less studied. This suggests that future pedagogical and research work should pay greater attention to how learners organise meaning across larger textual units rather than focusing exclusively on individual cohesive features.

9. Conclusion

Textual cohesion and coherence are central to the construction of effective written discourse, but they represent different dimensions of textual organisation. Cohesion concerns the linguistic relationships through which textual elements are connected, while coherence concerns the meaningful and logical organisation through which readers interpret those elements as a unified whole.

The distinction is particularly important in EFL writing because learners may develop knowledge of cohesive devices without necessarily developing the ability to organise ideas coherently. The frequent use of connectors, pronouns, repetition, or other cohesive resources does not guarantee that a text will communicate a clear and logically developed message. At the same time, coherent organisation may sometimes be achieved with relatively few overt cohesive markers. Effective writing therefore depends on the interaction between linguistic connectedness and meaningful organisation.

The literature reviewed in this paper suggests that cohesion and coherence should be understood as complementary dimensions of writing competence. Cohesion provides writers with linguistic resources for establishing relationships across textual units, while coherence involves the organisation and interpretation of those relationships within a broader semantic and communicative framework. Recent research in L2 writing further demonstrates the relevance of these dimensions to discourse competence and academic writing.

From a pedagogical perspective, the implications are clear. EFL writing instruction should move beyond the mechanical teaching of linking expressions and should instead integrate cohesion with the development of ideas, paragraph organisation, thematic progression, genre awareness, revision, and reader orientation. Model-text analysis, reading-to-writing activities, explicit discussion of textual organisation, feedback, and metacognitive reflection can provide learners with opportunities to develop these abilities in an integrated manner.

Ultimately, the development of writing competence requires learners not only to produce grammatically accurate sentences but also to construct texts in which linguistic choices, ideas, and rhetorical purposes work together. Teaching cohesion and coherence as interconnected but distinct dimensions can therefore contribute to a more comprehensive approach to EFL writing development and to the production of texts that are not merely linguistically connected, but also meaningful, purposeful, and coherent.

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Geochemical characteristics of the Gorisht-Kocul oil field in Albania

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Abstract

The paper deals with the main features of the crude oil of the Gorisht-Kocul oil field. This oil field was discovered in 1965 (without gas cap) with an oil-bearing layer of 850 meters, with geological reserves of 30.5 million tons. By 2025, 12,313,660.5 tons of crude oil have been produced. The Gorisht-Kocul oil field is currently active.

Based on the component composition, the crude oil of the Gorisht-Kocul oil field is with a high content of NSO+ASPH and fluctuates in the range of 36% to 55%. It also has a high sulfur content from 4.2% to 5.97%.

The density of the crude oil of the Gorisht-Kocul oil field is high in the range of 0.953-0.971. This indicator converted to API fluctuates in the range of 14.226 to 16.978. Based on the two indicators, the oil of the Gorisht-Kocul field is of the heavy type.

Based on the results of Engler distillation, the oil of the Gorisht-Kocul oil field is distinguished from other oils, as it has a low boiling point, on average 59.6°C. While the content of the 250°C-300 °C fraction is low.

The oil of the Gorisht-Kocul field is of the heavy type, with a high sulfur content.

Keywords: Oil field, saturated hydrocarbon, API, sulfur, Engler distillation.

1. Introduction

Albania is rich in oil and gas fields. The petroleum potential is related to the carbonate section of the Ionian zone (Prifti, 2011; Gjoka et al, 1986).

The positive result for oil in Albania begins with the production of oil from the well in Drashovic in 1918 with a depth of 200m (Bano & Kokonozi, 2001).

The first productive well that discovered the oil field in Kuçove is D-1 drilled in 1928. While in 1929 the oil field in Patos is discovered.

Oil fields in the carbonate section of the Ionian zone were discovered after 1960. The Gorisht-Kocul oil field was discovered in 1965 (Bano & Kokonozi, 2001). This reservoir represents a massive oil trap oil without gas caps. The natural reservoirs are represented by dolomitic and carbonate deposits of the Upper Triassic to Eocene (T_3 -Pg₂) with an **Gross pay** of 850 meters (Dhimulla et al, 1986; Gjini et al, 2004). The seal rocks are Oligocene flysch deposits (Pg₃). Oligocene flysch deposits, terrigenous and marl deposits of the Miocene are exposed on the surface.

The sedimentary rocks that build the Gorisht-Kocul region are clearly presented in the geological profile (Fig.2).

Two concepts are used in the article; oil trap, which lies in a structural-tectonic element, and oil field, which consists of more than one oil trap.

The geological reserves of the field are 30.5 million tons. By 2025, 12,313,660.5 tons of crude oil have been extracted. The Gorisht-Kocul field is currently active.

The Gorisht-Kocul field is located in the southern part of Albania, at the northwestern extreme of the Ionian zone (Fig.1).

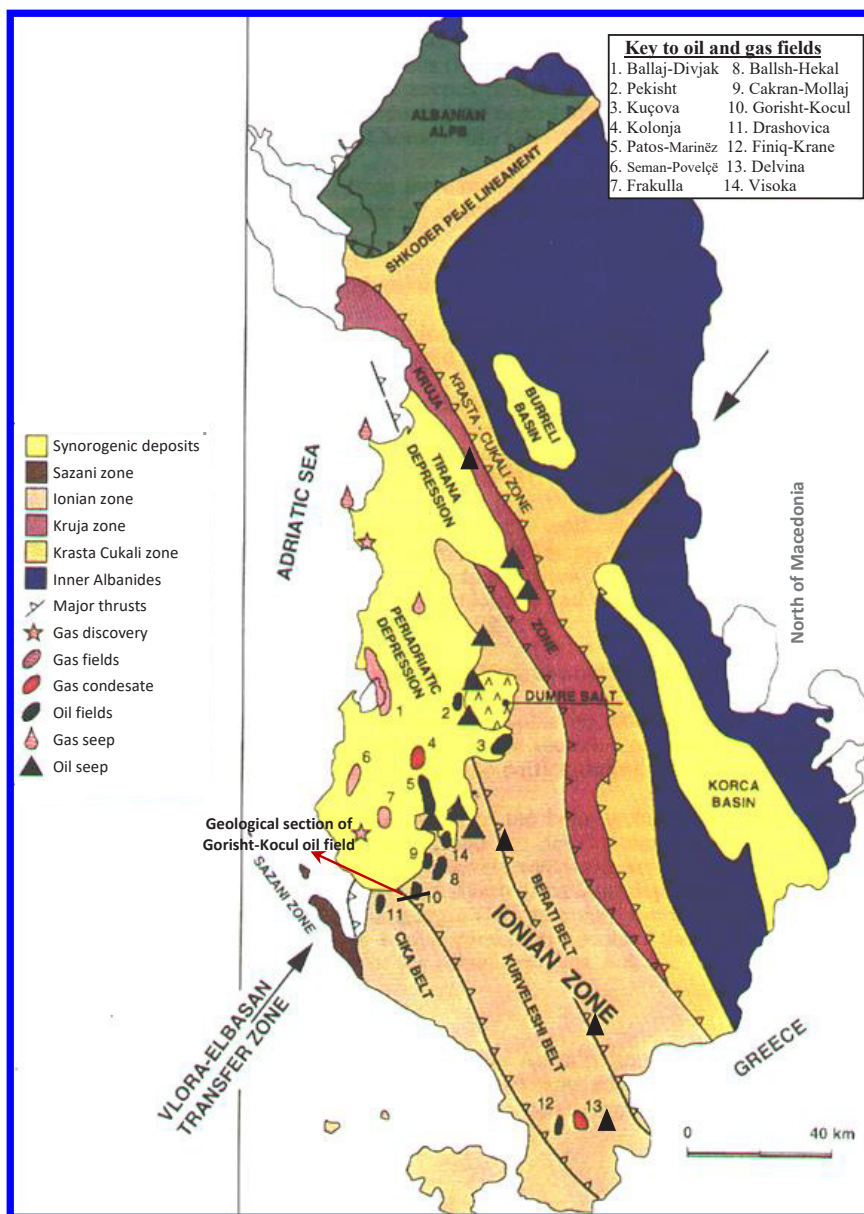


Figure 1. oil fields and gas fields in Albania

Oil produced from the Gorisht-Kocul oil field was exported to European refineries until 1978. After this year, its refining began in the refinery of the city of Ballsh until September 2019, which coincides with the closure of its activity. Then the crude oil from the Gorisht-Kocul oil field is processed in a refinery with reduced capacity (Bano & Kokonozi, 2001). The main refining product is bitumen, which is used in the construction industry.

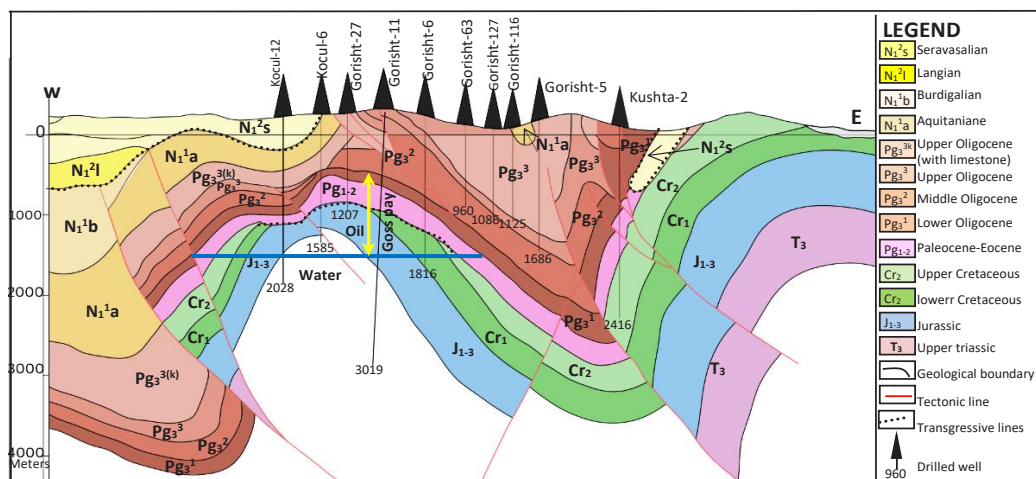


Figure 2. Geological section of Gorisht-Kocul oil field (Gjoka et al. 1986)

2. Material and method

Crude oils from oil fields in Albania have been subjected to laboratory analysis procedures. The laboratory methods used are in accordance with the European standard, on which the Albanian state standard is based.

The samples for the study were taken at the Gorisht-Kocul oil field. For reasons of correlations and classifications of crude oils samples from other oil fields in Albania were analyzed.

The oil samples are initially prepared for analysis:

- ✓ drying (removal of water or dewatering),
- ✓ desalting of petroleum,
- ✓ oil samples must reach constant weight.

The samples reach constant weight when the light hydrocarbon fractions are removed (evaporated). This is done so that the hydrocarbon samples are in the same conditions before the analysis process. There are samples from condensates and very light oils that do not reach constant weight.

The crude oil samples taken at the Gorisht-Kocul oil field reach a constant weight of 100ml. The analytical methods that we have applied in this study are the density of the crude oil (converted to API), the sulfur content, the hydrocarbon composition by liquid chromatography (after initially determining the asphaltenes) and the results of Engler distillation. Based on the analyses performed, several indicators were calculated (Prifti & Bitri, 1999).

The results of the analyses for the Gorisht-Kocul field are given in the following tables.

3. Results and discussion

Density is one of the main parameters of crude oil, it is a massive and easily measurable parameter. For interpretation purposes, API (American Petroleum Index) has been

estimated from this parameter, which is related to density according to the following equation:

$$\text{API} = 141.5/D - 131.5$$

Table 1. Geochemical parameters of crude oil from the Gotisht-Kocul oil field

Well	API	Sulfur%	Hydrocarbon compounds				Hydrocarbon reports		
			Sat.HC	Arom.HC	NSO	ASPH	(Sat+Aro) HC	NSO + ASPH	SAT / AROM
Kocul-14	13.657981	4.2	24.4	38.7	19.8	17.1	63.1	36.9	0.630491
Gorisht-22	16.86951	4.96	20	39.7	20.7	20.2	59.7	40.9	0.503778
Kocul-32	14.2	4.58	10.49	15.64	42.11	12.94	26.13	55.05	0.670716
Gorisht-77	13.4	5.36	17.4	40.2	16.8	25.8	57.6	42.6	0.432836
Gorisht-90	15.94191	4.8	18	39.4	18.79	22.2	57.4	40.99	0.456853
Gorisht-121	16.3	5.97	15.73	36.52	18.66	18.71	52.25	37.37	0.430723
Gorisht-184	16.97849	5.6	16.69	40.17	17.31	20.08	56.86	37.39	0.415484

*Sat. HC-Saturated hydrocarbons include metanic and naftenic hydrocarbons;

*Arom.HC- Aromatic hydrocarbons;

*NSO-Compound with Nitrogen, sulfur, oxygen;

*ASPH-Asphalt, heavy compound of crude oil.

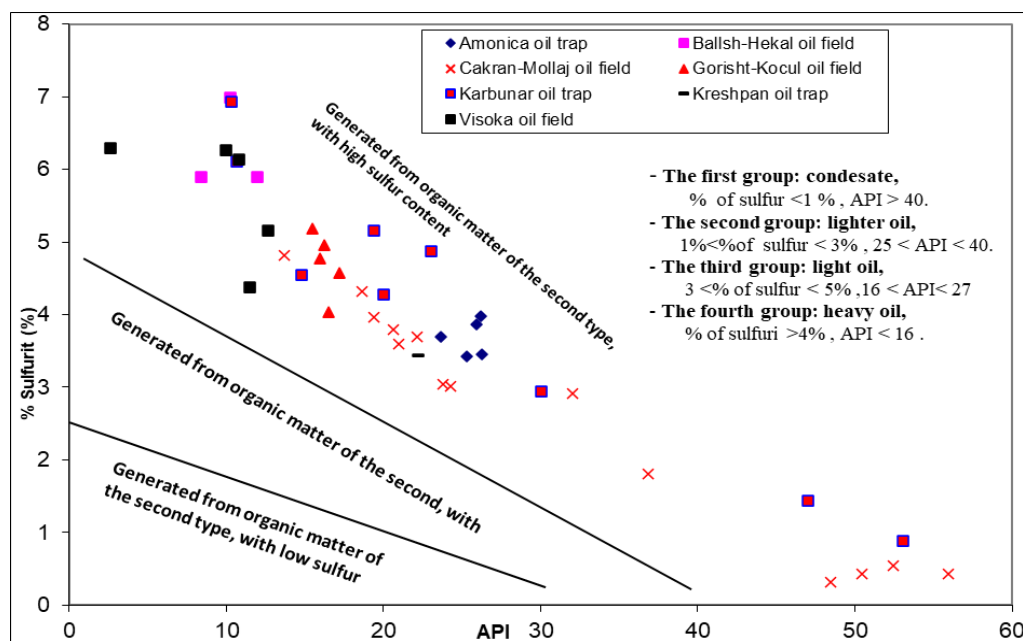


Figure 3. Separation of oil groups according to API and % sulfur (Prifti & Muska, 2013)

API is correlated with sulfur content. Based on this correlation, crude oils are divided into four groups:

- ✓ The first group: condensate: % of sulfur <1 %, API > 40.
- ✓ The second group: lighter oil: 1% <%of sulfur < 3%, 25 < API < 40.
- ✓ The third group: light oil: 3 <% of sulfur < 5%, 16 < API < 27.
- ✓ The fourth group: heavy oil: % of sulfur >4%, API < 16.

The crude oil from the Gorisht-Kocul oil field is included in the group of heavy oils and generated from organic matter of the second type, with high sulfur content (figure 3).

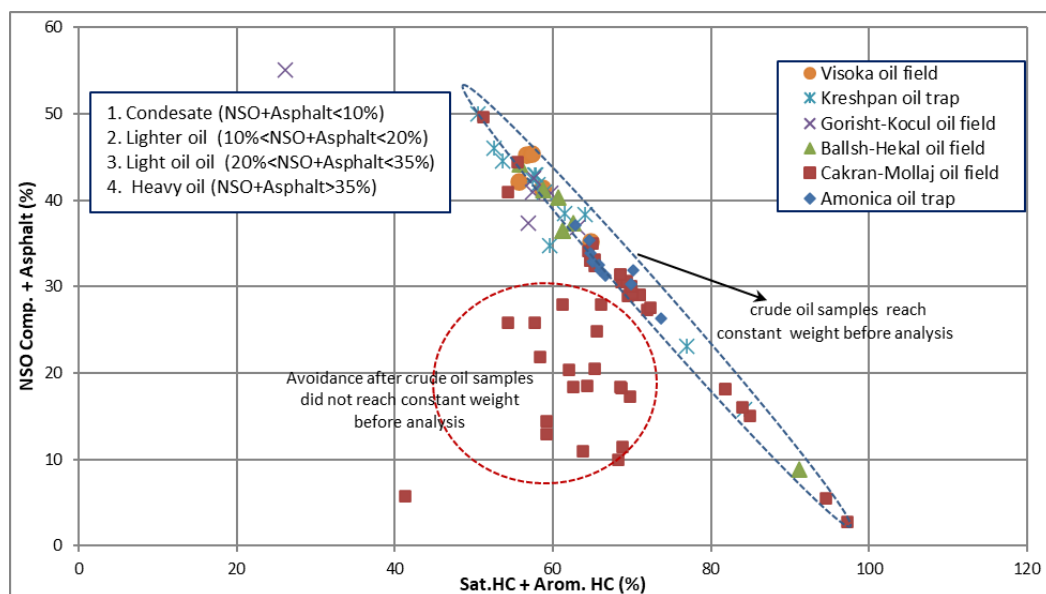


Figure 4. Classification of oils according to their hydrocarbon components

Crude oil consists of saturated hydrocarbons (methanic and naphthenic hydrocarbons), aromatic hydrocarbons, resinous compounds (nitrogen, sulfur, oxygen compounds) and asphaltenes.

