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(ICSNS XXXIV-2025)

Lisbon, 31 December 2025

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Judicial Competence and the Recognition of Foreign Decisions: The Role of Courts and Institutions in International Succession

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Abstract

The implementation of international succession norms within the Albanian jurisdiction presents a complex challenge, arising from the interplay of diverse legal frameworks, the varying nationalities of heirs, the distribution of assets across multiple jurisdictions, and the lack of consolidated judicial practice. This paper examines procedural and administrative issues, including the recognition, translation, and legalization of foreign documents, judicial competence and the recognition of foreign judgments, as well as the role of notaries and intermediary institutions in ensuring the effective enforcement of international succession. The analysis incorporates concrete Albanian–European cases that illustrate practical challenges, including bureaucratic delays, the management of internationally dispersed assets, conflicts between the law of nationality and the law of the situs of property, and questions related to digital inheritance.

The study further highlights the importance of interinstitutional coordination and bilateral and multilateral cooperation to improve procedural efficiency and ensure legal certainty for heirs. Through an analytical and practice-oriented approach, the paper concludes that harmonizing national legislation with international norms and practice is essential to ensuring a fair, predictable, and coherent process of international succession in Albania, offering guidance for legal practitioners and institutions in addressing emerging challenges in the field.

Keywords: Succession, Jurisdiction, International, Harmonization, Challenges, etc.

1. Introduction

1.1 Procedural and Administrative Issues in International Succession

International succession, due to its cross-border nature, involves a range of procedural and administrative issues that often render its implementation complex and time-consuming. These issues primarily relate to the recognition of foreign documents, their translation and legalization, the respective competences of notaries and courts, as well as the tax obligations arising from the distribution of assets across different jurisdictions. In practice, the resolution of such matters requires close cooperation between national and foreign authorities, together with advanced knowledge of private international law (publike. 1961).

One of the most common challenges in the process of international succession is the recognition and legalization of documents. For instance, in a case examined by the Tirana District Court, an Albanian family inherited assets located in both Albania and Italy. In order to complete the registration of property in Albania, the heirs were required to submit the Italian will translated, notarized, and legalized in accordance with the Hague Convention Abolishing the Requirement of Legalisation for Foreign

Public Documents (Apostille). However, the process was delayed for several months due to inconsistencies in the formats of legalization applied in the two countries. The Albanian court ruled that the will could be granted legal validity only after it had been verified by the Ministry of Justice, applying the principles of Albanian law governing the recognition of foreign acts (Vendim i Gjykatës së Rrethit Gjyqësor Tiranë. 2018). The translation and certification of documents constitute another significant obstacle. In a specific case involving Albanian–German succession, the heirs encountered difficulties due to the requirement for certified translations in both languages and the lack of consistency in legal terminology. As a result, the documents were returned several times for correction, thereby delaying the distribution of the estate. Albanian and German notaries cooperated through an internationally licensed notary in Germany, who ensured that the translations were legally valid in both legal systems (Drejtësisë 2019).

Another essential aspect of administrative procedures concerns the registration of property in different countries. A typical case involves an Albanian national who owned immovable property in both France and Albania. The French court recognized the heirs' ownership in accordance with the French will but required that the registration of the apartment in Albania be carried out on the basis of duly legalized Albanian documents. Consequently, the heirs were obliged to submit translated and notarized acts to the property registration office in Tirana. Only after verification by the Albanian authorities was it possible to register the property in their names, relying on the principle of *lex rei sitae* the law of the place where the property is located (Vendim i Gjykatës së Parisit, nr. 456/2020 dhe dokumentacion i pasurive në Shqipëri. 2020). Another essential aspect of administrative procedures concerns the registration of property in different countries. A typical case involves an Albanian national who owned immovable property in both France and Albania. The French court recognized the heirs' ownership in accordance with the French will but required that the registration of the apartment in Albania be carried out on the basis of duly legalized Albanian documents. Consequently, the heirs were obliged to submit translated and notarized acts to the property registration office in Tirana. Only after verification by the Albanian authorities was it possible to register the property in their names, relying on the principle of *lex rei sitae* the law of the place where the property is located (Shqipëri–Itali 1994).

The recognition of foreign wills and judicial decisions constitutes another delicate aspect of procedural practice. In a German–Albanian case, a will drafted in Germany was initially refused by the Albanian court due to the lack of legalization and an official translation. After these requirements were fulfilled, the court recognized the will, considering it valid and in compliance with Albanian inheritance law. This decision became a precedent for similar cases, underscoring the importance of strict compliance with international procedural requirements for the validity of testamentary instruments (Vendim i Gjykatës së Lartë të Shqipërisë. 2021). In certain cases, administrative difficulties stem from a lack of interinstitutional cooperation between the authorities of the states involved. An illustrative example arises from an Albanian–Greek case, in which delays in the exchange of information between the notarial authorities of the two countries resulted in the postponement of the

succession settlement for more than one year. Only following the intervention of the Albanian embassy in Athens and a formal request by the Ministry of Justice was the verification of documents and the finalization of the process made possible (Drejtësisë 2020).

Another important element is the lack of technical expertise on the part of heirs and even legal professionals. In many cases, individuals confronted with international succession lack the necessary knowledge to navigate the process properly. For this reason, it is essential for states to develop practical guidelines for citizens, based on international conventions and bilateral agreements on legal assistance ((CEPEJ) 2021). Overall, procedural and administrative issues are not merely formal aspects of international succession but are fundamental to ensuring legal certainty and respecting the will of the deceased. Their proper implementation requires institutional coordination, transparency, and the standardization of international practices in order to secure an efficient and fair process for all parties involved.

1.2 Judicial Jurisdiction and the Recognition of Foreign Decisions

International succession requires a specific approach to judicial jurisdiction and the recognition of foreign decisions, taking into account the legal connections of the parties involved and the location of the assets. These issues are among the most complex in judicial practice, as they involve the parallel application of national and international norms, as well as respect for the principles of state sovereignty and legal certainty for the parties. In this context, Albanian legislation, partially harmonized with the principles of the Hague Conventions and European Union law, establishes clear rules governing judicial jurisdiction and the recognition of foreign decisions in the field of international succession.

1.2.1 Determination of Judicial Jurisdiction

Jurisdiction determines which courts have the authority to adjudicate matters of international succession. According to Law No. 10428, dated 2 June 2011, "On Private International Law," jurisdiction is established based on the deceased's last habitual residence and the location of the assets (Shqipërisë 2011). This means that an Albanian court has jurisdiction over a succession case only if the deceased had habitual residence in Albania or if the assets are located within Albanian territory.

In cases involving immovable property, jurisdiction is considered absolute; that is, only the court of the country where the property is situated may adjudicate matters concerning it. This principle has been confirmed in several cases by the Tirana Court of Appeal, which ruled that properties located outside Albanian territory cannot be subject to review in Albanian judicial proceedings. A concrete example involves an Albanian-Italian family, where the deceased owned assets in both Tirana and Milan. One of the heirs requested that the proceedings be conducted in Albania for all assets. The Tirana Court of Appeal held that it had jurisdiction only over the immovable property located within Albanian territory, while the portion of the estate situated in Italy had to be addressed by the Italian courts (Vendim i Gjykatës së Apelit Tiranë, "Mbi përcaktimin e kompetencës për pasuritë me element të huaj" n.d.). This decision reflects the international principle of *lex rei sitae*, according to which, in matters

concerning immovable property, the laws and jurisdiction of the country where the property is located apply.