The crude oil of the Gorisht-Kocul oil field has a high content of aromatic hydrocarbons and NSO compounds. Aromatic hydrocarbons prevail over saturated ones. The ratio Saturated HC/Aromatic HC is less than 1 and is characteristic of immature oils (Denis et al. 1993)

Based on the hydrocarbon composition of crude oil, we have prepared two indicators: saturated hydrocarbons + aromatic hydrocarbons and NSO + asphalts (Prifti & Bitri, 1999). The correlation between them is given in Figure 4.

The figure shows two groups of crude oils. The first group is represented by crude oil samples reaching constant weight before analysis and represent accurate analysis results. This group includes crude oil from the Gorisht-Kocul oil field. While some samples from the Cakran-Mollaj oil field did not meet the condition of achieving constant weight before analysis.

The oil groups are separated according to NSO+Asphalt. This is done due to the fact

that they are the most stable components in crude oils.

1. Condesate (NSO+Asphalt<10%).
2. Lighter oil (10%<NSO+Asphalt<20%).
3. Light oil oil (20%<NSO+Asphalt<35%).
4. Heavy oil (NSO+Asphalt>35%).

As can be seen, the same groups are separated by API. This is due to the fact that API is influenced by the content of asphaltenes and NSO components (resines).

From Engler distillation performed on crude oils from oil fields, the following indicators were obtained (Prifti et al, 2015):

1. Start of boiling (boiling point), °C
2. Fractions (ml), start of boiling to 100°C ;
3. Fractions (ml); 100°C to 150°C ;
4. Fractions (ml); 150°C to 200°C
5. Fractions (ml); 200°C to 250°C
6. Fractions (ml); 250°C to 300°C .

Using the results, we calculated the sum of the fractions distilled up to 300°C and the fraction after 300°C (constant weight ml-fractions up to 300°C).

The results of the Engler distillation of crude oil from the Gorisht-Kocul oil field are given in Table 2. Two oil samples were analyzed from the Gorisht-75 well at different depths.

Table 2. Results of Engler distillation

Wells	Boiling point (°C)	Distillated fractions (ml)					Ratio		
		Up to 100°C	100-150 °C	150-200 °C	200-250 °C	250-300 °C	Fractions< 300°C	Fractions> 300°C	Fr:<300°C/ Fr:>300°C
Gorisht-22	53	1.5	7.5	13	19	26	67	33	2.0303
Gorisht-64	45	1.5	7.5	14	19	28.5	70.5	29.5	2.3898
Gorisht-65	49	1.5	7	13.5	18.5	25.5	66	34	1.9412
Kocul-74	64	1.7	7.5	13	18.8	27	68	32	2.125
Gorisht-75	55	0.5	6	12	17.5	25.5	61.5	38.5	1.5974
Gorisht-75	73	1.3	7.5	13.8	19	27.5	69.1	30.9	2.2362
Gorisht-90	54	4	9	14	19	27	73	23	3.173913
Gorisht-91	56	1	6	12	18	25.5	62.5	37.5	1.6667
Gorisht-101	55	1.5	7.5	13.5	19	27.5	69	31	2.2258
Gorisht-131	54	0.5	6.5	12	18	25	62	38	1.6316

Gorisht-138	89	1	7	12.5	17.8	26	64.3	35.7	1.8011
Gorisht-159	52	1.5	7.5	13.5	19	27	68.5	31.5	2.1746

Two parameters have been interpreted from Engler distillation: the initial boiling point and the ratio of the fraction up to 300°C to the fraction above 300°C. The two parameters have been correlated with API as the most useful indicator (Prifti et al, 2015).

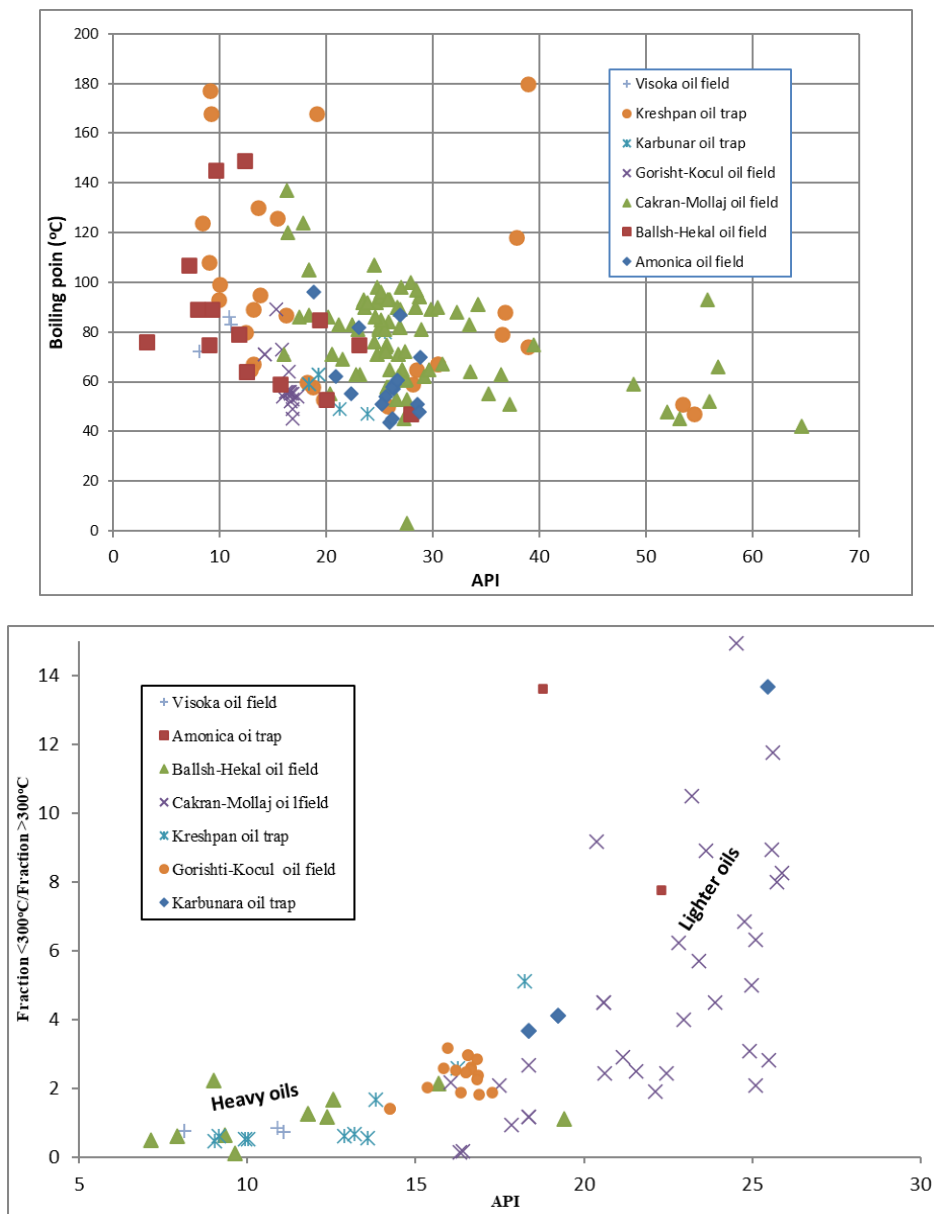


Figure 6. Correlation of API with the ratio of fractions up to 300°C with the residue above 300°C

From the comparison of the initial boiling point with API, it is evident that with the decrease in API, the initial boiling point increases. In the group of heavy oils, the crude oil of the Gorisht-Kocul oil field has the lowest boiling point (Figure 5).

The ratio of the fraction up to 300°C to the fraction above 300°C is calculated based on the sum of the distilled fractions and the fraction that remains.

This indicator is also correlated with API (Figure 6). It is noted that in the group of heavy oils, the oil of the Gorisht-Kocul oil field has the highest content of fractions distilled up to 300°C.

The physico-chemical characteristics of the crude oil of the Gorisht-Kocul oil field distinguish it as the best oil of the group of heavy oils.

4. Conclusion

Density is one of the main and easily measurable parameters (converted to API). It is used to judge the type of oil, the asphaltene and sulfur content.

According to the density (API), % sulfur and the content of NSO components and asphaltenes, the oil of the Gorisht-Kocul field is the highest quality in the group of heavy oils.

The initial boiling point obtained in the application of the Engler distillation method is lower in the group of heavy oils.

The fractions up to 300°C of the Engler distillation decrease by passing from condensates to heavy oils.

In the group of heavy oils, the crude oil of the Gorisht-Kocul oil field has the highest content of fractions up to 300°C.

The oil of the Gorisht-Kocul field is suitable for the production of asphalts and for the petrochemical industry.

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The Role of AI in ESL Writing: Enhancing Teacher Feedback with Write & Improve and Literatu

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“AI refines writing, but teachers shape thinkers.”

Abstract

Writing continues to be a difficult skill for English as a Second Language (ESL) learners, especially in relation to cohesion, argumentation, and narrative structure. AI-powered essay analyzers can do a good job of correcting grammar, spelling, and simple thought processes, but they have struggled to help students develop higher-order skills in writing — logical reasoning, rhetorical effectiveness, and the like. To address this gap, this study set out to evaluate Write & Improve and Literatu, exploring how these tools have enhanced teacher feedback and students' writing proficiency. The study involved 60 intermediate ESL students at a British international school in Abu Dhabi who analyzed essays written with and without AI assistance followed by teacher feedback on conceptual clarity and structure. These findings reveal that while AI tools do improve writing mechanics, they do not improve argument cohesion, logical flow, or creativity. Out of these tools, Literatu was found most effective as it enables teachers to amend the AI feedback, embed the IGCSE rubric, as well as adjust grading to better meet students' needs. Research has shown the power of a hybrid learning model, with AI doing the heavy lifting of automating the feedback process while teachers give direct instruction to the higher order skills of writing. Further research should deepen AI analysis of logic and rhetorical strength without losing the importance of human intervention in teaching writing. A contribution to the ongoing dialogue surrounding AI and education, this study promotes the use of human-artificial intelligence partnerships as the most effective structure to address ESL writing proficiency.

Keywords: Writing Education, AI Essay Analyzers, Logical Flow, Narrative Structure, Blended Learning, Teacher Feedback.

Introduction

Recently, the use of Artificial Intelligence (AI) in the English as a Second Language (ESL) writing assessment area has received widespread attention due to its potential in automating feedback systems allowing tutors to concentrate on enhancing higher level thinking skills (Dong, 2023). However, there still seems to be problems with evaluating arguments and logically reasoning out rhetorical elements and effectiveness. This highlights the importance of looking into how such technologies might be useful in developing more advanced writing skills such as critical thinking and systematic argumentation (Alharbi, 2023). Most literature concentrates on the issue of correcting grammatical errors instead of focusing on what constitutes logical AI-assisted academic writing at advanced levels (Marzuki et al., 2023).

To address these gaps, this research investigates the effect of teacher feedback on students' writing skills using the AI-based platforms Write & Improve and Literatu.

The primary aim of this research is to identify the possible improvements in ESL learners' academic writing concerning their structural, logical, and conceptual clarity skills because of human instruction enhanced with AI-assisted feedback.

This research seeks to answer the following questions:

- How significantly do AI writing tools like Write & Improve and Literatu change students' mastery of logic and clarity in their writing in ESL academic writing?
- What is the teachers' perception of the advantages and shortcomings of utilizing AI feedback in assessing and supporting essay development for students?
- To what degree does the integration of AI feedback and teacher comments successfully resolve issues in argument gaps, logics, and creativity in ESL writing?

This study investigates 60 (ESL) learners at the IGCSE level, which is set in the context of Abu Dhabi, where English Subject is compulsory, and academic writing is taught at all levels. The study is undertaken over three months, focusing on the impact of AI technology writing apps and its marking feedback. Formative and constructive feedback is needed espoused by the Cambridge Assessment (2021) describing the IGCSE curriculum, which balances communicative and academic writing. AI-enabled technologies have demonstrated a measure of success in aiding listening comprehension and oral fluency; however, they lack the personalization required to address intricate problems related to grammar, rhetorical structuring, and various other issues (Bax, 2018; Ellis, 2020).

Among the reviewed tools, Literatu stood out for its focus on teachers, allowing educators to customize AI feedback based on the IGCSE rubric and their students' individual needs. Write & Improve, however, seemed to excel in spotting mechanical and superficial aspects of writing. The evidence paints a picture where AI is efficient at pinpointing mechanical errors, but assessing the development of arguments and creativity in writing still relies on human judgment (Gr, 1992).

This balanced approach to the discussion concerning AI technology in education analyzes the human-AI interface, proposing that the fusion position becomes the new paradigm in instructing writing in English as a Second Language (ESL) lessons. Instead of taking the position of teachers, AI is positioned as an auxiliary service that automates the grading process while retaining the vital function of educators in fostering higher order thinking and advanced reading skills.

Literature Review

Automated writing evaluation systems (AWE) have progressed from simple spelling and grammar checkers to sophisticated systems that utilize machine learning and natural language processing (NLP) to examine higher level constructs of writing (Shermis & Burstein, 2013). These advancements make AWE a useful tool in teaching (ESL) writing, where the role of the feedback in learners' writing developmental process is critical for the improvement.

Some of the most used educational AWE applications include Cambridge English's Write & Improve and Literatu, feedback and learning analytics platforms that has widespread use in education institutions. Write & Improve rests on empirical corpus-based research and thousands of ESL essays. It offers automatic scoring based on the Common European Framework of Reference for Languages (CEFR) accompanied by

constructive revision commentary aimed at encouraging learners towards iterative redrafting (Cambridge English, 2021). Above all, the platform is distinguished for its provision of multiple submissions which encourages learners to adopt a process-oriented perspective on writing improvement.

On the other hand, Literatu does not work as a stand-alone AWE tool. Teachers can add comments, modify assessment rubrics, see student dashboards, and student analytics report visualization. This model supports educator-customized automation. In formative assessments particular timeliness and criterion rankings respond better to learners' developmental needs, which in turn makes Literatu very appealing due to such blended feedback instruments.

The pedagogical advantages of AWE tools have received more attention as of late. Zhang and Hyland (2018) observed that offering feedback during a lesson tends to increase learners' motivation to engage in the task, especially when the work is responsive to feedback. The revision-based proposals extend to Write & Improve and other platforms with process-writing pedagogy pedagogical frameworks that view revision as a fundamental step toward achieving linguistic precision and ensuring textual coherence.

Despite the criticisms mentioned, AWE is gaining attention for lacking high-order thinking skills. Cotos (2014) indicates that while AWE systems excel at recognizing mechanical errors (such as spelling, punctuation, and grammar) within a text, however they do not capture its semantic coherence, discourse structure, rhetorical sophistication, or contextual relevance. These challenges, particularly in ESL settings, where learners require significant scaffolding to appreciate genre conventions, structures of arguments, and cultural subtleties, are troublesome.

Further issues involve the diversity of writing styles and learner intent. Though rich in data, NLP models often struggle with the interpretation of direct or culturally rooted figurative language. This is particularly challenging in contexts such as IGCSE or Cambridge English, where prompts assess language ability as well as logical structure, clarity of ideas, and creativity. For this reason, many researchers advocate for a blended feedback approach in which AWE tools are integrated with teacher-led guidance (Ranalli, Link & Chukharev-Hudilainen, 2021).

This research tries to meet the gaps by looking into the practical use of Ai such as Write & Improve and Literatu which help with the development of student achievement, the level of teacher interaction, and applying AI to language classroom setup.

Methodology

Study Design and Three-Phase Implementation: Instruments, Procedures, and

Data Analysis

This case study was carried out in conjunction with a British international school in Abu Dhabi over the course of three months, enrolling 60 IGCSE ESL students aged 14 to 16. The adoption of IGCSE in conjunction with Abu Dhabi's multilingual context made the region a great place to study the impacts of AI tools on writing skills and feedback in actual classrooms. The focus of the study was on the teaching using Grammarly, ChatGPT, Write & Improve, and Literatu across academic writing skills

and assessed their impact in terms of grammatical accuracy, organization, coherence, and overall alignment with the IGCSE rubrics (Cambridge Assessment, 2021).

Phase 1: Baseline Evaluation and Participant Recruitment

The first phase emphasized the importance of contextual measures regarding students' prior AI exposure while assessing students' writing capabilities. All students who were part of the study completed a diagnostic writing assessment based on the IGCSE ESL Papers. The writing samples were scored using the official IGCSE writing rubric with regard to content and language along with coherence. These scores were important to track the level of improvement attained in writing through the individual growth framework developed later in the study.

Moreover, a questionnaire was conducted to assess students' knowledge on AI writing tools such as Grammarly, ChatGPT, Write & Improve and Literatu. At the same time, semi-structured interviews were conducted with the participating ESL teachers. Their views on what they consider to be the main gaps in formative feedback were a starting point, in addition to examining how teachers wish to implement AI technologies into their instruction and what goals they set for the study. Respondents shared a common concern that the time limitations within the school made it infeasible to provide personalized feedback to all students. Nevertheless, many in the teaching community believed that the formative assessment functions of AI tools offered positive potential as long as human intelligence remained integral to the process.

Phase 2: Integration of AI-Based Writing Tools into Instruction

The second stage focused on implementing AI-assisted writing tools into everyday classroom practices for the experimental group, while the control group received no such aid.

Students in the experimental group were given access to four AI platforms:

- Grammarly: Offers feedback on grammar, spelling, and vocabulary usage in real time (O'Neill & Russell, 2019).
- ChatGPT: Provided help with idea creation, outlining, and argument organization (Kasneci et al., 2023).
- Write & Improve: Automated feedback aligned to the CEFR was provided, emphasizing errors in grammar, coherence, and organization (Cambridge E. 2021).
- Literatu: Enables teachers to add customizable feedback based on developed rubrics and track students' writing progress over time (Literatu, 2020).

All students, regardless of the group they were in, were assigned two IGCSE aligned writing tasks, which included descriptive, narrative, and discursive compositions, every week. In the experimental group, students submitted the first draft through Write and Improve where an AI provides feedback on mechanical issues such as grammar and structure. They then revised their drafts and uploaded the final versions on Literatu which is where the teachers applied rubric based personalized feedback. An integral part of this phase focus was capturing dual teacher feedback for the experimental group: one prior to students receiving AI feedback (Pre-AI feedback) and the other after revising with AI suggestions (Post-AI feedback). This dual annotation strategy enabled researchers to analyze the extent to which AI assistance recalibrated

the focus of teacher comments from basic annotation toward more sophisticated considerations like argument construction and rhetorical impact. During this phase, the control group performed the same writing tasks but received handwritten teacher feedback without the use of an AI interface. This served as parallel teaching so that any differences in outcomes could be confidently attributed to the AI intervention and not to differences in task design or the quality of instruction provided.

Phase 3: Evaluation of Writing Proficiency and Feedback Effectiveness

Analyzing student performance and capturing their experiences were parts of the evaluation in the assessment intervention undertaken by teachers in the third and final phase. A post-test writing evaluation was administered to all the students at the conclusion of the three-month study within prescribed conditions. The written assignment followed the structure and level of difficulty of the initial assessment.

To evaluate the changes in grammar accuracy, coherence and cohesion, lexical sophistication, and task fulfillment, quantitative evaluation of pre and post intervention scores for writing assignments was undertaken. At the end of the intervention, teacher interviews were collected to form reflections regarding the impact that the AI tools provided, the changes that students exhibited relating to the writing exercises, and the students' challenges along with their own limitations that were observed during the sessions after the AI integration. It was discussed whether the AI-supported tools such as Write & Improve and Literatu supplements to their traditional feedback framework extended their reliance on basic human input and if, in their opinions, AI feedback subsequently changed the students' revision behavior towards greater compliance.

Surveys conducted following the implementation of the intervention offered additional perspectives on learner perceptions regarding AI feedback. A significant number of students expressed that they were more self-assured about revising their work due to the promptness and precision of the AI feedback. Some, however, expressed concern that the AI tools overlooked creativity, tone, and other nuances related to task interpretation.

Ultimately, all gathered data—including scores from the rubric, comments from teachers, logs of revisions, and responses to the interviews—was synthesized with a mixed analysis approach that integrated quantitative and qualitative data through statistical analysis and theme-based coding. This mixed approach provided the study with the means to measure the learning gains, while also describing in detail the changing relationships between students and teachers in an AI driven writing classroom.

Data Analysis Strategy

The study employed both quantitative and qualitative analysis:

Quantitative Analysis: Rubric-Based Scoring and Statistical Comparison

The IGCSE ESL writing rubric served as a guide for benchmarking students' essays both prior to and following the intervention, assessing the efficacy of the aid within

its defined scope. Students' essays were evaluated on: Content and Communicative Achievement, Organization and Coherence, Lexical Resource, and Grammatical Range and Accuracy. To eliminate possible bias from the experimental (AI-driven tools) and control (face-to-face instruction) groups, all written work was scored using a blind score technique by certified ESL educators.

A mixed methods approach combining descriptive and inferential analysis was utilized to evaluate the pre- and post-test scores. Student performance was first evaluated using basic descriptive metrics such as average scores, standard deviation, and range, elucidating the overall trends in their performance across both cohorts. To evaluate if the differences observed were statistically significant, each group was subjected to paired t-tests—comparing pre- and post-intervention scores within each group—and independent samples t-tests were conducted to evaluate differences between the experimental and control groups. This effectively allowed the evaluation of individual advancement, as well as the determination of the effectiveness of the use of AI compared with traditional feedback methods.

Furthermore, revision activities were measured through Write & Improve's revision logs, which automatically recorded every submission's grammatical changes, sentence editing, and cohesive device refinements as complete logs. These records of cumulative change provided detailed information about how learners adjusted and improved their writing over multiple drafts.

Besides that, inter-rater reliability was calculated based on human scores compared to automated CEFR levels assigned by Write & Improve. Assessing inter-rater reliability through the application of Cohen's kappa calculation, when possible, ensured that the judgments made by humans and machines were consistent, thereby validating findings concerning changes in writing skills.

Qualitative Analysis

The qualitative analysis provided insight into the pedagogical changes using AI tools in conjunction with the statistical analysis. Comments provided by teachers pre-AI and post-AI were analyzed with the aim of creating a categorized content analysis that included the following three categories of feedback:

- Feedback type 1: Surface Skill Feedback, which focuses on correction of grammatical, lexical and spelling errors.
- Feedback type 2: Corrective feedback which includes the evaluation of organization, paragraphing and marking transitions and logical ordering.
- Feedback type 3: Conceptual Feedback, focused on the development or arguing the idea, tone and relevance of the task.

This categorization enabled monitoring whether the incorporation of AI tools changed teachers' feedback patterns from primarily mechanical corrections to more strategic, conceptual guidance that encourages higher-order writing skill development. Furthermore, a judgement analysis of the amount and the depth of comments informed by AI versus those given prior to AI integration was conducted to determine whether AI facilitated a shift towards focusing deeper on critical thinking, coherence, and argumentation in the student's work instead of basic structural linguistic corrections.

Ethical Considerations:

This research was performed in accordance with both internal and external ethical requirements relevant to the use of human subjects in research. Every participating student and their parents, as well as each teacher, received comprehensive information sheets detailing the study’s goals, procedures, possible risks, and advantages, prior to the beginning of study. Consent was secured from all participants, or in the situation of minors, from the legal guardians. Participants in this research study were volunteers, having been informed that their participation, or lack thereof, would not be linked to any academic or personal repercussions. In terms of privacy and confidentiality, all data such as writing samples, feedback logs, interviews, and transcripts were strategically anonymized. Students were given ID codes, and no personally identifiable information was used in the analyses or disseminated results.

Results and discussion

Quantitative Findings

Improvements and Challenges through Write & Improve

Students who utilized Write & Improve evidenced improvement in basic writing competencies such as grammatical precision and coherence. Measurements showed improvement of 21% in the control of grammar and 14% in organization and logical framing of ideas. Furthermore, Write & Improve automated feedback on more fundamental aspects of sentence formation—such as time consistency, subject-verb agreement, article inclusion, and utterance crafting—which correspond to the Grammar and Accuracy as well as Coherence and Structure of the IGCSE marking system.

Table 1: Scores and Improvements in Organization and Grammar (Write & Improve Users)

Criterion	Pre-Test Mean	Post-Test Mean	Percentage Increase
Organization and Coherence	11.2	12.8	+14%
Grammatical Range and Accuracy	10.5	12.7	+21%

Although the platform proficiently aided in correcting errors, it did not sufficiently cultivate higher-level writing skills. As previously stated, Write & Improve provided little instruction on analyzing, engaging with the reader, or employing show-not-tell techniques, emotional tone modulation, and creative structuring of narratives—vital components for meeting the higher band score criteria (Band 1-2) under IGCSE benchmarks. Students were capable of addressing mechanical issues, however, they could not add personal touches to adapt the prose’s style to a respective audience, formulate diverse perspectives unaided, and tailor ideas, all of which needed intensive teacher support.

Improvements and Challenges through Literatu

Students using Literatu showed improvement in all the areas that Write & Improve assessed: grammar, coherence, vocabulary, and content relevance—and added specificity and depth. Because of Literatu's design, educators were able to upload the exact IGCSE marking rubric into the system. Feedback was therefore not only automated, but also aligned with the exam criteria, aiding students to modify their writing more efficiently toward IGCSE standards. Analysis revealed improvements of 21% in grammar, 18% in organization, 17% in content relevance, and 14% in vocabulary.

Table 2: Scores and Improvements for Literatu Users

Criterion	Pre-Test Mean	Post-Test Mean	Percentage Increase
Content and Communicative Achievement	11.8	13.8	+17%
Organization and Coherence	11.0	13.0	+18%
Grammatical Range and Accuracy	10.5	12.7	+21%
Lexical Resource	10.8	12.3	+14%

Regardless of the alignment with evaluation criteria, Literatu had similar shortcomings like Write & Improve. While the system helped with the mechanical and structural matters, it could not assess or improve these skills at higher levels, which involved telling--- not showing--- in descriptions, creative elaboration, emotive language, or complex, critical reasoning. Moreover, because students were given AI-assisted prompts, they were helped too much and too early by the AI, making them more reliant on given structures. Hence, students’ technical accuracy improved, but their critical thinking and creative initiative remained underdeveloped, requiring extensive teacher-led enrichment activities.

Comparative Analysis Between Experimental and Control Groups

The experimental group (Write & Improve and Literatu users) achieved substantially greater improvements than the control group (traditional feedback only).

Table 3: Comparative Gains Between Experimental and Control Groups

Writing Criterion	Experimental Group %	Control Group%
Organization and Coherence	+16%	+10%
Grammatical Range and Accuracy	+21%	+15%
Content and Communicative Achievement	+17%	+10%
Lexical Resource	+12%	+9%

These findings illustrate that the adoption of artificial intelligence (AI) feedback mechanisms greatly enhanced the essential writing competencies. Having said that,

the more creative and advanced aspects of writing that separate first-class IGCSE responses from the rest were not as impacted by AI, and indeed, careful teacher scaffolding was necessary. While substantial improvements occurred in surface-level language accuracy, content elaboration, argument sophistication, and creative idea generation were still areas where students showed little independent growth without additional teacher intervention.

Conclusion

The application of AI-enabled writing evaluation tools within ESL learning contexts have received increased attention from scholars and educators focused on optimizing feedback and learner independence (Burstein et al., 2013; Ranalli, Link & Chukharev-Hudilainen, 2017). The focus of this research was to explore such tools' capabilities in aiding traditional teaching and recognized Literatu as the tool most capable of balancing technological and pedagogical assistance. During the analysis, Literatu managed to refine the feedback process while retaining the teacher's pivotal role in nurturing higher-order thinking, creativity, and critical reflection.

A defining strength of Literatu is its customizability bearing in mind formal marking schemes such as the IGCSE rubric framework. Previous studies stress the importance of embedding AI feedback within authentic assessment criteria for maximized pedagogical impact (Chapelle, 2001; Wang, Shang & Briody, 2013). Literatu allows teachers to set the parameters of the questions and rubric and provides options for altering preset feedback allowing evaluators to tailor student assessments to standards relevant beyond classroom learning. Such adaptability tackles a primary weakness noted in previous AI-driven evaluation systems—that their inflexibility and objective characteristics renders them contextually inappropriate (Chen & Cheng, 2008).

On the learner's side, Literatu also quickens the feedback cycle and offers students meaningful, immediate feedback on their writing. Stevenson and Phakiti (2014) study stress the contribution of feedback to promoting learner autonomy and motivation, with particular attention to second language writing skills. Literatu's feedback detailing 'What Went Well' and 'Even Better If' is aligned to constructive feedback and provides formative assessment guidance (Black & Wiliam, 1998), which encourages claims of self-revision based on explicit instructions. In addition, the platform's example answers and specific instruction on how to adjust target areas bolsters arguments for supporting learners' self-regulated writing (Zimmerman & Schunk, 2011).

Despite the advantages put forward in this essay, this study was bound to confirm earlier findings that higher-order writing skills such as critical thinking, origination of ideas, and intricate argumentation patterns remain inaccessible to AI technologies (Hyland, 2016; Warschauer & Grimes, 2008). Even though Literatu offers strong evidential support for feedback on the surface and structural coherence, evaluation of higher-order cognitive abilities is still a human educator's responsibility. Therefore, AI technologies should not be thought of as replacing human instructors; instead, they must be viewed as collaborative aids that undertake mechanical functions, thereby enabling pedagogues to attend to the intellectual, emotional, and cultural aspects of instructing students about writing.

Implications and Recommendations

The findings of this study affect educators and institutions utilizing AI-assisted writing tools in that they confirm, and additionally reaffirm, that AI employs can enhance the efficiency, standardization, and customization of feedback (El Ebyary & Windeatt, 2010), as well as reaffirm the critical role of teachers in maintaining rigor and depth in writing pedagogy.

One of the results of this study is the implication analyzed related to the lack of comprehensive training for teachers, which is decidedly critical. Other studies have demonstrated (Bikowski & Casal, 2018) how a lack of adequate pedagogical training leads to reliance on AI as a one-stop solution, where educators either misuse or underuse feedback without contextualized instructional planning, accepting it uncritically at face value. It is crucial that these educators can use AI pedagogical tools, such as Literatu, that provide more than just information. AI outputs require intelligent navigation for integration into lesson plans and feedback frameworks. Thus, institutions need to offer comprehensive professional development that enables teachers to use AI responsibly within the writing process, intellectually engaging with the material rather than oversimplifying it.

This study will also be useful in creating guidance that ensures rubrics are aligned to formal assessment criteria. Biber and Gray (2016) emphasized that evaluation of writing needs to be level-appropriate to academic or examination genres that students intend to participate in.

Literatu and similar platforms offering customization options according to IGCSE or other standardized curriculums are particularly beneficial for such purposes. In the case of AI-driven appraisal, primary attention should be directed at how neatly the rubric frameworks align with external examination standards, so students have uniform preparatory pathways, exclamation marks, and clear markers for exam success.

Equally noteworthy is that autonomy must be actively encouraged. Frequent and detailed feedback from AI systems, particularly Literatu, serves as an incentive for learners to cultivate self-revision and reflective learning habits (Lee, 2017). Schools must embed AI feedback into metacognitive training and teach learners how to think critically about their feedback, change it if needed, and create self-monitoring strategies. These measures will not only help improve writing standards but also enhance academic resilience in the long run.

Lastly, this research advocates the need to conduct further studies focusing on the dynamics between AI and human interaction in ESL education for longitudinal research. Even if Literatu shows positive results as an example in fostering engagement among learners, measuring the impact on teacher workload, autonomy, critical thinking skills, and system itself in the long run still requires research. It could also be more informative by incorporating the various populations of learners and different teaching scenarios in looking into the more comprehensive measures of ethical AI in education.

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Generative Artificial Intelligence in Higher Education Teaching: Transforming Student Learning, Faculty Roles, Assessment, and Academic Responsibility

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Abstract

Generative Artificial Intelligence (GenAI) is reshaping university teaching, as it is becoming an important factor in teaching, writing, feedback, assessment preparation, and knowledge production. This article examines how GenAI is transforming student learning, academic staff work, assessment, and academic responsibility. It synthesizes research in this field and distinguishes between applications that enhance human judgment, and those that replace the intellectual activity through which learning develops. GenAI can support more accessible explanations, formative feedback, the generation of ideas, and the completion of routine academic tasks. Meanwhile, it creates risks because the information is not always accurate, taking ready-made answers without analyzing them oneself, opaque authorship, algorithmic biases, unequal access, etc.

The article proposes the HUMAN-AI framework, organized around six principles: Human intellectual ownership, Uncertainty-aware verification, Meaningful assessment, Accountable transparency, Non-discriminatory access, and Academic human oversight. The basis connects ethical principles with practical teaching decisions across the learning cycle. The paper argues that the future of higher education should not be based either on prohibition or on uncritical automation. Its direction should be combined with human and AI collaboration in which technology supports learning while educators and students retain judgment, responsibility, and meaningful human interaction.

Keywords: generative artificial intelligence; higher education teaching; student learning; faculty roles; assessment; academic integrity; AI literacy.

1. Introduction

Artificial intelligence has been used for a long time in higher education through adaptive systems, learning analysis, automated feedback, and support for administrative decision-making. GenAI systems can create explanations, essays, codes, summaries which resemble academic work very much, and tasks that previously served as evidence of learning can now be carried out with considerable help from technology. There are debates between technological enthusiasts and those who ask for it to be stopped. Supporters emphasize personalization, wider access, and increased efficiency. Critics focus on plagiarism, inaccurate information, surveillance, and dependence on technology. Both approaches address real problems, but neither of them fully explains the impact of GenAI.

The educational value of GenAI depends on the way technology, the student, the lecturer, the field of study, and the institution interact. For this reason, the analysis should be broad and should not focus only on what technology can produce, but also examine what students and lecturers should think, verify, and take responsibilities during its use.

Previous reviews have shown that research on artificial intelligence in higher education has often been focused more on technology than on lecturers and the teaching process (Zawacki-Richter et al., 2019). Later studies show that research in this field has grown rapidly. However, weaknesses continue to exist in ethics, methodological rigor, and interdisciplinary collaboration (Crompton & Burke, 2023; Bond et al., 2024).

This article aims to address these gaps by analyzing GenAI as a pedagogical and institutional challenge. It examines how universities can use this technology without weakening student autonomy, the validity of assessment, professional judgment, and academic responsibility.

2. Methodological Approach

The paper uses critical integrative review design which is appropriate for an emerging field that combines practical studies, systematic reviews, conceptual arguments, and policy guidance. Priority was given to peer-reviewed studies on GenAI in higher education, major reviews of artificial intelligence and assessment, and international guidance on ethical and human-centered use. The literature was organized into five themes: student learning and agency; faculty roles; assessment and integrity; equity and governance; and the future of teaching.

This paper does not claim to provide the complete coverage of a PRISMA-based systematic review. Instead, it compares common findings, differences, and implications across different types of evidence. Special attention is given to the difference between students' opinions and proven learning outcomes.

3. GenAI and Student Learning

3.1 Opportunities and educational value

Students may use GenAI for alternative explanations, obtain formative feedback, translate or simplify material. Survey research indicates that students recognize these advantages and are generally willing to use GenAI when expectations are clear (Chan & Hu, 2023).

The strongest uses are interactive rather than substitutive. A learner who compares explanations, checks a claim against an academic source, asks the system to expose weaknesses in an argument, is extending cognitive activity. By contrast, delegating interpretation, argument, and verification can leave the learner's competence unchanged.

3.2 Cognitive offloading and intellectual ownership

Educational technologies have always helped in the automatic completion of some mental processes. The main issue is to understand whether the task that is passed to technology is secondary or constitutes an essential part of the ability that the student must develop. For example, a reference management program can be used for the automatic formatting of citations. In contrast, the use of artificial intelligence for clinical reasoning, the evaluation of sources, or the interpretation of the content of a field may avoid exactly the intellectual process that the task aims to develop.

Excessive dependence on communication systems with AI can weaken the ability to think critically and to write independently, especially when the answers are accepted without being checked (Zhai et al., 2024).

For this reason, authorship should be understood as responsibility and intellectual ownership. Students should be able to explain their reasoning, argue their methodological choices, check the sources, distinguish the limitations, and hold responsibility for every statement included in the work. The use of AI should be declared when it has given an important contribution.