In practice, Albanian courts have demonstrated caution in maintaining a balance between national and foreign jurisdiction. In certain cases, Albanian courts have accepted to examine claims related to movable property located abroad when there is a close connection with Albanian heirs, but not for immovable property. This demonstrates a flexible approach aimed at ensuring procedural efficiency and avoiding duplicate proceedings (Kapaj 2021).

1.2.2 Recognition and Enforcement of Foreign Decisions

The recognition of foreign judgments in Albania is governed by Articles 393–399 of the Civil Procedure Code (Kodi i Procedurës Civile i Republikës së Shqipërisë 1996). According to these provisions, foreign judicial decisions may be recognized in Albania if they were issued by a court competent under the laws of the country of origin and do not conflict with Albanian public policy. The Albanian court does not reopen the case on the merits but examines only the formal conditions for recognition and the existence of legal obstacles, such as lack of jurisdiction, violation of the parties' right to defense, or conflict with a prior Albanian judgment (Drejtësisë, Kodit të Procedurës Civile, mbi pengesat për njohjen e vendimeve të huaja 1996). A well-known case in practice involves a request for the recognition of a judgment from the Court of Milan, which determined the distribution of an estate between an Albanian citizen and an Italian heir. The Tirana Court of Appeal granted the recognition request, reasoning that the foreign judgment had been issued by a competent court and did not violate the principles of Albanian public policy. The Italian judgment was recognized in Albania for the purpose of registration at the Immoveable Property Registration Office (Vendim i Gjykatës së Apelit Tiranë, “Njohja e vendimit të Gjykatës së Milanos mbi trashëgiminë ndërkombëtare” Datë 2020).

Another case concerns the recognition of a judgment by the Court of Thessaloniki, which determined the succession of a citizen with dual Greek–Albanian nationality. The Albanian court refused recognition of the judgment on the grounds that the defendant had not been properly notified, thereby violating the principle of the right to a fair trial. This case underscores the importance of respecting procedural guarantees during the recognition of foreign judgments (Vendim i Gjykatës së Apelit Korçë, “Refuzimi i njohjes së vendimit të Gjykatës së Selanikut për shkelje të njoftimit procedural” Datë 2021). In both instances, Albanian courts have demonstrated conformity with international standards by conducting a formal review of foreign judgments while safeguarding the fundamental principles of the domestic legal system. This approach aligns with the practices established under the Hague Convention on the Recognition and Enforcement of Foreign Judgments in Civil and Commercial Matters (1971), which Albania acceded to in 2019 (Konventa e Hagës për Njohjen dhe Zbatimin e Vendimeve të Huaja në Fushën Civile dhe Tregtare 1971).

1.2.3 Practical Challenges in Judicial Implementation

In practice, the enforcement of these rules faces several challenges, such as delays in the recognition process, lack of inter-institutional cooperation, and difficulties with

the legalization and translation of foreign documents. In many cases, documents submitted to Albanian courts are incomplete or lack an apostille, preventing the immediate recognition of the judgment. Courts often require an official translation of every document, which increases both the costs and duration of the proceedings. Another challenge is the absence of a shared judicial database with countries with which Albania has bilateral agreements. This negatively affects the verification of the validity of foreign judgments and their enforcement process. However, with the entry into force of several bilateral agreements, such as those with Italy and Greece on cooperation in civil judicial matters, a significant improvement has been observed in the handling of requests for the recognition of foreign judgments.

1.3 The Role of Notaries and Intermediary Institutions

In modern legal systems, particularly in the field of international succession, the role of notaries and intermediary institutions is essential for ensuring legal certainty and the legitimacy of cross-border transactions. In cases where an estate involves assets in more than one country, notaries serve as a link between the national and international legal systems, ensuring that the documents they prepare are valid in both jurisdictions. In Albania, this role has been significantly strengthened following the 2011 notarial reform and the entry into force of Law No. 110/2018 "On Notaries," which establishes clear competences for notaries in matters involving foreign elements, including the certification, legalization, and coordination of documents related to assets located outside the national territory (Kola 2021).

The notary, as a guarantor of the testator's intent and the security of transactions, ensures that every act is carried out in accordance with the applicable law of the country of nationality or the location of the assets. Within this framework, cooperation between national and foreign notarial institutions has become essential, particularly in cases where the legalization of a will or succession documents is required for use abroad (Ligji nr. 110/2018 "Për noterinë" 2018).

1.3.1 Certification and Legalization of Documents

The process of certifying and legalizing documents constitutes the foundation of legal certainty in international succession. In Albanian practice, a will or a certificate of inheritance issued in another country must comply with the requirements of the 1961 Hague Convention Abolishing the Requirement of Legalisation for Foreign Public Documents, also known as the "Apostille Convention." ((2020). 2020) If the document originates from a country that is not a party to this Convention, full diplomatic legalization through the Ministry of Foreign Affairs and Albanian consular representations is required.

Concrete examples from Albanian judicial practice illustrate the importance of this process. In a 2020 case, an Albanian citizen who had inherited property in Italy requested that his father's will, issued by an Italian notary, be recognized as valid in Albania. The Tirana Court ruled that the document was valid only after it had been provided with an Apostille and officially translated into Albanian, emphasizing that failure to complete this step would render the legal act null and void (Vendimi i Gjykatës së Rrethit Gjyqësor Tiranë, nr. 456, datë 15.06.2020. 2020).

In cases where documents are issued by countries that are not parties to the Hague Convention, such as some Asian and African states, a procedure of multiple legalizations through embassies and intermediary institutions is required. This often results in significant delays in proceedings and may complicate the implementation of international succession. For this reason, some legal experts have called on Albania to expand bilateral agreements for the reciprocal recognition of notarial documents with other countries (Gjoni 2022).

1.3.2 International Enforcement of Judgments

The recognition and enforcement of foreign judicial decisions in succession matters constitute another area in which intermediary institutions intervene, including the Ministry of Justice, the National Chamber of Notaries, and consular authorities. In practice, a foreign court decision recognizing an inheritance must undergo the process of “recognition” or “exequatur” in Albanian courts, in accordance with Article 515 of the Civil Procedure Code. Only after recognition can such a decision have legal effect in Albania (Zyrtare 2014, i ndryshuar). A 2019 case before the Tirana Court of Appeal illustrates this procedure: an Albanian citizen residing in France requested the recognition of a French judgment determining the division of a joint inheritance between him and his sister. The Albanian court, after establishing that the judgment did not conflict with Albanian public policy and had been issued by a competent court, recognized it and allowed its enforcement in Albania (Vendimi i Gjykatës së Apelit Tiranë, datë 22.05.2019. 22).

In other cases, such as judgments involving property in multiple countries (e.g., Albania–Greece), the process has encountered difficulties due to a lack of coordination between institutions. In a 2021 case, a Greek court decision recognizing an inheritance over property in Korçë was refused by the Albanian court because the documentation had not been legalized in accordance with the requirements of the relevant convention (Vendimi i Gjykatës së Lartë, datë 10.03.2021. 2021). This highlights the need for a more robust mechanism for inter-institutional cooperation and the digitalization of communication procedures between courts and notaries in different countries.

1.3.3 Coordination Between National and Foreign Institutions

A significant challenge in the practical implementation of international succession lies in the coordination between national and foreign institutions. In Albania, this cooperation involves the Ministry of Justice, the National Chamber of Notaries, the Ministry of Foreign Affairs, and courts of various levels. These institutions must ensure the proper recognition, legalization, and enforcement of foreign documents and judgments in accordance with international conventions (Drejtësisë, Ministria e Drejtësisë e Republikës së Shqipërisë (2023). Raport vjetor mbi bashkëpunimin ndërkombëtar juridik. 2023). In practice, this coordination is often supported by bilateral or multilateral agreements. A concrete example is the legal cooperation agreement between Albania and Italy (1995), which allows for the reciprocal recognition of notarial and judicial acts related to succession without the need for additional legalization procedures (Drejtësisë, Marrëveshja për bashkëpunim juridik ndërmjet Republikës së Shqipërisë dhe Republikës së Italisë (1995). 1995). In a 2022

case, a joint inheritance involving an Albanian–Italian family was managed through cooperation between the notaries of the Tirana Chamber of Notaries and those of Rome, enabling a swift process without bureaucratic delays ((2022) 2022). Meanwhile, in cooperation with the European Union, Albania has initiated the digitalization of communications between notaries through the “eNotary” platform, which allows for real-time verification of notarized documents from other European countries. This reform aims to align the Albanian system with the best practices of EU member states and to facilitate procedures for citizens with assets abroad ((2023) 2023). Interinstitutional coordination remains one of the key pillars for the successful implementation of international succession. Only through an integrated network of notaries, courts, and justice institutions can the fair and uniform application of legal norms be ensured in cases involving foreign elements.

1.4 Problematic Cases of Albanian Succession Involving Assets Abroad

International succession is among the most complex areas of private international law, particularly when it involves Albanian nationals with assets abroad. These cases are complicated by differences in national laws, the absence of bilateral agreements, and a lack of institutional coordination. This subsection analyzes five typical situations encountered by Albanian and foreign courts, including legal conflicts, difficulties in the enforcement of wills, undistributed assets, the role of embassies, and the emerging phenomenon of digital inheritance.

1.4.1 Conflicts Between the Law of Nationality and the Law of the Location of Assets

One of the most debated issues in Albanian practice is the determination of the applicable law when a succession involves assets in more than one country. The Law on Private International Law (2017) provides that, for immovable property, the law of the country where the property is located (*lex rei sitae*) applies, while for movable property, the law of the deceased’s nationality (*lex patriae*) governs (Zyrtare, Ligji nr. 10428, datë 02.06.2017, Për të Drejtën Ndërkombëtare Private, neni 32. 2017).

An important case was addressed by the Tirana Court of Appeal in 2018. The deceased was an Albanian national but owned property in both Albania and Greece. The heirs requested the recognition of a Greek court decision determining the division of the properties. The Albanian court ruled that the foreign decision would have effect only for the properties located in Greece, while Albanian law had to be applied to the properties in Albania (Vendimi i Gjykatës së Apelit Tiranë, datë 17.04.2018. 2018). This decision established a precedent for allocating material jurisdiction between states and clarified that Albanian courts retain sovereignty over any property situated within national territory.

Another noteworthy case is Supreme Court Decision No. 79 (2021), which involved an Albanian family with assets in both Italy and Albania. The Court emphasized that, although the deceased held Albanian nationality, Italian law had to be applied to the property in Italy, relying on Article 32 of the Law on Private International Law (Vendimi i Gjykatës së Lartë, datë 22.10.2021. 2021). This approach aligns with the jurisprudence of the Court of Justice of the European Union in *Weidert and Bouché* (C-438/14), where it was established that “the law of the location of the property takes

precedence over the personal law of the deceased in the case of immovable property. (Weidert and Bouché, Judgment of the Court (First Chamber), 21 June 2016. 2016)”

1.4.2 Testamentary Succession and Formal Challenges

The form of the will is one of the areas where conflicts most frequently arise. Albanian law requires that wills be notarized or in written form, whereas many European countries also recognize other forms, such as private or electronic wills. A 2020 case before the Tirana District Court involved an Albanian citizen who had lived in France and had executed a private, non-notarized will. The heirs in Albania challenged its validity, but the court upheld the will, reasoning that its form had to be assessed according to French law, the country where the act was executed (*lex loci actus*) (Vendimi i Gjykatës së Rrethit Gjyqësor Tiranë, datë 12.11.2020. 2020). This decision was regarded as a step toward alignment with the 1961 Hague Convention on the Form of Wills, recognized as one of the most significant instruments in this field.

In another 2021 case, the Shkodër Court of Appeal dealt with the will of an Albanian emigrant in Italy. The will was in Italian and lacked an official translation, which initially led the Albanian notary to refuse its registration. The Court of Appeal ordered the recognition of the will after legalization and translation, clarifying that the absence of a translation does not render the act invalid, but only unusable until the formal requirement is fulfilled (Vendimi i Gjykatës së Apelit Shkodër, datë 08.06.2021. 2021). These cases demonstrate that the treatment of foreign wills requires flexibility and careful interpretation of the law, particularly when the acts are executed in jurisdictions that recognize non-notarial forms.

1.4.3 Unclaimed Property and State Intervention

In many cases, heirs are absent or do not exist, leaving the property without an owner. Article 393 of the Civil Code provides that unclaimed property passes to the ownership of the state. However, when the property is located abroad, intervention by the Albanian state becomes difficult due to the lack of legal cooperation agreements. A typical case was addressed in 2019 by the Tirana District Court, in which an Albanian citizen had died in Germany without known heirs. Following verification by the Albanian and German authorities, the property was declared “ownerless” and passed into the ownership of the German state (Vendimi i Gjykatës së Rrethit Gjyqësor Tiranë, datë 23.09.2019. 2019). Subsequently, two relatives from Tirana sought recognition of their inheritance rights, but their claim was dismissed due to the expiration of the statutory deadline. The court emphasized the importance of procedural time limits and noted that “the inaction of heirs cannot undermine the right of the receiving state to consider the property abandoned.” In Albania, the Public Property Administration Agency is the institution responsible for cases involving ownerless property. According to the 2022 report, over 120 properties originating from deceased emigrants abroad have been identified, for which legal recognition procedures are still ongoing (pashpërndara. 2022).

1.4.4 Inheritance of Albanian Emigrants and the Role of Embassies

Albanian embassies and consulates play an indispensable role in protecting the rights

of Albanian heirs abroad. These institutions assist in obtaining death certificates, legalizing documents, and communicating with local courts ((2023). 2023). A notable 2021 case, handled in cooperation between the Albanian Embassy in Athens and the Korçë District Court, involved an Albanian emigrant who had passed away in Greece intestate. The embassy facilitated the acquisition and translation of Greek documents, enabling the registration of the inheritance in Albania (Athine 2021). The process lasted over 18 months, primarily due to the absence of bilateral agreements for the exchange of notarial documents. Ultimately, the Albanian court recognized the property in Albania as inheritable under Albanian law and ordered the transfer of part of the bank funds from Greece in the name of the heirs.

Another case in 2022 before the Durrës Court of Appeal involved an emigrant in Italy, where the Albanian embassy assisted the family in obtaining the will deposited at a notary office in Milan. After translation and legalization, the Albanian court recognized the will and registered it in the Cadastre, emphasizing “consular cooperation as a crucial factor for the effective enforcement of international inheritance law (Vendimi i Gjykatës së Apelit Durrës, datë 14.02.2022. 2022).”