4. Faculty Roles and Teaching Practice

GenAI does not reduce the need for academic expertise but it changes the way this expertise appears in teaching. When general explanations are easily accessible, the role of the lecturer becomes even more important in designing questions, selecting sources, identifying misunderstandings, connecting theory with practice, and developing academic judgment. In this way, teaching does not focus only on giving information, but on creating experiences where students compare, apply, question, and defend their ideas.

Academic staff can use GenAI to create questions with low weight in assessment, to propose examples, to adapt explanations, to organize feedback, to translate materials, and to reduce routine administrative tasks. This can create more time for direct communication and collaboration with students. However, lecturers must check the content, protect confidential information, and take responsibility for important decisions. Feedback created with the help of AI and checked by the lecturer is different from fully automated assessment.

Lecturers should understand the limitations of the systems, the risk of inaccurate information as well as issues of privacy and authorship. Institutions that encourage the use of AI without training and without sufficient support risk creating unclear practices and unequal experiences for students.

5. Assessment and Academic Responsibility

A response based only on detecting AI use is not enough. AI-generated writing and human edited writing can't be always easy to separate because they can overlap. Detection systems work based on probability, and this can reduce trust without solving problems. Reviews of institutional policies show important differences between institutions and, in many cases, place too much responsibility on individual lecturers (Luo, 2024; An et al., 2025).

Assessment provide reliable evidence and shows that student has the skills and abilities being evaluated. GenAI has shown that many traditional tasks were only indirect measures of learning. For example, a take-home essay may no longer clearly show a student's ability to read, combine information, and write independently, especially when the process of preparing the essay is not visible.

For this reason, stronger forms of assessment may include drafts, notes and analysis of sources, oral defence, and clear records of AI use. Research on assessment

transformation similarly emphasizes assessment designs centred on the learning process, higher-order thinking, and authentic tasks, alongside the development of teachers’ assessment literacy (Xia et al., 2024).

Level	Permitted use	Student responsibility	Typical purpose
0	No generative assistance	Complete independently	Foundational or supervised capability
1	Technical correction and accessibility support	Check changes and follow disclosure rules	Language form is not the main outcome
2	Explanation, brainstorming, practice, formative feedback	Verify output and retain authorship	Learning and early drafting
3	Substantive drafting, coding, or analytical assistance	Detailed disclosure and process evidence	Explicit human-AI collaboration
4	Critical analysis of AI-generated output	Evaluate accuracy, bias, and limitations	AI literacy and professional simulation

Table 1. Differentiated levels of GenAI use in assessment.

6. Equity, Privacy, and Governance

GenAI can improve access through translation, alternative explanations, and text simplification. However, access to quality systems varies according to cost, language, internet access, and institutional licensing. In addition institutions should provide approved basic tools and non-AI alternatives when its use is not necessary. Privacy risks appear when students or staff place patient data, unpublished research, assessment materials, or confidential data into external systems. Biases can reproduce stereotypes and present cultural assumptions as neutral knowledge. Therefore, the use of GenAI should be accompanied by data protection, accessibility, transparency, and accountability. Human-centered guidance emphasizes that the use of technology should be guided by educational purpose and not only by its availability (Miao & Holmes, 2023).

7. The HUMAN-AI Framework

The HUMAN-AI framework explains recurring ethical and pedagogical concerns into six operational principles. Its contribution is not to claim a completely unprecedented set of values, but to integrate dimensions often discussed separately and connect them directly with teaching and assessment decisions.

Principle	Meaning	Operational question
H - Human intellectual ownership	The learner or educator can explain and defend the work.	Who owns the reasoning represented in the final product?
U - Uncertainty-aware verification	AI output is provisional and checked against appropriate evidence.	What was verified, by whom, and against which source?
M - Meaningful assessment	Assessment reveals capability, not merely polished output.	Does the task make learning and judgment visible?
A - Accountable transparency	Material AI assistance is disclosed proportionately.	Can a reader understand how AI affected the work?
N - Non-discriminatory access	Use does not create avoidable disadvantage.	Can all students participate on fair terms?
AI - Academic human oversight	Consequential decisions remain under genuine human control.	Who is responsible and how may the decision be challenged?

Table 2. The HUMAN-AI framework for responsible teaching and assessment

8. Pedagogical Integration and the Future of Teaching

Responsible use of GenAI should be planned across the teaching process. Before class, it can support diagnostic questions and explanations and during class, students can compare, question, and improve AI-generated answers where after class, it can support practice and formative learning. In assessment, its use should match the skill, and at every stage, educators should define the purpose, check the material, and protect independent thinking.

The future university is unlikely to succeed by offering only general content that AI can generate instantly. Its value will increasingly come from academic communities, mentoring, laboratories, seminars, clinical and field experiences, supervised research, and reliable assessment. Personalisation should support meaningful human interaction, not replace it.

A major risk is the creation of a two-level system in which well-resourced students receive more human support while others depend mainly on automated teaching and feedback. So AI should reduce routine work and improve access to support, not reduce the contact between students and educators.

9. Discussion

The evidences support neither complete enthusiasm nor simple rejection. GenAI can make explanations more accessible, support formative learning, and reduce repetitive work. At the same time, it can produce errors, unclear authorship, and allow students to complete tasks without learning. These different outcomes can appear in the same

course because the educational effect depends on how GenAI is used within the task. The main difference is AI that supports human judgment and AI that replaces the thinking to develop that judgment. This also helps define academic responsibility. Students should be responsible for the claims they submit, educators for the quality and fairness of teaching and assessment. In addition academic integrity should not be seen only as student responsibility.

The HUMAN-AI framework offers a practical way to move beyond simple permission or prohibition. It can guide course design, assessment, faculty development, and institutional policy. However, it is still a conceptual framework and should be tested through surveys, classroom studies, comparative assessment research, and studies across disciplines and cultural contexts.

10. Practical Recommendations for Universities

Universities should approach GenAI as an educational issue rather than as a technology that must automatically be adopted. The first step is to identify the academic problems that AI may help solve. Each programme should define which skills students must demonstrate independently, where AI can support learning, and which decisions must remain under human responsibility. Before starting the course, policies should explain the acceptable level of AI use, how it should be reported, and what evidence students must provide to show their own understanding.

Assessment redesign should be an institutional responsibility rather than the task of individual lecturers. Universities can strengthen assessment through source-checking activities, reflective comments, and tasks linked to academic or professional contexts. Faculty development should include teaching methods, privacy, bias, accessibility, and checking AI-generated information. Students also need AI literacy education so that responsible use becomes part of learning.

AI policies should remain flexible institutions should review them regularly by considering student and faculty experience, access, privacy problems, and appeals related to AI-supported decisions. In this way, ethical principles become part of continuous academic management rather than fixed policy statements.

11. Conclusion

GenAI is transforming higher education by changing the way academic work is produced, evaluated, and attributed. Its value will not be determined only by technical performance, but by whether its use strengthens or weakens learning, judgment, fairness, and trust. Students should have opportunities to use AI critically without losing intellectual ownership of their work. Faculty need support to redesign teaching and assessment, rather than focusing only on detecting academic misconduct. Institutions must ensure transparency, equal access, privacy protection, and clear human oversight.

The future of higher education should be neither education without AI nor education delegated to AI. It should be based on a carefully designed partnership in which

technology expands access and opportunities, while human judgment remains decisive from both pedagogical and ethical perspectives.

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Organic Sector Development supported by National Agricultural Schemes in Albania

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Abstract

Organic agriculture remains a small but policy-relevant component of Albania's agricultural sector. This study examines the role and reach of Albania's national agricultural support schemes for organic farming, with particular attention to the organic-farm measure implemented through the Agency for Agricultural and Rural Development (AZHBR). To avoid unsupported causal claims, the study adopts a descriptive and policy-analysis design based primarily on official administrative and statistical sources. The analysis combines AZHBR monitoring data for 2024, the official 2025 national support scheme and qualified-application list, national agricultural statistics from INSTAT, and international organic-sector statistics from FiBL and IFOAM. In 2024, 169 applications were recorded under the organic-farm measure, 105 beneficiaries were reported, and ALL 16.8 million was paid, corresponding to an average payment of approximately ALL 160,000 per beneficiary. The 2025 qualified-application list contains 203 applications, indicating continued administrative demand for the measure, although qualified applications should not be interpreted as final payments. FiBL reports 802 hectares of organic agricultural land and 162 organic producers in Albania in 2024, with organic land representing about 0.1% of agricultural land. The findings indicate that the national scheme provides a targeted financial mechanism for supporting conversion and certified organic production, but its scale remains modest relative to the structural needs of the sector. Policy effectiveness therefore depends not only on payment levels but also on certification access, producer organisation, market development, advisory services, and improved monitoring of sector outcomes. The paper contributes a transparent administrative-data assessment of organic-farming support in Albania and identifies priorities for strengthening policy monitoring and future impact evaluation.

Keywords: organic farming; agricultural policy; national support schemes; direct payments; Albania; rural development.

1. Introduction

Agriculture remains an important component of Albania's rural economy, contributing to employment, household livelihoods and domestic food supply. At the same time, agricultural development continues to be constrained by structural characteristics such as small and fragmented farm holdings, limited mechanization, uneven access to markets and relatively weak integration along agricultural value chains. Recent agricultural statistics indicate continuing changes across major crop subsectors. In 2024, for example, production of medicinal and aromatic plants increased by 7.7%,

illustrating the relevance of higher-value agricultural activities within Albania's rural economy (INSTAT, 2025).

Within this context, organic agriculture represents a potentially important pathway for agricultural diversification, product differentiation and access to higher-value markets. Organic production is associated not only with specific production practices, but also with certification, traceability, environmental management and compliance with defined production standards. The European Union regulatory framework, established through Regulation (EU) 2018/848, places particular emphasis on organic production rules, certification, labelling and control systems (European Parliament & Council of the European Union, 2018).

Despite its potential, Albania's organic sector remains relatively small. The latest World of Organic Agriculture 2026, based on 2024 data, reports 802 hectares of organic agricultural land and 162 organic producers in Albania, with organic agricultural land accounting for approximately 0.1% of the country's agricultural land. The same international statistical framework places the development of Albania's organic sector in a substantially smaller scale context than that of the European Union, where organic agricultural land represented approximately 11.14% of agricultural land in 2024 (Willer, Schlatter, & Trávníček, 2026).

The limited scale of organic production makes the role of public policy particularly relevant. Public support can address some of the additional costs and institutional requirements associated with organic conversion and certification. However, the existence of a subsidy does not in itself demonstrate policy effectiveness. Assessment also requires consideration of the amount of support provided, the number of applicants and beneficiaries reached, the administrative implementation of the measure, and its relationship with the broader development of the organic sector.

In Albania, national agricultural support schemes provide a specific policy instrument for organic farming alongside support measures directed towards other agricultural activities, including medicinal and aromatic plants and GlobalG.A.P. certification. For 2025, the national scheme included a dedicated measure for organic farms. Under Decision No. 150, dated 6 March 2025, support for organic farms was differentiated according to the stage of conversion or certification: ALL 100,000 for the first year of conversion, ALL 150,000 for the second year, ALL 150,000 for the third year and ALL 200,000 for certified organic farms. The measure applies to eligible agricultural producers participating in an approved organic certification system and requires a minimum certified area of 0.5 hectares (Council of Ministers of Albania, 2025; Ministry of Agriculture and Rural Development & Ministry of Finance, 2025).

The administrative implementation of this measure also provides an important basis for empirical assessment. AZHBR's 2024 budget-monitoring report records 169 applications, 105 beneficiaries and ALL 16.8 million in payments under the organic-farm measure. For 2025, AZHBR subsequently published a qualified-application list containing 203 applications under the organic-farm measure. These administrative data make it possible to examine the scale and reach of public support without making unsupported claims about causal effects on farm income, productivity or investment (AZHBR, 2025).

Recent research on Albania similarly indicates that organic agriculture is developing

from a relatively low base and that the sector faces structural challenges related to farm fragmentation, certification, market development and institutional capacity. Qose (2025), using a combination of secondary statistics and primary evidence from organic farmers, identifies these issues as relevant constraints to the expansion of Albania's organic sector.

Against this background, the present study examines Albania's national support for organic farming through a descriptive analysis of administrative and sectoral evidence. Rather than estimating causal effects, the study focuses on the scale, targeting and administrative reach of the support measure and places these findings within the broader development of Albania's organic sector. This approach is appropriate because the available evidence allows the implementation of the support instrument to be documented, while a robust causal assessment of farm-level impacts would require a verified longitudinal or comparable farm-level dataset and an appropriate identification strategy.

Accordingly, the study addresses four research questions:

- What is the structure of Albania's national support measure for organic farms?
- How many applications and beneficiaries were recorded, and what financial resources were disbursed under the measure?
- How does the scale of public support compare with the current size and development of Albania's organic sector?
- What policy and institutional areas require further attention to strengthen the implementation, monitoring and longer-term development of organic farming in Albania?

The study contributes to the limited empirical literature on organic-farming policy in Albania by combining official administrative evidence from AZHBR with national agricultural statistics and internationally comparable organic-sector data. The analysis is intended to provide a transparent evidence base for understanding the current scale of public support and for identifying areas where future policy monitoring and impact evaluation can be strengthened.

2. Organic Agriculture and Public Support

Organic agriculture has increasingly become an established component of agricultural and rural development policy in Europe. Public intervention has developed partly because the transition to organic production may involve additional adjustment and certification requirements, while some of the environmental and social benefits associated with organic farming are not fully reflected in market prices. Padel and Lampkin (2007) document the development of governmental support for organic farming in Europe and identify a broad policy mix that includes legal standards, certification and control systems, direct payments to converting and established organic producers, market-development measures, advisory services, research and institutional capacity building.

Stolze and Lampkin (2009) similarly emphasize that organic-farming policy in Europe has developed through a combination of environmental, market and rural-development objectives. Their analysis shows that public support has not been limited

to direct financial payments; policy instruments have also addressed regulation, market development, information, research and stakeholder participation. This broader perspective is relevant when assessing agricultural support because the effectiveness of a financial measure may depend on the institutional and market environment in which producers operate.

The adoption of organic farming is also influenced by farmers' objectives, risk considerations and the policy environment. Kallas, Serra and Gil (2010), using farm-level evidence from vineyard producers in Catalonia, found that agricultural policies were among the factors associated with farmers' decisions concerning organic conversion. Their findings support the view that financial incentives can form part of the enabling environment for organic adoption, while not implying that subsidies alone determine farmers' decisions.

Consequently, public support for organic agriculture should be considered as part of a wider policy system rather than as an isolated subsidy instrument. Financial assistance may facilitate conversion or help compensate for some of the costs associated with certification and compliance, while advisory services, producer organisations, certification infrastructure, market access and consumer information can influence whether organic production can be maintained and developed over time. This broader policy perspective is particularly relevant for countries where the organic sector is still relatively small and institutional and market conditions are continuing to develop.

The European regulatory framework provides an important reference point for this development. Regulation (EU) 2018/848 establishes the legal framework for organic production and labelling in the European Union and sets requirements concerning production, certification, controls and related market information (European Parliament & Council of the European Union, 2018). For Albania, the gradual alignment of national legislation, certification arrangements and control procedures with the EU framework is relevant to the credibility of organic production and to the development of market opportunities, particularly where products are intended for European markets.

The Albanian organic sector nevertheless remains at an early stage of development. Qose (2025) reports that organic agriculture covered approximately 797 hectares in 2023, representing about 0.1% of total agricultural land. Medicinal and aromatic plants accounted for the largest share of the organic area, followed by olives, fruit trees and vineyards. The study also identifies small and fragmented farms, limited mechanisation, weak post-harvest infrastructure, certification-related constraints and weak domestic market development among the challenges affecting the sector.

These characteristics provide a relevant context for examining public support in Albania. Where the organic sector remains limited in scale, the assessment of support should consider not only the financial amount allocated but also the number of producers reached, the stage of organic conversion or certification supported, the administrative implementation of the measure and its relationship with the broader institutional and market environment. This provides the basis for examining Albania's national support framework in the following section.

2.1 Albania's National Support Framework

Agricultural support in Albania is implemented through annual national support schemes administered by the Agency for Agricultural and Rural Development (AZHBR). Within this framework, organic farming is addressed through a dedicated support measure alongside other interventions targeting specific agricultural activities and quality or market-oriented standards. The 2025 national scheme included a specific measure for organic farms as well as a separate measure related to GlobalG.A.P. certification (AZHBR, 2025).

The organic-farm measure was established within the 2025 national support framework under Decision No. 150, dated 6 March 2025. The decision differentiates the level of support according to the stage of organic conversion or certification: ALL 100,000 for the first year of conversion, ALL 150,000 for the second year, ALL 150,000 for the third year and ALL 200,000 for a certified organic farm (Council of Ministers of the Republic of Albania, 2025). The applicable rules also establish eligibility and land-use requirements for participating producers, including a minimum area of 0.5 hectares and participation in an approved organic certification system. These provisions are further specified through the relevant implementation instructions (Ministry of Agriculture and Rural Development & Ministry of Finance, 2025).

The structure of the measure indicates that national support is intended to address different stages of the transition towards organic production rather than only fully certified production. This distinction is relevant because conversion involves a period during which producers must comply with organic production requirements while the economic benefits associated with certified organic products may not yet be fully realised. Consequently, differentiated payments according to conversion stage can be interpreted as a policy mechanism designed to support continuity through the transition process.

The national framework also includes support for GlobalG.A.P. certification. This measure should be distinguished clearly from organic certification. Organic certification concerns compliance with legally defined organic-production standards, whereas GLOBALG.A.P. is a private farm-assurance and certification system focused on production processes and good agricultural practices, including areas such as food safety, environmental management, worker welfare and traceability (GLOBALG.A.P., 2026). GLOBALG.A.P. certification is based on third-party audits conducted by independent certification bodies and can facilitate access to buyers and supply chains that require recognised farm-assurance standards.

The two instruments may therefore complement each other in supporting agricultural market development, but they should not be treated as equivalent forms of certification. Organic certification establishes whether production complies with the requirements of the organic regulatory framework, while GLOBALG.A.P. certification provides assurance regarding specified good agricultural and farm-management practices. Maintaining this distinction is important for the present analysis because the study specifically evaluates the organic-farm support measure, rather than quality certification support in general.