1.4.5 Digital Inheritance and Virtual Assets Abroad

Digital inheritance represents a new legal field concerning virtual assets, online accounts, and cryptocurrency wallets of deceased individuals. Currently, Albania lacks a clear legal framework for addressing these assets; however, some European courts have established important precedents. One of the first cases is Milan Court Decision No. 3146/2022, in which the heirs’ request to access the deceased’s cryptocurrency account was granted. The court classified cryptocurrency as inheritable property and ordered the platform “Coinbase” to provide limited access for asset transfer (Vendimi i Gjykatës së Milanos, nr. 3146/2022. 2022). In Albania, although similar decisions do not yet exist, the 2023 European Commission Report recommends that Balkan states integrate the concept of digital inheritance into their Civil Codes, including provisions on electronic accounts, digital content, and cryptographic keys (K. E. (2023). 2023). This indicates that the Albanian legal system will face new challenges in the future, requiring the integration of civil law principles with digital technology.

1.5. Conflict Resolution and Judicial Interpretation

The resolution of conflicts of law in the field of international inheritance constitutes one of the most complex challenges in private international law. In a world where individuals own assets in multiple jurisdictions, hold multiple citizenships, and draft wills according to foreign laws, courts face the need to harmonize legal systems that often differ significantly in their approach to property, inheritance, and family law. Judicial interpretation, therefore, plays a fundamental role in determining the applicable law and maintaining the balance between individual autonomy and state sovereignty (Daloz 2020).

In international practice, the principle of competent jurisdiction remains one of the core issues courts must resolve. According to Regulation (EU) No. 650/2012, jurisdiction over inheritance is primarily determined by the decedent’s habitual residence at the time of death, except in cases where the decedent has expressly chosen

that their inheritance be governed by the law of their nationality. A key decision in this regard is the judgment of the Court of Justice of the European Union (CJEU) in *Oberle v. Bundesrepublik Deutschland* (C20/17), which established that, for cross-border inheritances, habitual residence is the most important factor in determining the applicable law (CJEU, *Oberle v. Bundesrepublik Deutschland*, Judgment 2018). This principle has directly influenced the alignment of Albanian practice with European standards, as Albanian Law No. 10428, dated 2 June 2011, "On Private International Law," in Article 18, similarly provides that, in the absence of a choice of law, inheritance is governed by the law of the decedent's last habitual residence (79/2011. 2011).

One of the most significant cases reflecting this effort at harmonization is the decision of the Albanian Supreme Court, No. 47, dated 12 June 2018, which addressed the matter of a decedent holding dual Albanian and Greek nationality. The decedent had left a will in Athens, while immovable property was located in Tirana. The Court ruled that Greek law would apply to the validity of the will, as it was drafted in accordance with Greek law, whereas Albanian law would govern the registration and administration of the immovable property within Albanian territory (*Gjykata e Lartë e Republikës së Shqipërisë*, datë 12.06.2018. 2018). This interpretation not only respected the principle of territorial sovereignty but also established a precedent for the division of competencies between the two jurisdictions, thereby avoiding a direct conflict of laws.

Another case illustrating the practical challenges of international inheritance is the decision of the Tirana Court of Appeal, No. 338, dated 20 May 2020, involving an Italian citizen with immovable property in Vlorë and a bank account in Milan. The Albanian heirs requested the application of Italian law to all assets, but the Albanian court ruled that Italian law would govern the inheritance distribution, while Albanian law would regulate the registration procedures and taxation of immovable property in Albania. (*Gjykata e Apelit Tiranë*, datë 20.05.2020. 2020) This decision reflected the Albanian judiciary's effort to construct a coexistence model between two legal systems, in which each law finds its proper scope of application.

In European practice, similar cases have been addressed using a comparable approach. The Paris Court of Appeal (2019) ruled that the inheritance of a French citizen residing in Spain, with assets in France, Italy, and Albania, would be governed by Spanish law for the personal portion and by the national laws of the respective countries for immovable property (*Cour d'Appel de Paris*, 12.04.2019. 2019). This decision is frequently cited in legal literature as an example of applying the principle of "legal coexistence," which aims to maintain a balance between national interests and the individual rights of the decedent.

In Albania, another recurring issue concerns the recognition of foreign inheritance judgments. One such case was addressed by the Durrës Court of Appeal, No. 245, dated 15 March 2021, in which Italian heirs requested the recognition of a decision by the Court of Milan regarding the division of assets of a citizen who had resided in Albania for many years. The Albanian court recognized the judgment only partially, reasoning that certain parts conflicted with Albanian public order, as they excluded the legally mandatory heirs, which contravenes the principles of the Albanian Civil

Code on the protection of the compulsory portion of inheritance (Gjykata e Apelit Durrës, datë 15.03.2021. 2021). This case highlighted the boundary between respecting foreign judgments and the Albanian state's obligation to safeguard the fundamental values of its legal system.

More broadly, judicial interpretation of international inheritance matters has gained increasing importance due to emerging developments such as digital inheritance and virtual assets, which are no longer directly tied to a physical location. French and German courts have begun applying the law of the decedent's nationality for general administration aspects of inheritance, while the law of the country where the servers or digital platforms are located is used for the technical aspects of access and control (Cour de Cassation, Chambre Civile, Arrêt du 8 juin 2021, Affaire de Succession Numérique. n.d.). Although Albania does not yet have consolidated practice in this area, efforts to align with EU standards are evident, particularly through decisions of the Tirana courts in recent years, which have begun recognizing digital ownership as part of the inheritable estate.

In conclusion, the role of the courts in resolving international inheritance conflicts is essential for maintaining justice and legal certainty. Judicial interpretation, grounded in the principles of the closest connection, respect for public order, and harmonization with international law, contributes to the development of a modern Albanian jurisprudence that directly engages with European standards. These developments clearly demonstrate that the resolution of inheritance conflicts is no longer merely a formal legal matter, but a dynamic process requiring a balance between legal norms, practice, and contemporary social realities (European Law Institute 2023).

Conclusions and Recommendations

Conclusions

1. **Complexity of International Inheritance** - The analysis of concrete cases demonstrates that international inheritance represents an exceptionally complex field for the Albanian jurisdiction. The interweaving of different national laws, variations in document formats, and the diversity of heirs' nationalities create numerous challenges, including determining the applicable law, recognizing wills and foreign judgments, and ensuring their practical enforcement.
2. **Importance of Administrative Procedures and Institutional Coordination** - Resolving international inheritance matters requires close coordination among courts, notaries, the Ministry of Justice, the Ministry of Foreign Affairs, and international institutions. Procedural aspects—including legalization, translation, and registration of documents—are essential to guarantee legal certainty and to uphold the testator's intent.
3. **Decisive Role of Notaries and Intermediary Institutions** - Notaries are key actors in the international inheritance process, ensuring the validity of documents in both jurisdictions and cooperating with national and foreign authorities. Without this role, bureaucratic delays and conflicts of law may significantly increase the complexity of enforcement.
4. **Concrete Challenges Regarding Jurisdiction and Recognition of Foreign**

Judgments - Albanian courts have demonstrated flexibility in applying judicial competence, respecting the principle of *lex rei sitae* for immovable property, and recognizing foreign judgments only when they comply with public order standards and formal procedures. However, the lack of interinstitutional cooperation and shared databases has caused considerable delays.

5. **Digital Inheritance as an Emerging Legal Challenge** - Virtual assets and online accounts constitute an emerging challenge for the Albanian legal system. The absence of a clear legal framework necessitates the development of specific provisions for digital inheritance, harmonized with EU practices and case law.
6. **Progress Through Bilateral Agreements and Digitalization** - Cooperation between Albania and countries such as Italy, Greece, and France has improved the process of recognizing and enforcing foreign judgments and documents. The digitalization of notarial and judicial procedures, through platforms like “eNotary,” represents a significant step toward harmonization with EU standards.

Recommendations

1. **Strengthening Practical Guidance for Citizens** - Develop manuals and clear guidelines for Albanian citizens with assets abroad, covering procedures for legalization, translation, and registration of documents.
2. **Standardizing Interinstitutional Procedures** - Establish a unified protocol among courts, notaries, the Ministry of Justice, and the Ministry of Foreign Affairs to facilitate information exchange and coordination in international inheritance cases.
3. **Addressing Digital Inheritance Issues** - Prepare a legal framework for digital inheritance, including online accounts, cryptocurrency wallets, and virtual assets, harmonized with EU decisions and international practices.
4. **Expanding Bilateral Agreements** - Increase the number of bilateral agreements for the recognition of notarial and judicial acts, including with non-EU countries, to prevent delays and complexity in the legalization process.
5. **Training Legal Professionals and Notaries** - Organize courses and training sessions for judges, notaries, and legal professionals on international inheritance rules, including the interpretation of foreign wills and judgments.
6. **Developing a Shared Judicial Database** - Create an electronic system that allows immediate verification of foreign judgments and documents in international inheritance cases, reducing processing times and administrative delays.
7. **Harmonization with EU Practices** - Continue aligning Albanian legislation with the Hague Conventions, EU Regulation No. 650/2012, and the case law of the Court of Justice of the EU to ensure a stable and predictable practice for heirs.
8. **Active Involvement of Consulates and Embassies** - Formalize the role of Albanian diplomatic missions in preparing and verifying documents for international inheritance, thereby reducing delays and enhancing enforcement effectiveness.

To ensure an efficient and equitable system for international inheritance, Albania must continue strengthening institutional coordination, harmonizing with international standards, digitalizing procedures, and providing active support to citizens managing assets abroad.

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Challenges in the practical application of the legal institute of statute of limitations for the enforcement of the sentence

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Abstract

Statute of limitations for the enforcement of the sentence has been addressed by the Supreme Court in its unifying criminal decisions and in several other rulings, in which clear rules have been established regarding the interpretation and application of the statute of limitations for the enforcement of the sentence, in particular the mandatory requirement that the criminal judgment be final within the meaning of *res judicata*. However, the amendments to the Code of Criminal Procedure introduced in 2017 have given rise, in practice, to certain ambiguities in the application of this legal institute because they have affected several provisions relating to enforceable judgements. This paper examines the statute of limitations for the enforcement of the sentence in cases where an appeal or a cassation appeal is declared inadmissible, in circumstances where the Code of Criminal Procedure now provides that, when a court declares an appeal inadmissible, the decision is deemed as not appealed for the purposes of execution. This situation has not been directly addressed in unifying decisions or in any other rulings of the Supreme Court and carries the potential for divergent interpretations in judicial practice with regard to the statute of limitations for the enforcement of the sentence.

Keywords: Statute of limitations for the enforcement of the sentence, time limit, final judgement.

Introduction

In legal terminology, statute of limitations refers to the acquisition or loss of a civil or criminal right as a result of the lapse of a period of time prescribed by the law. In civil law, this includes the statute of limitations of a lawsuit, which results in the loss of the right to seek judicial enforcement of an obligation after the expiration of the prescribed period. In criminal law, it encompasses the statute of limitations for criminal prosecution and the statute of limitations for the execution of the sentence. Article 66 of the Criminal Code provides for the statute of limitations on the right of the competent authorities to initiate or pursue criminal prosecution, while Article 68 of the same Code provides for the statute of limitations on the right of the competent authorities responsible for the enforcement of the sentences to enforce such judgements. This paper focuses on the latter.

The statute of limitations for the enforcement of a sentence extinguishes the sentence, in the sense that it becomes unenforceable precisely due to the expiration of the time limits established by law.

The institute of the statute of limitations for the enforcement of sentences has been addressed on several occasions by the Supreme Court. In its unifying decisions, the Supreme Court has clearly held that the time limit for the enforcement of a sentence is calculated from the date on which the decision has acquired the status of *res judicata*. The amendments to the Code of Criminal Procedure adopted in 2017 affected, *inter alia*, the provisions relating to the concept of final judgements and the enforcement

of criminal judgements. One of the amended provisions now stipulates that, where a court declares an appeal inadmissible, the decision is deemed not to have been appealed for the purposes of enforcement.

Cases in which an appeal has been declared inadmissible have not been addressed directly in the unifying decisions of the Supreme Court and carry the potential for divergent interpretations in judicial practice with regard to the statute of limitations for the enforcement of sentences. Since the law provides that the decision is deemed not to have been appealed for the purposes of enforcement, the question has arisen in practice as to when the time limit for the enforcement of the sentence begins to run in respect of the convicted person. A correct interpretation of the relevant legal provisions in this regard is of great importance in order to avoid the wrongful exclusion of convicted persons from the enforcement of their sentences.

The concept of the statute of limitations for the enforcement of a sentence and the legal criteria for calculating its time limits

With regard to the statute of limitations for the enforcement of the sentence, Article 68 of the Criminal Code provides for the following limitation periods:

(a) twenty years for a decision imposing a sentence of fifteen to twenty five years' imprisonment;

(b) ten years for a decision imposing a sentence of five to fifteen years' imprisonment;

(c) five years for decisions imposing a sentence of imprisonment of up to five years or other lighter penalties. Pursuant to this provision, the calculation of the respective time limit begins on the date on which the decision becomes final.

The statute of limitations for the enforcement of a sentence consists in the State's irrevocable waiver, expressly provided for by law, of its power to enforce a sentence imposed on a person for a criminal offence.

Through Article 68 of the Criminal Code, the competent authorities entrusted with the enforcement of sentencing decisions are subject to both an obligation and a temporal limitation to enforce them within the prescribed time limits, as well as a prohibition on enforcing them after the expiration of those limits. These obligations and prohibitions are conditioned, first, on the moment when the sentencing decision has become final and, second, on the time limits provided for in Article 68 of the Criminal Code, depending on the severity of the sentence imposed.

The statute of limitations for the enforcement of sentences primarily aims to increase the efficiency of state authorities by obliging them to enforce sentences within a reasonable period of time, since beyond those limits enforcement is no longer permissible. Furthermore, the statute of limitations serves to strengthen legal certainty, as a convicted person should not remain in a state of perpetual uncertainty regarding the enforcement of the sentence imposed; the expiration of the time limit releases the individual from serving the criminal penalty. Third, the statute of limitations reduces society's interest in punishment after the passage of a prolonged period, as the preventive and rehabilitative purposes of the sentence are diminished over time. Fourth, the statute of limitations for the enforcement of the sentence upholds the principle of humanism in criminal law by avoiding the execution of sentences at an

excessively late stage.