The administrative implementation of the national scheme provides an additional basis for assessing its scale and reach. AZHBR's 2024 budget-monitoring report

recorded 169 applications, 105 beneficiaries and ALL 16.8 million in payments under the organic-farm measure. For 2025, AZHBR published a qualified-application list containing 203 applications under Measure 6, Support for Organic Farms. The two figures represent different administrative stages and should therefore not be interpreted as a direct comparison of final beneficiaries or expenditure. The 2024 figures refer to applications, beneficiaries and payments recorded in the monitoring report, whereas the 2025 figure refers to qualified applications. This distinction is retained throughout the empirical analysis.

3. Data and Methodology

This study uses a descriptive, comparative and policy-analysis approach based on secondary data. The main sources are: (i) AZHBR administrative and monitoring data for the 2024 national support scheme; (ii) AZHBR's official 2025 national support documentation and qualified-application list for the organic-farm measure; (iii) INSTAT agricultural statistics; and (iv) FiBL-IFOAM international organic-agriculture statistics.

The 2024 AZHBR monitoring report provides the number of applications, beneficiaries and paid funds for each national support measure. For the organic-farm measure, the report records 169 applications, 105 beneficiaries and ALL 16.8 million in paid support. These data allow calculation of an application-to-beneficiary rate and an average payment per beneficiary. The 2025 official qualified list contains 203 organic-farm applications. Because this is a qualified-application list rather than a final paid-beneficiary dataset, it is used as an indicator of administrative reach and not as evidence of final expenditure.

The analysis uses frequencies, percentages, ratios and average values. The principal indicators are: application-to-beneficiary conversion rate; average payment per beneficiary; organic-farm measure share of applications, beneficiaries and expenditure within measures 1–7; annual change in the number of applications/qualified applications; and comparison of Albania's organic area and producer base with the wider European context.

No causal model is estimated. The paper does not claim that national subsidies caused changes in farm income, productivity or investment. Such conclusions would require a verified farm-level dataset and an identification strategy capable of addressing selection and other confounding factors. The present analysis instead evaluates the scale, targeting and administrative reach of the support instrument.

4. Results

4.1. Development of the organic sector

The latest FiBL-IFOAM data show that Albania had 802 hectares of organic agricultural land in 2024 and 162 organic producers. Organic agricultural land represented approximately 0.1% of total agricultural land. The corresponding European Union share was 11.14%, demonstrating a substantial difference in the scale of organic-sector development. The number of Albanian organic producers reported by FiBL increased

from 129 in 2022 to 162 in 2024, indicating continued expansion in the producer base despite the small absolute scale.

Indicator	Albania, 2024	European Union, 2024
Organic agricultural land	802 ha	18.1 million ha
Organic share of agricultural land	0.1%	11.14%
Organic producers	162	438,447

Table 1. Selected organic-sector indicators. Source: FiBL & IFOAM (2026).

4.2. Implementation of the organic-farm support measure in 2024

The AZHBR monitoring report provides a clear administrative picture for 2024. The organic-farm measure received 169 applications, of which 105 were reported as beneficiaries, and ALL 16.8 million was paid. The resulting application-to-beneficiary rate was 62.1%. The average payment per beneficiary was exactly ALL 160,000, which is consistent with a measure combining different stages of conversion and certified production with payment levels of ALL 100,000, ALL 150,000 and ALL 200,000.

Indicator	2024 result	Derived indicator
Applications	169	—
Beneficiaries	105	62.1% of applications
Paid support	ALL 16.8 million	—
Average paid support	—	ALL 160,000 per beneficiary

Table 2. Organic-farm support under the 2024 national scheme. Source: AZHBR (2025), Budget Monitoring Report 2024; authors' calculations.

The organic measure represented 1.11% of all applications under measures 1–7 in 2024, 0.76% of beneficiaries under those measures, and 0.61% of expenditure under those measures. These shares indicate that organic support was a targeted rather than large-scale component of the national direct-support portfolio.

Measures 1–7 aggregate, 2024	Applications	Beneficiaries	Paid funds (ALL)
All measures 1–7	15,280	13,890	2,739,655,403
Organic farms – Measure 6	169	105	16,800,000
Organic share	1.11%	0.76%	0.61%

Table 3. Position of the organic-farm measure within national direct-support measures 1–7. Source: AZHBR (2025); authors' calculations.

4.3. Evidence from the 2025 support scheme

The 2025 policy framework retained the organic-farm measure with the same basic payment schedule: ALL 100,000 for the first year of conversion, ALL 150,000 for the second and third years, and ALL 200,000 for a certified organic farm. The official AZHBR

qualified-application list for the organic-farm measure contains 203 applications. This is 34 applications, or 20.1%, more than the 169 applications recorded in the 2024 monitoring data. The comparison should be interpreted cautiously because the 2024 figure is reported within a completed monitoring framework, whereas the 2025 figure represents qualified applications at the relevant administrative stage rather than final paid beneficiaries.

The 2025 qualified list illustrates the geographic breadth of the measure. It contains applications from several counties, including Fier, Elbasan, Durrës, Shkodër, Berat, Tiranë, Korçë, Vlorë and Lezhë. Reported eligible areas range from the minimum threshold of 0.5 hectares to substantially larger areas. The administrative list alone, however, does not provide sufficient information to assess production type, income or market performance.

Indicator	2024	2025	Interpretation
Organic-farm applications	169	203 qualified	+20.1% in reported applications/qualified applications
Payment schedule	100k–200k ALL	100k–200k ALL	Structure retained
Final paid beneficiaries	105	Not established from the qualified list	Do not equate qualified applications with final payments

Table 4. Comparison of the organic-farm measure, 2024–2025. Sources: AZHBR (2025); Council of Ministers (2025).

4.4. Administrative reach and targeting

The administrative data suggest three features of the measure. First, organic support is highly targeted: the measure accounts for a small share of the overall national support portfolio. Second, the average payment in 2024 was ALL 160,000 per beneficiary, indicating that the measure reached farms at different stages of conversion and certification. Third, the increase from 169 applications in 2024 to 203 qualified applications in the 2025 list indicates greater administrative participation, although the available evidence does not establish whether this translated into a comparable increase in final expenditure.

The 2024 application-to-beneficiary rate of 62.1% is also informative. It indicates that a substantial proportion of applications did not appear in the reported beneficiary total. The administrative record alone cannot establish why applications did not result in payment. Possible explanations may include failure to meet eligibility requirements, missing documentation, verification findings or other administrative conditions; these should not be treated as established causes without case-level evidence.

5. Discussion

The descriptive evidence indicates that Albania has established a dedicated public-support instrument for organic farming, covering both the conversion process and

certified organic production. The structure of the measure is consistent with the broader European policy experience, in which financial assistance has been used alongside regulatory, certification, advisory and market-development instruments to support the development of organic agriculture (Padel & Lampkin, 2007; Stolze & Lampkin, 2009). The Albanian case therefore reflects a broader policy approach in which public intervention is used to address some of the additional requirements associated with organic production. However, the administrative evidence also indicates that the organic-farm measure remains relatively limited in scale within Albania's overall agricultural support system.

The 2024 implementation data illustrate this limited scale. The organic-farm measure recorded 169 applications, 105 beneficiaries and ALL 16.8 million in payments. Relative to the other national support measures, organic farming therefore represented a relatively small component of total agricultural support. At the same time, the existence of a dedicated measure and the subsequent 203 qualified applications recorded for 2025 indicate continued administrative demand for this form of support. The 2025 figure should, however, be interpreted carefully because it refers to qualified applications rather than final beneficiaries or expenditure. The difference between these administrative stages prevents a direct comparison of payment performance across the two years.

The international comparison provides additional context for interpreting these findings. According to FiBL and IFOAM, Albania had 802 hectares of organic agricultural land and 162 organic producers in 2024, with organic agricultural land representing approximately 0.1% of agricultural land. The corresponding share for the European Union was approximately 11.14% (Willer, Schlatter, & Trávníček, 2026). This difference illustrates the relatively early stage of development of organic agriculture in Albania. It should not, however, be interpreted as evidence that Albania's national support policy has failed or that the support gap alone explains the difference. The EU organic sector has developed within a substantially larger agricultural and consumer market and under a longer-established institutional and policy framework. The comparison is therefore most useful as an indication of the scale of development still separating Albania from the European organic sector.

The findings also demonstrate the importance of distinguishing between the existence of a support instrument and its measurable sectoral outcomes. Administrative records provide important information on applications, beneficiaries and expenditure, but these indicators alone cannot establish whether support has increased farm productivity, income, investment, certified area or market participation. Such outcomes require additional longitudinal and farm-level evidence. Consequently, the present findings should be interpreted as evidence on the implementation and administrative reach of the support instrument rather than as an estimate of its causal impact.

This distinction has direct implications for policy monitoring. Monitoring systems could be strengthened by linking support records, where legally and institutionally feasible, with indicators that capture changes in certified and converting area, production structure, certification continuity, production value, market destination and producer participation over time. Such integration would make it possible

to move from monitoring the disbursement of support towards monitoring the development of the supported sector. It would also provide a stronger evidence base for determining whether the structure and level of support remain appropriate as the organic sector develops.

The distinction between organic certification and GLOBALG.A.P. support is also important for interpreting the national support framework. Organic certification concerns compliance with the applicable organic-production requirements, whereas GLOBALG.A.P. provides farm-assurance standards covering areas such as food safety, traceability, environmental management and workers' health, safety and welfare. GLOBALG.A.P. certification is independently audited through approved certification bodies and can support producers seeking to meet requirements within formal agricultural supply chains. These instruments may therefore be complementary from a market-development perspective, but their objectives and certification systems are different. For monitoring purposes, they should consequently remain analytically distinct so that the specific contribution of organic-farming policy can be assessed.

Finally, the findings suggest that the development of organic farming requires attention beyond the annual payment itself. The relatively small scale of the sector means that producers may face fixed administrative and certification requirements that are significant in relation to the size of their operations. The policy response may therefore benefit from complementary measures addressing information and advisory services, producer organisation, certification access, market coordination and the availability of reliable sector data. Such measures should not be viewed as substitutes for direct financial support, but as complementary components of a broader policy environment in which financial assistance can be translated into sustained organic production and stronger market participation.

Overall, the evidence supports a cautious interpretation of Albania's national organic-farming support policy. The country has established a targeted financial instrument and recorded measurable administrative participation, but the available data do not permit conclusions about causal effects on farm-level economic or production outcomes. The principal policy challenge is therefore not only to maintain an identifiable support mechanism, but also to strengthen the monitoring and institutional framework needed to assess its longer-term contribution to the expansion, continuity and market integration of organic agriculture.

6. Policy Implications

1. Strengthen outcome-oriented monitoring. AZHBR and MBZHR should connect payment records with certified and in-conversion area, production type, certification continuity and market indicators.
2. Maintain predictable conversion support. The current staged payment structure recognises that conversion and certification are processes rather than one-time events. Predictability is important for farm planning.
3. Reduce administrative transaction costs. The 2024 application-to-beneficiary ratio indicates that the implementation process deserves closer examination. Administrative review should identify the principal reasons for non-payment

without assuming that all unsuccessful applications reflect the same problem.

4. Strengthen advisory and certification support. Financial support should be accompanied by practical information on organic standards, documentation, certification procedures, soil and pest management, and market requirements.
5. Promote producer organisation. Collective action can help small producers reduce transaction costs, improve access to certification and strengthen their position in value chains.
6. Develop domestic and export market linkages. Albania's organic sector remains small, and market development is necessary if certification is to generate sustainable economic returns. Policy should therefore consider traceability, branding, buyer linkages and market information alongside production support.
7. Build a future impact-evaluation dataset. A farm-level panel combining beneficiary records with verified production, income, investment and certification data would allow future researchers to estimate policy effects more rigorously. The present descriptive study should be considered a baseline for such work.

7. Conclusions

This study provides a revised assessment of national support for organic farming in Albania using verifiable administrative and sectoral data. The evidence shows that the organic-farm measure is a targeted component of the national agricultural support system. In 2024, AZHBR recorded 169 applications, 105 beneficiaries and ALL 16.8 million in paid support, with an average payment of ALL 160,000 per beneficiary. The 2025 qualified-application list contains 203 applications, indicating continued demand for the measure, although the qualified list cannot be interpreted as final expenditure.

At sector level, Albania's organic agriculture remains modest in scale. FiBL reports 802 hectares of organic agricultural land and 162 organic producers in 2024, with organic land representing approximately 0.1% of agricultural land. The comparison with the EU organic share of 11.14% demonstrates the scale of Albania's development gap.

The evidence does not support a causal claim that national subsidies have increased farm income, productivity or investment because the present study does not use a verified longitudinal farm-level dataset or a causal identification strategy. Instead, the results demonstrate the administrative reach and financial scale of the organic-farm measure and identify the main policy areas requiring stronger monitoring and complementary intervention.

Future policy should therefore combine predictable conversion and certification support with advisory services, producer organisation, market development and improved administrative data. A stronger evidence system linking beneficiaries to production and market outcomes would allow future evaluations to move from descriptive monitoring toward rigorous assessment of additionality and policy effectiveness.

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9. Conflict of Interest

The authors declare that they have no conflict of interest related to this research or its publication.

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Data-source note

The quantitative results in this revised manuscript are based on publicly accessible administrative and statistical sources. AZHBR's 2025 page provides the national support documentation and links to the official qualified-application lists, while the 2024 monitoring report provides reported applications, beneficiaries and paid funds by measure. The 2025 organic-farm qualified list contains 203 applications. These sources should be retained with the manuscript's submission records for reproducibility.

Human Factors and Awareness Gaps: Rethinking Cybersecurity Culture in the Age of AI at Albanian Higher Education Institutions

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Abstract

As the integration of Artificial Intelligence in the academic and administrative functioning of Albanian Higher Education Institutions (HEIs) is expanding, the human aspect of cybersecurity risk has not lessened, but rather has been complicated. Faculty, administrative staff and students across public universities in Albania are rapidly using AI-powered tools from generative AI used in coursework to digitalize administrative systems frequently without enough awareness of the accompanying data security and privacy dangers. This study investigates the dissonance between the pace of technological adoption and the level of cybersecurity awareness in Albanian HEIs, positing that it is human behavior, not solely technical vulnerability, that poses the major threat to the cybersecurity of institutions. Drawing on an analysis of quotidian practices in a technical environment of a public Albanian university, the paper indicates the main risk areas for the local context: uncritical use of third-party AI tools involving sensitive institutional or research data, weak password and access-management practices of non-technical staff, limited formal cybersecurity training adapted to academic environments, and a more general lack of cybersecurity awareness culture in the public education sector of Albania. The study presents a culture-based strategy to cybersecurity for Albanian HEIs, including continual and role-specific training awareness, explicit internal policies on the use of AI tools, and leadership engagement in modelling secure digital behavior at the institutional level. It closes by stating that awareness and institutional culture should be seen as fundamental pillars along with technology protections and governance structures (currently under development) for sustainable enhancement of cybersecurity resilience across Albanian higher education.

Keywords: cybersecurity awareness, human factors, AI adoption, higher education, Albania, institutional culture.

1. Introduction

AI-driven tools' rapid acceptance at Albanian universities is a game changer in the landscape of higher education (ENISA, 2021). From intelligent research assistants to automated grading software and smart teaching systems, these technologies are slowly but surely creeping into every aspect of the administrative and academic processes. Administrative teams use AI technologies for admissions, student information management and duty automation, while academic members use them for curriculum planning, content production and data analysis (Sharma et al., 2020). Students are using generative artificial intelligence (AI) tools to assist them with their academics, articles and group projects. Such vast usage, apart from convenience, also signals a wider trend of digitalization and innovation of education on a global level (Australian Cyber Security Center, 2021).

These technical developments, notwithstanding, are a big and sometimes underestimated portion is cybersecurity risk. The risks of unforeseen data breaches and unauthorized access are presented by behaviors like password reuse, credential sharing, and reckless uploading of sensitive data to third-party AI platforms (CISA, 2022). Students, instructors and staff often have no or inaccurate beliefs about technology's inherent security from a cyber security standpoint (Alshaikh, 2020). Many consumers are worried about data privacy and integrity and hold their institution's IT department or technology provider directly responsible for this (European Commission, 2022). This creates dangerous complacency in the use of technology.

These difficulties are compounded by a general lack of structured cybersecurity awareness programs as regards the demands of academic institutions in Albania (OECD, 2022). When training does take place, it tends to be generic and sporadic and does not address the day-to-day realities of users of AI-powered educational technology (JISC, 2019).

This creates a widening divide in the readiness of academic institutions to combat cyber security threats and the pace of their adoption of new technology.

In this essay we suggest that a purely technical approach such as firewalls, encryption and security protocols is not sufficient for the ever-changing threat landscape linked with the use of AI (NIST, 2023). What is required, instead, is an integrated approach that emphasises the impact of institutional culture and individual conduct (Parsons et al., 2017). The expenditure for cybersecurity in higher education isn't only about purchasing protection from cyber thieves. All levels of the institution will be involved in this long-term commitment to teaching, knowledge and responsible digital citizenship (Alshaikh, 2020). This study aims to illuminate the obstacles and prospects for the development of resilient cybersecurity culture in Albanian higher education through the prism of the interplay of technology, human factors, and organizational values (Brundage et al., 2018).

2. Literature Review

Cybersecurity Culture in Educational Institutions

Recent studies have indicated that educational institutions face specific issues about securing their Internet infrastructure. Universities and colleges also have a reputation for intellectual freedom, a very diverse user base and their networks are open by design. This might make it challenging to implement strong security. Undoubtedly, technical defences are of utmost importance but as (Alshaikh 2020) observed, the human aspect, which includes the attitudes, behaviours and understanding of cybersecurity, is often the most significant risk.

The idea of a strong cybersecurity culture covers not only the adherence of regulations, but also the creation of security-conscious behaviours among all individuals who are a part of an organization. This is because the concept of a culture of cybersecurity must be robust. It has been stated by Parsons et al. (2017) that the deployment of awareness campaigns, training programs, and the dedication of leadership representatives are the most essential elements in the process of enhancing this culture. Research, on the

other hand, demonstrates that there are still knowledge gaps between the professionals and the pupils. Among the most common issues include the use of insecure password practices, susceptibility to phishing attacks, and an overall underestimation of the dangers that are associated with cyberspace (ENISA, 2021).

Cybersecurity and AI: Opportunities and Threats

The emergence of AI has transformed both the character of risks and the instruments available to companies to meet them. AI-powered attacks are growing more sophisticated and more difficult to detect using traditional means, with automatic phishing, deepfake material and intelligent malware only some of the examples (Brundage et al., 2018). "Today's cybercriminals are using machine learning to scan systems for security vulnerabilities, craft convincing social engineering messages and change their tactics on the fly.

AI also helps networks protect themselves from cyberattacks. AI-powered systems may be able to filter through masses of network data in search of abnormalities, suspected security breaches, and ways to automate reactions to such threats, at rates that humans just cannot match (Sharma et al., 2020). Institutions can better respond to existing and emerging threats when AI is integrated into security architecture.

Comparative Context. Case Studies from Around the World!

The study of numerous nations indicates the role of artificial intelligence in the culture of cybersecurity and the response of educational institutions to it.

JISC (2019) showed that after frequent cyber security awareness training and phishing simulations there was a statistically significant improvement in UK university students' knowledge of the hazards posed by cyber security.

In the US, AI-based security operations centers have been developed through partnerships between university and government organisations (EDUCAUSE, 2022). This is a good example of how to do it. The centers exchange information on possible threats to university networks.

The Australian government encourages educational institutions to incorporate education of cyber security and artificial intelligence literacy in their curriculums (Australian Cyber Security Center, 2021). This will help to ensure the youngsters are adequately prepared to tackle the ever changing digital hazards.

The research found that a more pleasant atmosphere inside the institution, continuous assistance for educating both staff and students and adaptive security measures powered by artificial intelligence boost the possibilities of the projects being successful.

3. Particularities of Albanian higher education institutions

It is very important to know what is occurring throughout the world but the difficulties that higher education institutions in Albania are facing are distinct since they have low resources, changing administrative structures and increased awareness on the need for digital security. The absence of unified IT governance and the lack of expert cybersecurity capabilities in the organization leads to inconsistent application of the

security policy. Furthermore, it may be the case that students and staff are not aware that they expose themselves to a more harmful situation when they use informal information exchange, typical in the academic field (ENISA, 2023).

One big concern is the growth of third-party AI solutions, sometimes under-tested to meet data privacy standards such as the General Data privacy Regulation (GDPR). In their pursuit of innovation and efficiency, there is a possibility that academics and administrative staff will not carry out risk assessments as they adopt new tools into their everyday work routines. This is what caused the data loss and illegal access to the institutions (CISA, 2022).

4. Creating a cybersecurity-positive culture

Albania's higher education institutions have the chance to develop a collaborative culture to find solutions to these challenges, given that cybersecurity is a shared goal for these institutions. Regular cyber security training suited to the individual work should be provided to all students, instructors and administrators. This recommendation is addressed.

Everyone needs to be aware of the ethical and private usage standards for artificial intelligence (AI) technologies and we need to make sure you are aware of them too. They can demonstrate best practices at their own university and increase awareness of the problem and its relevance among academics and staff, in an effort to build support for cyber security programs in their institutions. This is something they can do."

You need to have a plan for how you are going to react in the event that an issue emerges (NIST, 2023) and exercise it repeatedly. This needs to be done before the problem arises.

5. The importance of the country's administration and policies for the country

"Cybersecurity needs to be effectively controlled by strong safety standards coupled with academic transparency. The establishment of a centralised office or taskforce on cybersecurity can also help in pooling of efforts and in integrating disparate divisions. The European Commission (2022) advises that the use of artificial intelligence technology be subject to frequent audits and inspections for conformance with national and European standards to limit the chance of unintended effects becoming a reality.

Partnership with international agencies and local cyber authorities provides access to resources, latest threat intelligence and best practice standards (OECD, 2022). A side benefit of collaboration.

Recommendations for Changes that can be implemented over a long period of time are:

The orientation seminars conducted for new students and staff members ought to include a cyber hygiene curriculum that is mandatory and should be incorporated in the curriculum.

"If you are trying to encourage reporting of problematic behaviour, you need to create

a space where there is no punishment of any kind." This will incentivise people to report those behaviours.

Besides investing in secure digital infrastructure, it is important to ensure complete transparency on security measures and the reasons behind them. It is necessary to foster research on a diverse array of subjects relevant to artificial intelligence ethics, security and policy, so as to guide future initiatives. This is because such study might offer guidance for future strategies.

6. Conclusion

The adoption of artificial intelligence in Albanian higher education institutions is not only a question of their technological capabilities but also of the development of a culture of cybersecurity that is robust, aware and proactive. Both of these features are quite important. This is the predicament that has presented itself because both of these components are necessary for the effective integration of artificial intelligence. We cannot stress enough the impact that this particular feature plays in ensuring effective completion of the integration procedures. Building digital resilience in a sustained and ongoing way requires institutions to focus not just on technical protections but also on human factors and organisational principles. This is the only way in which they can guarantee continued and lasting resilience. This is especially the case because this plan is the only method for them to ensure that their digital resilience is successfully built. This is why they are doing it considering that it is very necessary for them to do so so that they can create their digital resilience. This is also the reason why this is the circumstance that we are currently in. This is the only way that they are able to reach the objectives that they have set for themselves.

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Assessment of Soil Salinization in Akërni (Vlora, Albania): Drivers, Impacts and Sustainable Management Approaches

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Abstract

Soil salinization is widely recognized as a major form of land degradation affecting agricultural productivity, particularly in coastal regions (FAO, 2021). The Akërni area in Vlora, Albania, represents a typical case of salinity-affected soils, primarily influenced by seawater intrusion, shallow saline groundwater, and insufficient drainage systems. This study aims to identify the main drivers of soil salinization and evaluate their impact on land use and agricultural productivity, within the broader context of Albania's EU integration and alignment with environmental and agricultural standards.

An integrated methodological approach was employed, combining field observations with a review of existing data on soil properties, environmental conditions, and relevant EU directives. The findings indicate that soil salinization in Akërni is driven by both natural factors, including high evapotranspiration and marine influence, and anthropogenic factors such as poor irrigation practices and land mismanagement (Shrivastava & Kumar, 2015).

The accumulation of soluble salts in the soil profile has resulted in reduced soil fertility, limited crop diversity, and progressive land degradation. However, sustainable land management practices—including improved drainage, soil amendments such as gypsum, and the cultivation of salt-tolerant crops—can significantly mitigate salinity effects and support compliance with EU environmental and agricultural standards (Qadir et al., 2014).

In conclusion, addressing soil salinization in Akërni requires a holistic and integrated approach that combines environmental monitoring, improved agricultural practices, and climate adaptation strategies, contributing not only to local agricultural sustainability but also to Albania's efforts to meet EU accession criteria in environmental and land management policies. This study provides practical recommendations for sustainable land management in salinity-affected coastal ecosystems.

Keywords: Soil salinization, Akërni, Vlora, coastal agriculture, land degradation, sustainable management sodicity, pending laboratory analyses, Narta Lagoon, soil rehabilitation, gypsum, leaching, drainage, salt-tolerant crops, agricultural policy, Albania.

Article status: PRELIMINARY — a revised version will be issued as soon as the remaining laboratory determinations (Na, Ca, Mg, SAR, ESP, CEC, carbonates) are delivered.

1. Introduction

FAO estimates that over 800 million hectares of land are salt-affected worldwide, and that the trend continues to expand in coastal and irrigated areas under the combined pressure of sea-level rise, seawater intrusion, and inadequate irrigation/drainage (FAO, 2021). Salt-affected soils are classified using the USDA/FAO diagnostic thresholds: a soil is saline at $EC_e \geq 4$ dS/m; sodic at $ESP \geq 15\%$ or $SAR \geq 13$ (mmol/L)^{1②}; and saline-

sodic when both conditions are met (Shahid et al., 2018; Osman, 2018; Choudhary & Kharche, 2018).

Akërni lies on the coastal plain between the city of Vlorë and the Narta Lagoon, a hypersaline lagoon fed by the Vjosa delta and characterized by restricted water exchange and high evaporation (Kane et al., 2015). The lagoon-plain system is ecologically fragile and the area has been the object of recent environmental red-flag warnings (Wetlands International European Association, 2024). Agricultural parcels in Akërni experience chronic salt inputs through capillary rise of brackish groundwater, occasional flooding by lagoon/sea water during storm surges, wind-borne salt from the dry lagoon bed, and historic irrigation with water of variable quality on soils with poor drainage.

Despite this exposure, systematic plot-scale data on Akërni soils are scarce. This study was designed as a low-cost, replicable diagnostic protocol: 16 subsamples were collected from the 0–30 cm layer of one agricultural parcel following a grid/diagonal walking pattern, homogenized into a single composite sample (code T1), and analyzed in the laboratory. The objectives are: (1) report and interpret the measured physico-chemical parameters against international thresholds; (2) explicitly identify the parameters that were REQUESTED but are NOT YET DELIVERED by the laboratory, and for each of those pending parameters state the standard analytical method, its expected diagnostic role, and the literature-based expectation for a coastal parcel such as Akërni; (3) design a technically sound rehabilitation and prevention programme; and (4) translate the technical findings into concrete legislative and fiscal proposals easing the burden of farmers cultivating coastal salt-affected land in Albania.

2. Study Area

Akërni is a coastal settlement in the Municipality of Vlorë, south-western Albania, on the sandy barrier and adjacent plain that separate the Narta Lagoon from Vlorë Bay. The lagoon (~42 km²) sits north-west of the city and receives the influence of the Vjosa delta. Climate is Mediterranean, with hot dry summers in which evaporation greatly exceeds precipitation — a key driver of lagoon-water hypersalinity and of summer salt accumulation on the soil surface (Kane et al., 2015). Soils of the plain are young, alluvial-to-sandy, weakly developed, with shallow water tables that fluctuate seasonally and are influenced by the sea and the lagoon.

The sampled parcel is cultivated agricultural land (matrix: soil + plant, composite sample T1) within this plain. The land-use history typical for the area — reclamation with drainage in the socialist period followed by decades of reduced maintenance of drainage and irrigation networks — is a well-documented driver of renewed secondary salinization in coastal Albania (World Bank, 2023).

3. Materials and Methods

3.1 Sampling design

Sixteen (16) subsamples were collected from the topsoil layer (0–30 cm) of the parcel using a systematic grid/diagonal walking pattern, each subsample at an equal

distance from the previous one and avoiding field edges, manure heaps, irrigation channels and other atypical spots. The 16 subsamples were thoroughly homogenized in a clean container and reduced by quartering to a single composite sample of about 1 kg (code T1; client: Enerilda; matrix: soil + plant; date of receipt: 14.09.2026), which was transported to the laboratory. This composite design is the standard, cost-efficient approach for homogeneous parcels — the laboratory analysis represents the mean fertility and salinity status of the parcel and averages short-range variability. Because of that, however, an additional in-field verification with an EM38 sensor or 4-electrode transect is recommended (Section 6) to verify spatial uniformity and to detect any salinity hot spot within the parcel.

3.2 Laboratory panel of parameters (delivered and pending)

The full analytical panel of parameters requested for the study was: pH, EC, available potassium (K "këmb"), loss on ignition (LO%), gravimetric water content (W%), water-soluble sulphate (SO₄), water-soluble chloride (Cl), sodium (Na), calcium (Ca), magnesium (Mg), sodium adsorption ratio (SAR), carbonates, and texture (sand/silt/clay). The laboratory has delivered the parameters marked "measured" in Table 1; the parameters marked "in laboratory" are still being processed and are treated here strictly as PENDING — no estimated value is reported for any of them, and no gypsum dose or sodicity class is therefore proposed numerically, in accordance with the principle that analytical diagnosis must precede chemical amelioration.

Table 1. Status of the analytical panel of sample T1 (Akërne, 0–30 cm composite; 16 subsamples).

Parameter	Unit	Measured value	Status (as of 30.09.2026)
pH (1:2.5 H ₂ O)	pH units	8.61	Measured
Electrical conductivity (EC)	µS/cm	200.1	Measured
Available potassium (K)	mg/kg	72.55	Measured
Loss on ignition (LO%)	%	2.04	Measured
Gravimetric water content (W%)	%	3.64	Measured
Sulphate (SO ₄ ²⁻)	mg/kg	644.02	Measured
Chloride (Cl ⁻)	mg/kg	183.7	Measured
Sand	%	17.088	Measured
Silt	%	62.184	Measured
Clay	%	20.728	Measured
Sodium (Na)	mg/kg	—	In laboratory
Calcium (Ca)	cmol+/kg	—	In laboratory
Magnesium (Mg)	cmol+/kg	—	In laboratory
SAR (Na adsorption ratio)	(mmol/L) ¹ ÷ ²	—	In laboratory
ESP (exchangeable Na %)	%	—	In laboratory
CEC	cmol+/kg	—	In laboratory
Carbonates (CaCO ₃ eq.)	%	—	In laboratory

" — " in the measured-value column means the laboratory result was not delivered at the date

of writing and is therefore not reported (no number has been invented, extrapolated or imputed from any other source to fill the cell).

3.3 Interpretation framework

Measured values were interpreted against the internationally accepted diagnostic thresholds for salt-affected soils (Table 2): ECe 4 dS/m for salinity, ESP 15% / SAR 13 (mmol/L)^{1/2} for sodicity (USDA Salinity Laboratory criteria; FAO), and the FAO/USDA texture triangle (Shahid et al., 2018; Osman, 2018).

Table 2. Diagnostic thresholds for the classification of salt-affected soils (USDA/FAO).

Class	ECe (dS/m)	ESP (%)	SAR (mmol/L) ^{1/2}	Principal diagnosis
Normal soil	< 4	< 15	< 13	No salinity or sodicity constraint
Saline soil	≥ 4	< 15	< 13	Excess soluble salts; leaching needed
Sodic (alkaline) soil	< 4	≥ 15	≥ 13	Excess exchangeable Na; Ca amendment
Saline-sodic soil	≥ 4	≥ 15	≥ 13	Combined salt + Na problem

4. Results

Only the measured portion of the analytical panel is reported in this Section (Section 5 presents the expected diagnostic role of the pending parameters). The four figures were drawn directly from the laboratory values of sample T1; no estimated values were introduced.

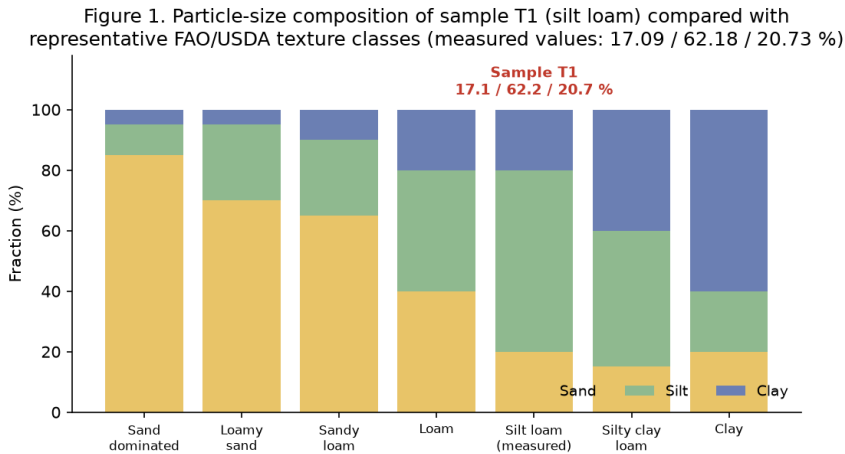


Figure 1. Particle-size composition of sample T1 (sand 17.09 %, silt 62.18 %, clay 20.73 %) classified as silt loam on the FAO/USDA triangle, compared with the reference particle-size compositions of the seven main textural classes; solid-line box marks the measured sample.

Figure 2. Measured pH of sample T1 (8.61) on the standard soil-reaction scale (FAO/USDA classification bands)

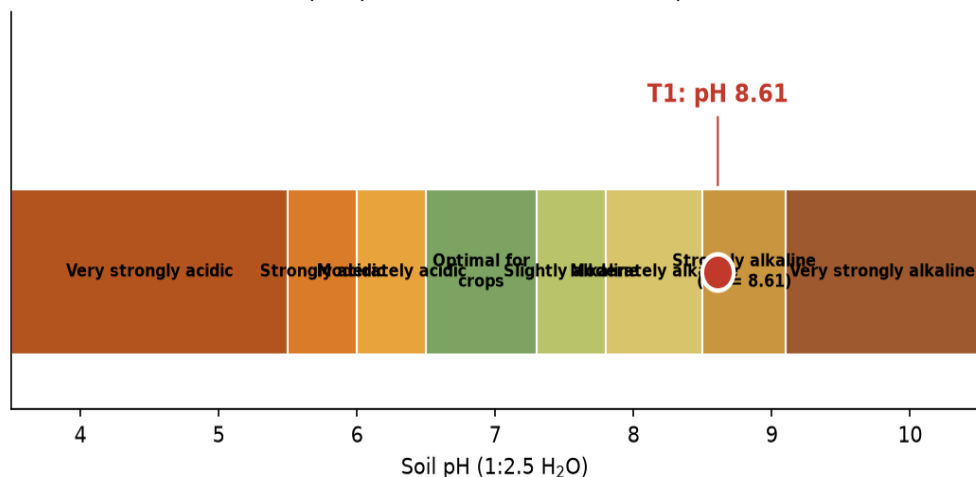


Figure 2. Measured pH of sample T1 (8.61) placed on the standard soil-reaction classification scale (FAO/USDA); the sample falls in the "strongly alkaline" band and is bordered by the "moderately alkaline" band where most crops would still perform within acceptable limits.

Figure 3. Measured EC of sample T1 (0.20 dS/m) against FAO/USDA salinity classes. The topsoil is currently ~20× below the salinity threshold.