In Unifying Criminal Decision no. 7, dated 11 October 2002, the Supreme Court held that the competent state authorities responsible for the enforcement of sentencing decisions have both the right and the duty to enforce a criminal judgment immediately once it has become final, a right which they continue to possess until the expiration of the time limit of twenty, ten, and five years, as provided respectively in points (a), (b), and (c) of Article 68 of the Criminal Code. A sentencing decision may not be enforced either before it has become final or after the above-mentioned time limits have expired. Furthermore, in the same decision, the Supreme Court reached the unifying conclusion that the time limit for the enforcement of the sentence cannot be extended for any reason whatsoever. This applies both in cases where the sentencing decision has not been enforced at all and in cases where the decision has been enforced and, after the convicted person has begun serving the sentence, the further execution of the sentence thereof is interrupted for any reason, including the escape of the convicted person.

On the other hand, it must be clear that if the enforcement of the sentence has commenced within the time limit, it shall continue until the completion of the sentence. As it is also emphasized by the Supreme Court, the statute of limitations for the enforcement of a sentence applies only where the sentence has not been enforced at all within the time limits provided for in Article 68 of the Criminal Code, or when enforcement has commenced (the serving of the sentence has begun) but has been interrupted for any reason.

The most important issue relating to the statute of limitations for the enforcement of a sentence is the accurate determination of the date from which the time limit for the convicted person begins to run and whether that period has been fulfilled, which, as noted above, cannot be extended for any reason whatsoever.

Of particular relevance in this regard are the guidelines provided by Unifying Criminal Decision no. 2, dated 3 November 2014, of the Supreme Court. According to this decision, the calculation of the time limit for the enforcement of a sentence begins on the date on which the decision acquires the status of *res judicata*. In its reasoning, the Court stated: “46. ... the expression ‘final’ used in Article 68 of the Criminal Code must be understood as referring to ‘res judicata’, and the calculation of the time limits for the enforcement of a sentencing decision must commence from the moment the sentencing decision has become ‘res judicata’...”. A decision acquires the status of *res judicata* when it is no longer subject to challenge by ordinary means of appeal. The Supreme Court, citing the Explanatory Report of the European Convention on the International Validity of Criminal Judgments, clarified as follows: “18. ... this is the case when the decision is irrevocable, meaning when no further ordinary remedies are available, or when the parties have exhausted such remedies or have allowed the relevant time limits to expire without filing an appeal.”

In the above-mentioned decision, the Supreme Court further clarified that the enforceability of a judgement does not always equate to it having the status of *res judicata*. A judgement of the court of appeal is enforceable but does not constitute *res judicata*. Every judgement that has acquired the status of *res judicata* is always enforceable; however, not every enforceable judgement constitutes *res judicata*.

According to the Supreme Court, in certain provisions of the Code of Criminal Procedure the expression “final” corresponds to the meaning of *res judicata*, whereas in other provisions it is not used in that sense but rather in the sense of an “enforceable judgement”. According to the Supreme Court “*this apparent ‘contradiction’ in the use of the expression ‘final’ is, in the view of the Joint Chambers, linked to the legislator’s choice to provide that a sentencing decision may be enforced without necessarily having acquired the status of res judicata. A decision of the court of appeal is enforceable but does not constitute res judicata.*”

In its decision, the Supreme Court reached the unifying conclusion that, in Albanian criminal procedural legislation, the expression “final decision” is to be understood, depending on the circumstances, either as a decision that has acquired the status of *res judicata* or as an “enforceable decision.” According to the Court, a criminal decision becomes final in the sense of *res judicata* when:

- **The Supreme Court decides:** (i) to declare the cassation appeal inadmissible where it has been filed on grounds other than those permitted by law, pursuant to Article 433 of the Code of Criminal Procedure; (ii) to quash the decision of the Court of Appeal and to uphold the decision of the court of first instance, pursuant to Article 441 (1) (b) of the Code of Criminal Procedure; (iii) to quash the decisions of the court of first instance and the court of appeal and to terminate the proceedings without remittal for re-examination, pursuant to Article 441 (1) (d) of the Code of Criminal Procedure; (iv) to modify the decisions of court of appeal and the court of first instance and the final resolution of the case, where the application of procedural or substantive law is not dictated by the need for a reassessment of the facts or the evidence in the case, pursuant to Article 441 (1) (dh) of the Code of Criminal Procedure; (v) to uphold the decision of the court of appeal, pursuant to Article 441 (1) (e) of the Code of Criminal Procedure. Accordingly, a criminal decision becomes final in the sense of *res judicata* in all cases where the Supreme Court disposes of a case by decision, except where the decision of lower courts is quashed and the case is remitted for retrial.
- **The parties lose the statutory time limits** for filing an appeal before the court of appeal or a cassation appeal before the Supreme Court.
- In all other cases, the expression “final” is to be understood as referring to an “enforceable decision” of the courts of appeal.

However, in the above-mentioned unifying conclusion, the Supreme Court did not expressly address the case in which a cassation appeal is declared inadmissible due to its withdrawal, pursuant to Article 420 (2) of the Code of Criminal Procedure. This provision stipulates that an appeal shall be declared inadmissible in chambers where: (a) it has been lodged by a person lacking legal standing; (b) the judgment is not subject to appeal; (c) the provisions concerning the form, filing, transmission, notification, and time limit of the appeal have not been observed; (ç) the appeal has been withdrawn during trial; (d) the appeal no longer has a subject matter.

An appeal against a decision of the court of first instance is a highly important procedural act, requiring strict compliance with a number of conditions relating to its form, manner, and time limits. The obligation to comply strictly with these formal requirements derives from the non-active role of the court, particularly the Supreme Court, in the examination of a criminal case; consequently, failure by the appealing

party to comply with these requirements results in the appeal not being examined on the merits. The preliminary verification of these formal requirements aims to prevent abuse of the right to appeal, which directly affects judicial economy, enhances the efficiency of the justice system, and improves the quality of adjudication in other cases that are examined on their merits. For these reasons, the court examining the appeal must first verify compliance with these formal requirements and ascertain whether the party maintains the appeal (i.e., has not withdrawn it) before proceeding to examine the merits of the appeal.

Problems in judicial practice

With the amendments made to the Code of Criminal Procedure in 2017, paragraph 4 was added to Article 420, which provides: “Where the court declares the appeal inadmissible, the judgment shall be deemed as not appealed for the purpose of execution.” This amendment has generated differing interpretations in judicial practice regarding the moment from which the time limit for the enforcement of a sentence begins to run.

In some cases, in judicial practice, convicted persons (whose sentence by a decision of the court of first instance or the court of appeal had not yet been enforced) have withdrawn the cassation appeal they had filed before the Supreme Court, and the latter declared the cassation appeal inadmissible under Article 420 (2) of the Code of Criminal Procedure. Following this, they requested the court of first instance to recognize the statute of limitations for the enforcement of the sentence imposed against them, arguing that the time limits provided for in Article 68 of the Criminal Code had elapsed. According to their argument, since the cassation appeal was declared inadmissible under Article 420 (2) of the Code of Criminal Procedure, the decision is deemed not to have been appealed before the Supreme Court for enforcement purposes, pursuant to Article 420 (4) of the Code. Therefore, they claim that the starting point of the time limit should be the date of the decision of the court of appeal. They contend that the decision became final on the date of the court of appeal’s ruling and from that date until the filing of the request to recognize the statute of limitations, the time limit had already expired. They further argue that following Unifying Decision no. 2, dated 3 November 2014, of the Supreme Court, Article 462 of the Code of Criminal Procedure, entitled “*Enforceable Judgements*,” underwent amendments, and they take these changes into account in their interpretation. In some instances, such requests have been granted by the courts, highlighting the need for a correct interpretation of Article 420 (4) of the Code of Criminal Procedure in the context of applying the institute of the statute of limitations for the enforcement of the sentence.

Despite the fact that the Supreme Court, in the unifying conclusion cited above, did not expressly include within the meaning of *res judicata* a decision declaring a cassation appeal inadmissible under Article 420 (2) of the Code of Criminal Procedure, a criminal decision shall be considered to have acquired the status of *res judicata* even when the Supreme Court, due to the withdrawal of the cassation appeal, disposes of the case by declaring the cassation appeal inadmissible pursuant to Article 420 (2) of the Code of Criminal Procedure. This conclusion is drawn based on the overall guidance

provided in the unifying decision, as it is precisely at this moment that all ordinary means of appeal have been exhausted and the criminal decision can no longer be challenged by ordinary means. In cases where the matter has been adjudicated by the court of appeal, the criminal decision acquires the status of an “enforceable decision” at the moment it is ruled by the court of appeal, but it does not yet acquire the status of *res judicata* if the decision is still subject to cassation appeal, which is actually exercised by the convicted person within the statutory period. Even if the convicted person withdraws the cassation appeal while the case is pending before the Supreme Court, only on the date when the Supreme Court disposes of the cassation appeal by declaring it inadmissible can it be considered that, legally, all ordinary remedies have been exhausted for the convicted person and that the “enforceable” final decision has also acquired the status of *res judicata*. As the Supreme Court reasoned in its unifying decision: “... for the purpose of calculating the time limit for the enforcement of the sentence provided for in Article 68 of the Criminal Code, it is essential to determine the moment when the decision has acquired final form in the sense of *res judicata*... This date is precisely the moment when the decision ... can no longer be challenged by ordinary remedies ... [...] ... only at that moment can it be said that all ordinary remedies have been exhausted.” In light of the above, by clearly distinguishing between a final decision that has acquired the status of *res judicata* and a final “enforceable decision”, claims by convicted persons requesting recognition of the statute of limitations for the enforcement of a sentence can be correctly adjudicated.

The provision of Article 420 (4) of the Code of Criminal Procedure, according to which “Where the court declares the appeal inadmissible, the judgment shall be deemed as not appealed for the purpose of execution.” has no legal effect in such cases. By its very content, the provision clarifies that its effects relate specifically to the enforcement of the decision, that is, it concerns a final decision as an “enforceable decision”, and not a final decision that has acquired the status of *res judicata*. The status of *res judicata* cannot be acquired retroactively. In other words, the withdrawal of a cassation appeal and the Supreme Court’s decision declaring it inadmissible cannot retroactively shift the moment at which the appellate court’s decision acquires the status of *res judicata*. To illustrate with an example: suppose a person is convicted and sentenced to imprisonment by a court of first instance on 1 February 2023. Against this decision, he files an appeal before the court of appeal, which, on 1 February 2024, reviews the case and upholds the decision of the court of first instance. At this moment, the decision becomes “enforceable” but does not yet acquire the status of *res judicata*, as the period for filing a cassation appeal has not expired, meaning ordinary means of appeal are still available. Indeed, within the statutory period, the person files a cassation appeal before the Supreme Court. On 1 February 2025, he withdrew the cassation appeal and the Supreme Court declares it inadmissible on the same date. It is precisely on 1 February 2025 that all ordinary means of appeal are exhausted for this person and the decision acquires the status of *res judicata*. The withdrawal of the cassation appeal cannot retroactively alter the moment when ordinary means of appeal were exhausted. Thus, it is clear that a decision that had not acquired the status of *res judicata* by 1 February 2025 (the date the Supreme Court declared the cassation appeal inadmissible) cannot retroactively acquire that status as of 1 February 2024

(the date the court of appeal's ruling).

Similarly, Article 462 of the Code of Criminal Procedure refers to final decisions as "enforceable judgements". Not only the title "*Enforceable judgements*" but also its content confirms this. Specifically, among others, paragraph 3 (b) provides: "3. *Final decisions include: ... b) the decision of the court of appeal when it definitively resolves the case, according to letters 'a', 'b' and 'c' of paragraph 1 of Article 428 of this Code.*" In this regard, the amendments made by Law No. 35/2017 (which in time come after the Supreme Court Unifying Decision No. 2, dated 3 November 2014) did not alter its meaning. Regarding decisions of the court of appeal, the expression "final decision" continues to signify the "enforceable decision" of the court of appeal and not a decision that has acquired the status of *res judicata*.

The same interpretation applies in cases where the inadmissibility of an appeal is declared by the court of appeal and the convicted persons claim that the decision of the court of first instance should be considered unappealed for purposes of calculating the time limit for enforcement of the sentence.

Conclusion

Only by clearly distinguishing between a final decision that has acquired the status of *res judicata* and a final decision that is merely "enforceable" and by carefully analyzing the specific circumstances of each case, can requests by convicted persons seeking recognition of the limitation of enforcement of a criminal sentence be properly resolved. The inadmissibility of a cassation appeal under the circumstances provided in Article 420 (2) of the Code of Criminal Procedure does not retroactively shift the starting point of the time limit for enforcement of the sentence. Even when the Supreme Court declares a cassation appeal inadmissible under Article 420 (2), the decision only becomes final in the sense of *res judicata* at that moment. The provision of Article 420 (4) of the Code of Criminal Procedure, according to which "*Where the court declares the appeal inadmissible, the judgment shall be deemed as not appealed for the purpose of execution*", has no legal effect regarding the moment when a decision acquires *res judicata* status and for calculating the time limit. That moment occurs only when all ordinary means of appeal against the decision are exhausted. Article 420 (4) relates solely to issues of enforcement of the sentence and to the calculation of time served in pre-trial detention by convicted persons.

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Consumer Price Index Dynamics in Albania 2007–2025 with application to Hotels, Cafés and Restaurants

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Abstract

This study analyzes the dynamics of the Consumer Price Index (CPI) in Albania according to the Classification of Individual Consumption According to Purpose (COICOP) for the period January 2007 – November 2025, based on official monthly data from INSTAT, and develops a special predictive application for the sub-index “Hotels, cafes and restaurants”. The cross-group comparative analysis highlights long-term changes, turning points and significant differences in the growth rate and price volatility, confirming the heterogeneous character of inflation across consumption categories.

For the sub-index “ *Hotels, cafes and restaurants* ”, the forecast is performed on the monthly series using an 80/20 training–testing split. Several common time series forecasting methods are compared, including basic models, seasonal approaches, Holt–Winters, Theta, ETS and seasonal ARIMA, as well as several data-driven models. The performance is assessed through MAE, RMSE, MAPE, sMAPE and MASE indicators, while the final selection is based on a multi-criteria ranking. The results show that the ETS model provides the most consistent and accurate performance in the test, making it suitable for medium- and long-term projections of this CPI component.

Keywords: Consumer Price Index, Albania, INSTAT, COICOP, services sector, forecast. ETS; PROMETHEE II.

1. Introduction

The Consumer Price Index (CPI) is one of the most important macroeconomic indicators for assessing price stability, consumer purchasing power, and monitoring inflation in an economy. It is widely used by public authorities, monetary institutions, and economic actors as a basis for formulating economic policies, indexing wages and pensions, and analyzing structural developments. (Albanian Bank, n.d.) In this context, the long-term and short-term dynamics of the CPI provide essential information on inflationary pressures and on how price changes are distributed across different sectors of the economy.