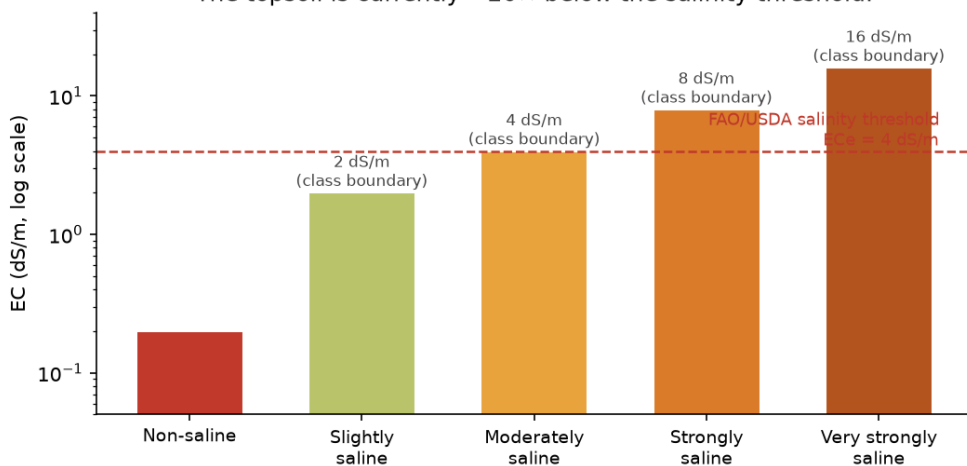


Figure 3. Measured electrical conductivity of sample T1 (converted to 0.20 dS/m against the FAO/USDA salinity classes, log scale). The topsoil is currently ~20× below the salinity threshold ($EC_e = 4$ dS/m) — i.e., not saline on the basis of the measured topsoil alone, while remaining exposed to external salt pressure at the site.

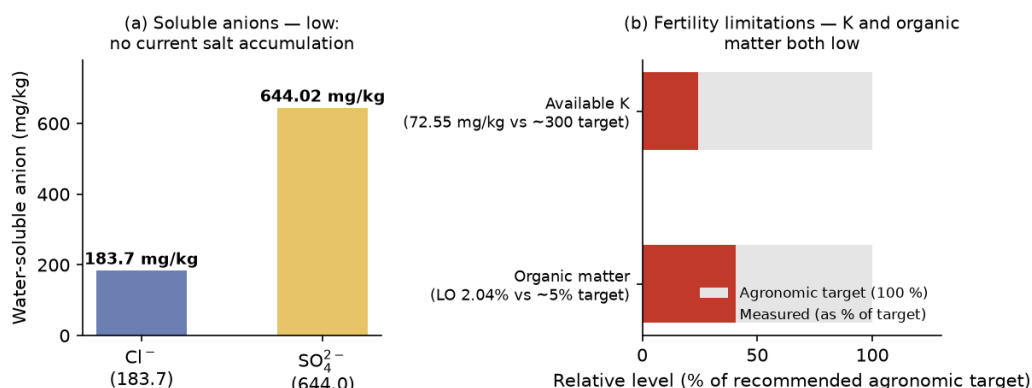


Figure 4. (a) Water-soluble anions of sample T1: low Cl (183.7 mg/kg) and moderate SO_4 (644.02 mg/kg); (b) Fertility limitations expressed as % of typical agronomic targets: available K = 72.55 mg/kg ($\approx 24\%$ of a ≈ 300 mg/kg target) and loss-on-ignition = 2.04 % ($\approx 41\%$ of a 5 % organic-matter target); both parameters are clearly below target and motivate a K-fertilization plus organic-matter-restoration component in the rehabilitation programme.

Summary of the measured picture. The 0–30 cm layer of the Akærni parcel, captured by a homogeneous 16-point composite, is currently (a) non-saline in its own bulk sample ($\text{EC} \approx 0.20$ dS/m, far below 4 dS/m), (b) moderately alkaline (pH 8.61) and therefore not at the optimum soil-reaction band, (c) low in organic matter and K (LO% 2.04, K 72.55 mg/kg), (d) low-moderate in soluble Cl and SO_4 (183.7 and 644.02 mg/kg), and (e) silt loam (sand/silt/clay 17 / 62 / 21 %).

5. Pending Laboratory Analyses: Diagnostic Role and Literature-Based Expectations

The following parameters were requested in the analytical panel for sample T1 and have NOT yet been delivered by the laboratory. To make the article useful even at this preliminary stage, the expected diagnostic role of each parameter is taken from standard soil-science literature. The expected RANGES are presented only as literature-based hypotheses drawn from generic coastal profiles and from the specific saline/sodic encrustation mechanisms in the Narta Lagoon system (Kane et al., 2015). NO value is reported as measured — the cells remain blank until the laboratory returns a number.

Table 3. Pending laboratory determinations for sample T1 — analytical method, expected diagnostic role, and literature-based expectation for a coastal Akærni parcel (no measured value reported in this preliminary article).

Pending parameter	Standard analytical method	Expected diagnostic role	Literature-based expectation for Akærni	References
Na	Saturation-paste extract, atomic absorption or ICP-OES	Main soluble cation; directly feeds SAR; controls EC in saline-sodic soils	Expected to be the DOMINANT cation in coastal soils influenced by seawater/lagoon inputs; chloride often tracks Na in such profiles (Suarez 2005; Mugai 2004; Adeoye 2014)	Suarez 2005; Mugai 2004
Ca and Mg	Saturation-paste extract, AAS or ICP-OES; exchangeable Ca/Mg via NH_4OAc extraction	Divalent cations that compete with Na on the exchange complex; Mg/Ca ratio > 5 is a specific indicator of seawater encroachment	Expected to be subordinate to Na near the lagoon; seawater has Mg/Ca ≈ 5 (Suarez 2005); Ca is also the controlling cation for gypsum dissolution in remediation	Suarez 2005; Ibrahim 2025
SAR	Computed as $\text{SAR} = \text{Na} / \sqrt{\text{((Ca + Mg)/2)}}$ in mmol/L	Diagnostic criterion of sodicity; $\text{sar} \geq 13$ indicates sodic risk (FAO/USDA)	Expected to be elevated above 13 if ESP is above 15, especially in parcels flooded by lagoon overwash; saline seawater intrusion usually drives Na uptake over Ca/Mg first	Shahid et al. 2018; Choudhary & Kharche 2018
ESP	Exchangeable Na / $\text{CEC} \times 100$ on ammonium-acetate extract	Definitive index of sodicity; $\text{ESP} \geq 15$ indicates sodic soil	Expected low-to-moderate in a presently clean topsoil but potentially much higher in patchy sodic micro-sites within the parcel (capillary-crusts spots)	Shahid et al. 2018; Osman 2018
CEC	NH_4OAc at pH 7; or Barium-chloride compulsive exchange	Required to compute the numeric gypsum requirement (GR, t/ha) once ESP is known	CEC scales with clay content; in a silt loam with $\approx 21\%$ clay the typical CEC range is 10–25 cmol/kg (USDA-NRCS reference values)	NRCS 2026 (draft CPS)
Carbonates (CaCO_3 eq.)	Acid neutralization; pressure calcimeter	Indicate carbonate accumulation, which raises pH and can co-occur with sodicity in arid/semi-arid profiles	Likely to be present given the pH 8.61 and the carbonate-rich Vjosa-Vlora sediments; important for selecting the right amendment (gypsum vs. elemental S vs. acids)	Choudhary & Kharche 2018

No value appears in the "expected ..." column above beyond those reported in the cited literature for generic coastal profiles; these are HYPOTHESES to be compared with the

returned laboratory numbers — not imputed values.

5.1 How to read the four figures when the pending data arrive

Once the laboratory delivers the still-pending values:

- Na/Ca/Mg bars will complete the "schematic percent equivalents plot" of the extractable base cations; Na is expected to be the dominant one in the topsoil (Suarez 2005; Mugai 2004).
- An SAR-vs-ESP pair plot will be drawn: if the points lie above the FAO/USDA regression ($ESP \approx 15 \rightarrow SAR \approx 13$) the parcel will be classified as sodic or saline-sodic and gypsum will be quantitatively recommended (NRCS-610 ; Oregon State PNW 601).
- The cumulative anion plot ($Cl + SO_4 + NO_3 + HCO_3$) will be drawn to check ionic balance against the cation sum; in Narta-affected fields a "sea-type" Cl-Na dominance is commonly reported (Suarez 2005).
- A second, dedicated figure ("refined picture, post-laboratory rest") will replace the present Figure 4-b once Na, Ca, Mg, SAR and ESP are available.

6. Discussion

6.1 Present chemical status of the Akärni topsoil

According to the measured portion of the analysis, the 0–30 cm layer of the sampled parcel is currently non-saline in its own composite ($EC \approx 0.20$ dS/m, far below the 4 dS/m threshold; Cl and SO_4 both low-to-moderate). This is encouraging — but should be read with three caveats. (1) EC measured on a 1:2.5 suspension is not directly the saturation-extract ECe used in the classification tables; however, at 0.20 dS/m the margin to any conversion factor is so large that the "non-saline" conclusion is robust. (2) A single snapshot in the dry season (September) may coincide with the downward leaching period; coastal saline soils often show a strong seasonal cycle with summer accumulation and autumn flushing. (3) Most importantly, the parameters that diagnose sodicity (Na, Ca, Mg, SAR, ESP, CEC, carbonates) are STILL IN LABORATORY. The elevated pH (8.61) is compatible with — but does not prove — a sodicity problem. Until the follow-up analysis is delivered, the sodicity status of the parcel MUST BE TREATED AS UNCONFIRMED and the gypsum dose CANNOT be calculated from any measured ESP.

6.2 Why salinity/sodicity risk remains high despite the clean topsoil

Even though the composite topsoil is presently clean, Akärni lies inside the Narta Lagoon system and is subject to a permanent salt pressure: (i) the lagoon is hypersaline due to high evaporation and restricted water exchange (Kane et al., 2015); (ii) shallow coastal groundwater can carry marine salts upward by capillary rise, especially in spring when evaporation resumes; (iii) storm surges can flood low-lying fields with lagoon or sea water; (iv) the silt-loam texture (Figure 1) supports strong capillary connectivity between the water table and the surface. The low organic matter (LO 2.04%) and the low available K (72.55 mg/kg) further weaken the buffering capacity of the soil. The pH 8.61 makes it likely that a coastal profile under the same salt pressure

would exhibit a Na-base saturation with concomitant carbonate accumulation (Suarez 2005), but this is a HYPOTHESIS to be verified once the pending data are returned — no measured ESP/SAR value is reported here that would prove it.

7. Rehabilitation and Prevention Programme for Akærni

7.1 Once the pending analyses are back: complete the diagnosis

1. Insert the measured Na, Ca, Mg, SAR, ESP, CEC and carbonates into Table 1 and update Section 4, replacing the placeholder sections with measured numbers; update Figure 4-b and add the SAR-vs-ESP plot described in Section 5.1.
2. Run the seasonal loop: composite sampling (16 subsamples, 0–30 cm) every spring and autumn to capture the salinity cycle; archive all results in a parcel-level database.
3. Measured depth and EC of the shallow groundwater in two piezometers; map EC variability within the parcel with an EM38 sensor or a simple 4-electrode transect to identify any incipient salt hot spot.

7.2 Leaching and drainage (non-negotiable foundation)

Once the parcel is to be reclaimed (or protected from a future overload), the key mechanism is leaching — applying an excess of good-quality irrigation water so that soluble salts are washed below the root zone. The leaching-requirement concept of the US Salinity Laboratory states that the fraction of applied water that must pass through the root zone is approximately $LF = EC_w / (5 \times ECe_{threshold})$. Leaching is only effective where the displaced brine can actually leave the field — therefore SUBSURFACE (tile) drainage OR REGULARLY CLEANED OPEN DRAINS must be restored or installed before any large-scale leaching is attempted; without drainage the salt is simply moved laterally and can re-salinize neighbouring parcels (Utah State University Extension; Oregon State PNW 601; NRCS CPS 610; Abate 2021).

For Akærni this means in practice: (a) reactivating the communal drainage network and its controlled-gate outfall to the lagoon/sea side; (b) farm-level field drains at 1.2–1.5 m depth where the water table rises above 1 m; (c) small check banks on the lagoon-facing margin to deflect storm-surge water.

7.3 Gypsum (conditional on confirmed ESP/SAR — MEASURE FIRST)

If the pending analyses confirm sodicity ($ESP \geq 15$ — when measured — or $SAR \geq 13$), the standard amendment is gypsum ($CaSO_4 \cdot 2H_2O$): Ca replaces exchangeable Na on the clay complex, the formed Na_2SO_4 is then leached out. The gypsum requirement is $GR (t/ha) = (ESP_{initial} - ESP_{target}) \times CEC (cmol/kg) \times 1.72 \times \text{bulk-density factor} / 100$, with ESP_{target} typically set at 10 and a purity correction for the actual gypsum used; phosphogypsum can replace natural gypsum at lower cost (Outbakat et al., 2022). Because ESP and CEC are NOT YET MEASURED on sample T1, NO NUMERIC GYPSUM DOSE IS RECOMMENDED in this preliminary article — applying gypsum "blindly" would waste farmer money and may acidify soils not actually sodic. Once ESP and CEC are returned by the laboratory, the calculated dose should be applied in split applications incorporated into the top 15–20 cm, always in combination with

leaching and drainage. Where pH is high but ESP is confirmed low, mild acidifying amendments (elemental S, organic matter) and drainage improvement may be enough.

7.4 Agronomic package (apply regardless of salinity class)

- Organic matter restoration: farmyard manure, compost, green manures and conservation till — to raise LO% from 2.04% toward 4–5%; organic amendments improve aggregate stability, infiltration and microbial activity.
- K fertilization: K = 72.55 mg/kg is low (Section 4); apply K₂O per balanced fertilization plan — potassium also improves the osmotic tolerance of crops.
- Salt-tolerant cropping as an interim strategy: barley, sugar beet, sunflower, forage sorghum, date palm and pomegranate tolerate moderate salinity; artichoke, asparagus and several forage grasses tolerate sodic conditions; avoid sensitive crops (beans, carrot, onion, strawberry) until reclamation is confirmed.
- Mulching and residue cover to suppress summer capillary evaporation (the main surface salt-accumulation mechanism in silt loams with shallow water tables).
- Halophytic buffer strips (*Salicornia*, *Suaeda*, *Tamarix*) on the lagoon-facing margin to intercept wind-borne salt and storm splash, and to act as a biological windbreak.

8. Legal and Policy Proposals in Support of Farmers

Saline soil rehabilitation is expensive when imposed on individual farmers. Albanian legislation provides the skeleton: Law No. 8337/1998 on the transfer of ownership of agricultural land, forests, pastures and meadows; Law No. 7846/1994 on irrigation and drainage works; the irrigation legislation as amended in 2017 (which allows municipalities to introduce irrigation service charges); and IPARD III for rural-development support (European Commission). The following proposals are addressed to the Ministry of Agriculture and Rural Development and to the Parliament of Albania:

1. National inventory and legal definition of salt-affected soils. Amend the agricultural land legislation (Law No. 8337/1998 and related bylaws) to introduce an official category of "land affected by salinization/sodication", certified on the basis of laboratory thresholds ($EC_e \geq 4$ dS/m; $ESP \geq 15$; $SAR \geq 13$), with a national geo-referenced inventory maintained by the soil service.
2. Tax and fee relief for certified parcels. Exempt or reduce the agricultural land tax and municipal irrigation service fees for parcels in the certified category, for as long as the owner implements the approved rehabilitation plan — a directly enforceable fiscal incentive.
3. IPARD III investment measure for drainage and amelioration. Negotiate/include an IPARD III measure financing up to 60–70 % of the cost of subsurface drainage, laser land levelling, gypsum/ameliorant application and monitoring wells on certified parcels.
4. Subsidized gypsum and amendments. A per-hectare voucher scheme for gypsum, phosphogypsum, organic compost and cover-crop seed on affected parcels, disbursed only against laboratory proof of purchase and application (avoiding blind application without confirmed sodicity, as flagged in Section 7.3).

5. Water-quality monitoring duty. Extend the obligations of Law No. 7846/1994 and the water legislation so that drainage-water and lagoon-water salinity is monitored seasonally and published, giving farmers objective data for irrigation decisions.
6. Preventive building norms in the coastal strip. Any new subdivision or infrastructure project within the Narta–Akërni coastal strip must include a hydro-technical impact assessment (drainage, flooding, salt transport), consistent with the environmental concerns raised for the Narta Lagoon (Wetlands International European Association, 2024).
7. Farmer advisory service. A standing agronomic advisory programme on sampling protocols, interpretation of thresholds, and salt-tolerant rotations, delivered with the Agricultural University of Tirana and municipal extension officers, financed from the rural-development budget.
8. Compensation/insurance instrument. Pilot a state-subsidized insurance or compensation scheme for crop losses caused by storm-surge flooding of fields adjoining lagoons — increasingly needed under climate change and sea-level rise.

9. Conclusions (preliminary)

Based on the DELIVERED fraction of the analytical panel for sample T1 (composite of 16 subsamples, 0–30 cm, Akërni), the topsoil is currently non-saline (EC 0.20 dS/m vs. threshold 4 dS/m), moderately alkaline (pH 8.61) and below target in organic matter (LO 2.04%) and available K (72.55 mg/kg), with a silt-loam texture (17 / 62 / 21 %) and low soluble Cl (183.7 mg/kg) and moderate SO₄ (644.02 mg/kg). The parcel is nevertheless located in a saline environment (hypersaline Narta Lagoon, shallow groundwater, Mediterranean evaporation), and the parameters that diagnose sodicity (Na, Ca, Mg, SAR, ESP, CEC, carbonates) and seasonal groundwater EC are STILL IN LABORATORY at the date of writing.

The recommended strategy is therefore: (1) complete the diagnostic panel and establish seasonal monitoring; (2) restore drainage before any leaching; (3) apply gypsum ONLY after ESP/SAR confirmation, at a dose calculated from measured CEC and ESP; (4) build soil resilience through organic matter, potassium fertilization, mulching and salt-tolerant crops with halophytic buffer strips; (5) pair the technical package with the eight legal/fiscal proposals of Section 8. A revised article will be issued as soon as the pending laboratory data are delivered.

10. Limitations of this preliminary version

This article is based on the DELIVERED fraction of one composite sample (T1) representing one parcel at one moment (September). The parameters Na, Ca, Mg, SAR, ESP, CEC and carbonates — explicitly listed in the analytical plan — are not yet present in the dataset and are treated here strictly as PENDING. All values reported in the figures, tables and the text are LABORATORY-MEASURED; no value has been imputed, extrapolated or estimated, and the worked gypsum requirement is therefore intentionally not yet calculated.

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Academic and administrative staff of private higher education institutions as subjects of criminal offences against state activity in Albania

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Abstract

Private higher education institutions, despite their private legal status, carry out academic activities regulated by state legislation and integrated into the national higher education system. The establishment and commencement of academic activities, the accreditation of institutions and study programmes, the assessment of students, the administration of academic results, and the awarding of academic qualifications raise questions concerning the legal nature of the functions performed by the academic and administrative staff of these institutions. Against this background, this paper examines whether such staff may fall within the category of special active subjects of criminal offences against state activity. The analysis focuses on the relationship between the private nature of the institution and the employment relationship, on the one hand, and the nature of the specific function performed, on the other. Through an analysis of Albanian legislation and a comparative examination of guidance derived from Italian case law, the paper seeks to identify the criteria upon which the determination of the special status of the active subject should be based, distinguishing the legal status of the individual from the nature and legal effects of the specific function performed.

Keywords: academic staff; administrative staff; private higher education institutions; special active subject; public function; public service; criminal offences against state activity.

1. Introduction

The right to education enjoys constitutional protection. Article 57 of the Albanian Constitution, in addition to recognising everyone's right to education, provides for the possibility for pupils and students to receive education in non-public institutions established and operating in accordance with the law, and guarantees the autonomy of higher education institutions and academic freedom (Republic of Albania, 1998, art. 57(1), (6)–(7)).

In furtherance of this constitutional framework, Law No. 80/2015 defines higher education as a “public good and public responsibility” and organizes it within a system comprising both public and non-public institutions. Non-public higher education institutions are private legal entities; however, their academic activities are conducted within a specific state regulatory framework (Republic of Albania, Law No. 80/2015, arts. 1, 2, 5, 6, 17). The establishment of an institution and the commencement of its academic activities, study programmes, accreditation, quality assurance, and oversight of compliance with legislation are subject to the requirements established by law (Republic of Albania, Law No. 80/2015).

At the same time, successful completion of a study programme entitles the student to receive a certificate, diploma, or academic degree, while the law provides for the maintenance of registers documenting enrolment, academic results, and the issuance of diplomas and certificates (Republic of Albania, Law No. 80/2015, art. 6(22), arts. 70, 73, 75, 91, 101).

This interplay between the private nature of the institution and the employment relationship of its staff, on the one hand, and the legal regulation and legal effects of academic and administrative activities, on the other, raises an important question for criminal law: is the private nature of the institution sufficient to exclude academic and administrative staff from the category of special active subjects of criminal offences against state activity, or should their status be determined by reference to the nature of the specific function performed, the source of the authority exercised, and the legal effects of the activity carried out?

2. Legal nature of private higher education institutions and their activities

2.1. The Private Nature of the Institution and the Public Regulation of Its Activities

The determination of the legal nature of private higher education institutions should be distinguished from the determination of the nature of the specific activities carried out within them. Law No. 80/2015 recognises non-public higher education institutions as private legal entities, which may operate on a for-profit or non-profit basis. Nevertheless, this private nature coexists with the fact that higher education is provided within a system regulated by the state.

Such regulation is evident from the very establishment of the institution and the commencement of its activities. The law distinguishes between the “authorisation for establishment” and the “authorisation to commence academic activities”, while study programmes, accreditation, and quality assurance are subject to statutory mechanisms of authorisation, evaluation, and oversight.

Legal regulation also extends to the outcomes of academic activities. Study programmes are linked to the ECTS credit system, and their successful completion leads to the award of the relevant diploma or certificate. Likewise, every higher education institution (HEI) is required to maintain a master register of students, a register of academic achievements, and a register of issued diplomas and certificates, to which the law attributes an evidentiary function.

These provisions support neither the conclusion that every activity of a private HEI is exclusively private in nature nor the opposite conclusion that public regulation transforms the institution into a public body or every activity performed by its staff into a public function. For the purposes of criminal-law classification, it is necessary to examine the specific function performed, the legal source of the authority exercised, the legal regime governing its exercise, and the legal effects produced by the activity. Italian case law provides a useful point of comparison. In *Cass. pen., Sez. VI, No. 41241/2025*, the Court of Cassation examined the position of the Director General of a private online university. The Court assessed the specific activities performed and their connection with the provision of university education and the awarding of academic qualifications, recognising the Director General as an *incaricato di pubblico servizio* (a person entrusted with a public service).[4] The case arose from specific circumstances and cannot be generalised to every private HEI; nevertheless, it is methodologically relevant for distinguishing between the legal nature of the entity and the specific function performed.

3. The active subject of criminal offences against state activity

3.1. *The Special Status of the Active Subject*

Section II of Chapter VIII of the Criminal Code contains criminal offences that require the perpetrator to possess a particular status. The Code does not employ uniform terminology: Article 248 refers to a “person exercising public functions”; Article 249 to the continued exercise of a “state function or public service”; Article 250 to an “employee performing a state function or public service in the exercise of his or her duties”; while Article 251 refers to a “person entrusted with a state function or public service” (Criminal Code of the Republic of Albania, arts. 248–251).

Despite these terminological differences, these provisions demonstrate the importance attached to the function, service, or duty performed by the perpetrator. Consequently, as regards the staff of private HEIs, the issue cannot be resolved solely by establishing that the employment relationship exists with a private legal entity.

A systematic argument may be found in administrative legislation. The Code of Administrative Procedures extends its scope to private persons who, pursuant to legislation, have been granted the right to exercise public functions, duties, or powers, as well as to public or private legal persons that provide public services and determine the rights and obligations of their users. Likewise, the concept of a “public body” also encompasses a natural or legal person who has been granted the right to exercise public administrative functions (Republic of Albania, Law No. 44/2015, arts. 2(2)(b)–(c), 3(6)). A functional approach is also reflected in Law No. 49/2012 on Administrative Courts (Republic of Albania, Law No. 49/2012, art. 2(6)).

These definitions cannot be mechanically transposed into criminal law. They may serve as a systematic interpretative argument, while the status of the active subject must be determined on the basis of the criminal-law provision itself, in accordance with the principle of legality and the requirement of strict interpretation.

Consequently, the relevant question is not simply “where does the person work?”, but rather “what function does the person perform and from what legal source are his or her powers derived?”. The assessment must take into consideration the normative source of the function, the specific powers exercised, the nature of the activity, and its legal effects.

3.2. *The Organic Criterion and the Functional Criterion*

The determination of the special status of the active subject may, at a theoretical level, be analysed according to two approaches: the organic criterion and the functional criterion. The organic criterion links the individual’s status primarily to his or her legal status, the legal nature of the institution within which the activity is performed, and the relationship connecting the individual to that institution. The functional criterion, by contrast, shifts the analysis towards the nature of the activity actually performed, the legal source of the authority exercised, the legal regime governing that activity, and the effects it produces.

A clear normative model of the functional approach can be found in Italian criminal law. Article 357 of the Italian Criminal Code links the status of *pubblico ufficiale* to the exercise of a legislative, judicial, or administrative public function and, with regard

to the latter, takes into account the public-law regime governing the activity and the exercise of decision-making, authoritative, or certifying powers. Article 358, on the other hand, links the status of *incaricato di pubblico servizio* to the performance, *a qualunque titolo* (“in any capacity”), of a public service, excluding activities consisting merely of the performance of material tasks (*Codice penale italiano*, arts. 357–358).

In interpreting these provisions, the case law of the Italian Court of Cassation applies an objective-functional criterion, according to which the status of the subject is not determined solely by the public or private nature of the entity or by the existence of a formal employment relationship with a public body, but by the nature of the activity actually performed and the legal regime to which that activity is subject (Corte Suprema di Cassazione, 2025, No. 41241).

This model cannot be automatically transposed into Albanian criminal law, since the content and limits of the special status of the active subject must be determined by the relevant Albanian criminal-law provision. Nevertheless, the objective-functional criterion is of comparative relevance because it makes it possible to distinguish the legal nature of the institution and of the employment relationship from the legal nature of the specific function performed.

With regard to the staff of private HEIs, the analysis may therefore be conducted on two levels: at the organic level, by establishing the private nature of the institution and of the employment relationship; and at the functional level, by identifying the legal source of the authority exercised, the content of the specific function, and the legal effects resulting from its exercise. Only on this basis can it be determined whether the person possesses the special status required by the relevant Albanian criminal-law provision.

4. Academic staff of private HEIs as special subjects

Law No. 80/2015 provides that the staff of higher education institutions consists of academic, academic support, and administrative staff, while their rights and obligations are defined by the statutes and internal acts of the institution, in accordance with the applicable laws and secondary legislation (Republic of Albania, Law No. 80/2015, art. 57(1)–(3)). Academic staff engage in teaching, scientific research, institutional support, and student counselling activities (Republic of Albania, Law No. 80/2015, art. 59(1)–(5)). However, the mere status of being a lecturer at a private HEI is not sufficient for that person to be regarded as a special subject of criminal offences against state activity. The assessment must be linked to the specific activity performed.

In this regard, academic assessment is of particular significance. The law regulates the organisation of study programmes and the ECTS credit system, the completion of cycles of study and the award of the corresponding diploma (Republic of Albania, Law No. 80/2015, arts. 70(1)–(4), 72, 73(1)–(3), 75), as well as the recognition of credits, transfer of studies, and recognition of periods of study (Republic of Albania, Law No. 80/2015, art. 89(1)–(2)). For this reason, student assessment should not be viewed in isolation, but rather as part of a legally regulated academic process whose results affect the progression and completion of the student’s studies.

The significance of this function is further reinforced by Article 101 of Law No. 80/2015, according to which the register of academic achievements certifies the results

obtained by each student and is deposited with the state archives (Republic of Albania, Law No. 80/2015, art. 101(1), (3)–(5)). The assessment result is thus incorporated into a legal system of documentation and certification. This does not mean that a member of the academic staff exercises a public function in every aspect of his or her activities; rather, it must be determined whether the specific activity constitutes the exercise of a legally prescribed or regulated power and whether it produces legal effects on the student's academic status or academic progression.

The fact that the specific powers of academic staff are also defined by the statute or internal regulations does not necessarily alter this analysis. Law No. 80/2015 provides that the statute contains the basic rules governing the activities of the HEI, is drafted in accordance with the law and secondary legislation, and determines, *inter alia*, the duties and rights of academic staff (Republic of Albania, Law No. 80/2015, art. 33(1)–(4)). These acts may serve to specify the powers of staff within the framework established by higher education legislation.

The objective-functional criterion applied in Italian case law also supports, from a comparative perspective, the need to assess the activity actually performed and the legal regime governing it, without treating the private nature of the institution as the sole determining factor (Corte Suprema di Cassazione, 2025, No. 41241, §§ 2–2.1).

Consequently, the academic staff of a private HEI cannot be regarded as special active subjects *ratione personae* solely by virtue of their status as academic staff. Their status must instead be assessed *ratione functionis*, by determining whether the specific activity performed, the source of the authority exercised, and its legal effects place the person within the category of active subjects required by the relevant criminal-law provision.

5. Administrative staff of private HEIs as special subjects

The same method of analysis applies to administrative staff. Law No. 80/2015 includes administrative staff among the categories of personnel of higher education institutions and separately regulates academic support staff of an administrative nature, who support the performance of teaching, scientific research, and institutional development activities (Republic of Albania, Law No. 80/2015, arts. 57, 66–67).

However, the formal status of an administrative employee is not sufficient to attribute to that person the special status required under criminal law. A distinction must be drawn between activities of a merely material or technical nature and those involving the exercise of administrative, documentary, or certifying powers provided for within the legal framework governing the institution's activities. This distinction is particularly relevant in the administration of a student's academic record.

Law No. 80/2015 requires every HEI to maintain a master register of students, a register of academic achievements, and a register of issued diplomas and certificates, to which the law attributes an evidentiary function with regard to student enrolment, academic results, and the issuance of diplomas and certificates (Republic of Albania, Law No. 80/2015, art. 101(1)–(5)). Consequently, when assessing the position of administrative staff, it is necessary to identify specifically which employee, under the applicable legal framework and the institution's internal acts, has been entrusted with powers

relating to student enrolment, the administration or certification of academic results, the issuance of attestations or certificates, or documentation relating to graduation. From a systematic perspective, the Code of Administrative Procedures demonstrates that the private nature of a legal person is not, in itself, incompatible with the exercise of public functions, duties, or powers (Republic of Albania, Law No. 44/2015, arts. 2(2)(b)–(c), 3(6)). These definitions cannot be automatically transposed into criminal law, but they may serve as a systematic interpretative argument; the status of the active subject must always be determined according to the constituent elements of the specific criminal-law provision.

Along the same lines, from a comparative perspective, *Cass. pen., Sez. VI, No. 41241/2025* confirms the importance of assessing the activity actually performed and the legal regime governing it, irrespective of the private nature of the entity (Corte Suprema di Cassazione, 2025, No. 41241, § 2). In that case, the Director General of a private online university was considered an *incaricato di pubblico servizio* (a person entrusted with a public service) on account of the specific function performed and its connection with the provision of university education and the awarding of academic qualifications (Corte Suprema di Cassazione, 2025, No. 41241, §§ 2.1–2.3).

Consequently, neither the formal status of an administrative employee is sufficient to regard that person as a special subject, nor does the private nature of the employment relationship *a priori* exclude that possibility. The assessment must be conducted *ratione functionis*, taking into consideration the specific function performed, the legal source of the authority exercised, the content of the activity, and the legal effects it produces.

6. Implications for criminal offences against state activity

The preceding analysis demonstrates that non-public higher education institutions, although private legal entities, carry out their activities within a state-regulated system. Law No. 80/2015 regulates the organisation of study programmes, the credit system, the conditions for completion of cycles of study, the awarding of diplomas, and the documentation of academic results, while the quality assurance framework is complemented by the standards established by the Higher Education Quality Code (Republic of Albania, Law No. 80/2015; Council of Ministers of the Republic of Albania, 2021, Decision No. 824).

The private nature of an HEI does not, in itself, constitute a sufficient criterion for excluding *a priori* its staff from the category of special active subjects of criminal offences against state activity. Conversely, the public regulation of university activities does not justify the opposite conclusion that every member of academic or administrative staff constitutes a special subject in relation to every activity performed. The assessment must be conducted by reference to the specific function, taking into consideration the legal source of the authority exercised, its content, and the legal effects of the activity performed.

For this reason, the same individual may have different criminal-law relevance depending on the specific activity performed. A lecturer's teaching activities cannot automatically be equated with the exercise of powers relating to the assessment and documentation of academic results. Likewise, the performance of material or technical

tasks by administrative staff must be distinguished from the exercise of powers relating to the administration, attestation, or certification of academic documentation. Even where a person possesses the special status required by the relevant criminal-law provision, this establishes only one of the constituent elements of the criminal offence. Criminal liability requires a separate assessment of all the other elements of the specific offence (Criminal Code of the Republic of Albania, Chapter VIII, Section II). This distinction is particularly important in relation to Article 248 of the Criminal Code: it must first be established whether the person possesses the status required by the provision and, secondly, whether his or her act or omission satisfies the objective elements of the offence, including the requirement that the conduct be “contrary to the law” and constitute an improper performance of official duties (Criminal Code of the Republic of Albania, art. 248).

In this regard, a distinction must be drawn between the normative source of the person’s authority and the normative source of the unlawfulness of the conduct. The statute and regulations of a private HEI may be relevant for specifying the powers of academic or administrative staff; however, a breach of such acts cannot automatically be equated with the requirement under Article 248 that an act or omission be “contrary to the law”.

This issue requires particular attention, especially given that, on 21 July 2026, the Criminal Chamber of the Supreme Court of the Republic of Albania referred for unification of judicial practice the question of whether this expression also encompasses acts or omissions committed in breach of rules established by secondary legislation adopted on the basis of and for the implementation of a law (Supreme Court of the Republic of Albania, Criminal Chamber, 2026).

7. Conclusion

The preceding analysis demonstrates that the private nature of a higher education institution and of the employment relationship of its staff are not, in themselves, sufficient to exclude the special status of the active subject of criminal offences against state activity. Conversely, the fact that the activities of private HEIs are conducted within an extensive state regulatory framework does not automatically confer such status upon every member of academic or administrative staff.

The analysis developed in this paper supports a functional approach, according to which the legal nature of the institution must be distinguished from the nature of the specific activity performed. For this purpose, particular importance must be attached to the legal source of the function, the specific powers vested in the individual, the legal regime governing the activity, and the effects it produces. This approach finds comparative support in the objective-functional criterion developed in Italian criminal law, without implying the automatic transposition of Italian legal categories into the Albanian criminal-law system (Corte Suprema di Cassazione, 2025, No. 41241).

In the context of private HEIs, activities such as the assessment and documentation of academic results, the administration of a student’s academic record, the recognition of credits, graduation procedures, and the administration or certification of academic documentation must be assessed by reference to the specific powers attributed under

the relevant legal framework and the effects they produce. By contrast, activities that are merely material or technical in nature, or that arise solely from ordinary private-law relationships, do not acquire a public character merely because they are carried out within a higher education institution.

Consequently, the special status of the active subject should not be attributed *ratione personae* merely on the basis of the individual's position as a lecturer, manager, or administrative employee of a private HEI. Rather, it must be assessed *ratione functionis*, by reference to the specific activity performed and the requirements of the relevant criminal-law provision. The same person may therefore perform activities with different criminal-law relevance depending on the function exercised in the particular circumstances.

Finally, establishing the special status of the active subject constitutes only one of the conditions for criminal liability. For each criminal offence, all constituent elements of the offence must be independently established. In particular, for the purposes of Article 248 of the Criminal Code, the legal source of the individual's authority must be distinguished from the normative source determining the unlawfulness of the conduct. Accordingly, the fact that a particular power is specified in the statute or internal regulations of an HEI does not, in itself, mean that a breach of those acts satisfies the requirement under Article 248 that an act or omission be "contrary to the law" (Criminal Code of the Republic of Albania, art. 248).

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