This importance becomes even more pronounced in small and transition economies, such as Albania, where market structure, import dependence and sensitivity to external shocks make price levels particularly exposed to fluctuations. In these conditions, changes in the CPI reflect not only domestic factors, but also strong international influences, including energy, food and services prices. Consequently, analysis of the CPI at the aggregate level is often insufficient, while analysis by main consumption groups becomes necessary to understand the sources and intensity of inflation, as well as its cross-sectoral heterogeneity.

Within this structure, the services sector, and in particular tourism, has gained an increasingly important share in the Albanian economy over the last (World Bank, n.d.)two decades. The activity of hotels, cafes and restaurants is closely linked to tourist flows, domestic consumption and employment, making this sector a key component of economic growth. Consequently, the behavior of prices in this sub-index is important not only for measuring inflation, but also for assessing the competitiveness and sustainability of the tourism sector.

The purpose of this study is to analyze the dynamics of the Consumer Price Index in Albania for the period 2007–2025, initially providing a comparative overview of price developments by main consumption groups and, subsequently, focusing specifically on the sub-index “Hotels, cafes and restaurants”, with the aim of identifying its main features in terms of growth, volatility and relative positioning to other CPI groups.

The main contribution of the paper lies in the combination of a cross-sectoral summary analysis of the CPI with a focused application on a sector of strategic importance for the Albanian economy. This approach allows for a clearer reading of historical price developments and creates a solid analytical basis for assessing future trends in the services and tourism sectors.

2. Literature Review

Recent literature highlights that the dynamics of the Consumer Price Index is not homogeneous across major consumer groups. Sectoral studies show that inflation manifests itself in different ways depending on the nature of goods and services, price formation mechanisms and the degree of exposure to external factors. In this context, the analysis of the CPI by COICOP groups is considered essential for identifying sources of inflation and assessing structural pressures in the economy.

Hałka and Kotłowski (2020) show that different components of the CPI exhibit different levels of inflationary persistence, suggesting that aggregate aggregation may mask heterogeneous behavior at the sector level. These differences reflect differences in demand elasticity, cost structure, and the degree of price adjustment across different sectors of the economy.

Studies based on microprice data also show that prices in different sectors adjust at different rates, with basic goods tending to react more quickly to external shocks, while services are characterized by a more inertial behavior and more gradual price increases (Cavallo & Kryvtsov, 2023). These findings support the need for cross-group analyses of the CPI, especially in small and open economies, where the influence of international factors is pronounced.

2.1 Inflation in the services sector and tourism-related prices

A significant body of contemporary literature focuses on the behavior of inflation in the services sector, which often exhibits different characteristics from the goods sector. Bobeica and Nickel (2020) argue that services prices tend to be less sensitive to short-term fluctuations and more closely linked to structural factors, such as labor costs and domestic demand. As a result, services inflation tends to exhibit higher persistence.

In the post-pandemic period, services inflation has received particular attention in the literature. Forbes, Gagnon and Collins (2023) show that in many economies' services inflation has shown resilience to temporary declines in demand and has quickly regained its long-term trend after economic activity normalized. This behavior suggests that services sectors, including tourism, constitute a key component in the overall inflationary dynamics.

In the context of small and open economies, Dudine, Kliatskova and Petreski (2021) analyze the relationship between tourism and inflation, showing that prices in the hotel and restaurant sector reflect both seasonal demand and long-term structural developments. OECD (2023) emphasizes that inflation in services has become an increasingly important source of overall inflation, especially in countries where tourism and services have a significant share in the economy.

These studies provide a strong theoretical and empirical basis for focusing the analysis on the "Hotels, cafes and restaurants" sub-index, as a representative indicator of inflation in the services and tourism sector.

2.2 Forecasting CPI and sectoral indices

The modern literature on inflation forecasting emphasizes that, despite the development of algorithmic methods, traditional time series models remain competitive, especially for series with clear trend structure and seasonality. The results of the M5 competition show that classical statistical methods continue to provide high predictive performance in many economic applications (Makridakis et al., 2022).

Petropoulos et al. (2022) argue that the choice of method should be based on the characteristics of the data and not on the complexity of the model. In monthly economic series, where seasonality and trend are pronounced, Exponential Smoothing and Holt–Winters-type models often prove to be more stable than more complex approaches. Along the same lines, Trapero, Kourentzes and Athanasopoulos (2021) show that the selection of the model for seasonal series should privilege interpretability and medium-term stability.

For comparative model evaluation, the literature suggests the use of multi-criteria approaches, which avoid reliance on a single accuracy indicator. Ishizaka and Nemery (2021) point out that multi-criteria analysis methods, such as PROMETHEE II, provide a suitable framework for ranking predictive models when several performance metrics are used simultaneously. This approach is particularly useful in applied studies, where a balanced assessment of accuracy and stability is aimed at. Following the theoretical framework presented above, this section focuses on the descriptive analysis of the Consumer Price Index in Albania according to the twelve main COICOP groups for the period 2007–2025. The aim is to identify long-term trends, cross-sectoral differences and price growth patterns, placing the positioning of the hotel and services sector in context before further predictive analysis.

This study follows a structured analytical approach in two phases. In the first phase, a descriptive and comparative analysis of the Consumer Price Index (CPI) according to the twelve main COICOP groups is carried out for the period January 2007 – November 2025, with the aim of identifying structural differences in price dynamics

and placing sectoral developments in the general inflationary context in Albania. The second phase focuses exclusively on the “Hotels, cafes and restaurants” sub-index. This choice is related to the importance of the services and tourism sector in the Albanian economy and the need to analyze in more depth a component of the CPI that directly reflects domestic demand and seasonal economic activity. Limiting the modeling to only this sub-index avoids aggregation effects and allows for a clearer interpretation of short-term and long-term price trends.

The time series modeling is carried out through a comparative approach, on a training-testing data partition, where different forecast alternatives are tested. The performance of the models is evaluated with several accuracy indicators, while the final selection is based on a balanced multi-criteria assessment. The selected model is then used to generate medium- and long-term forecasts for the “Hotels, cafes and restaurants” index, interpreted in relation to inflationary developments in recent years.

3.1 Data source

The data are taken from (INSTAT, 2025), as the official source of statistics for the Consumer Price Index in Albania. The time series has a monthly frequency and covers the period January 2007 – November 2025. The index is reported according to the COICOP classification, enabling a structured analysis of price movements by main consumption groups.

3.2 CPI groups

The analysis includes the twelve main groups of the CPI according to COICOP: food and non-alcoholic beverages; alcoholic beverages and tobacco; clothing and footwear; housing, water, energy and fuel; household furnishings and maintenance; health; transport; communication; entertainment and culture; educational services; hotels, cafes and restaurants; miscellaneous goods and services.

In the comparative analysis, these groups serve to present the cross-sectoral heterogeneity of price dynamics during the observation period. Meanwhile, modeling and forecasting are developed only for the “Hotels, cafes and restaurants” sub-index, due to its economic importance and direct connection with the services and tourism sector.

4. Descriptive Analysis of the Consumer Price Index by Major Groups

The descriptive analysis of the Consumer Price Index by main COICOP groups aims to provide a clear picture of how inflationary pressures have been distributed among different consumption sectors in Albania during the period 2007–2025. This comparative overview serves as an analytical basis for understanding the heterogeneity of inflation and for contextualizing developments in the services sector before focused forecasting analysis.

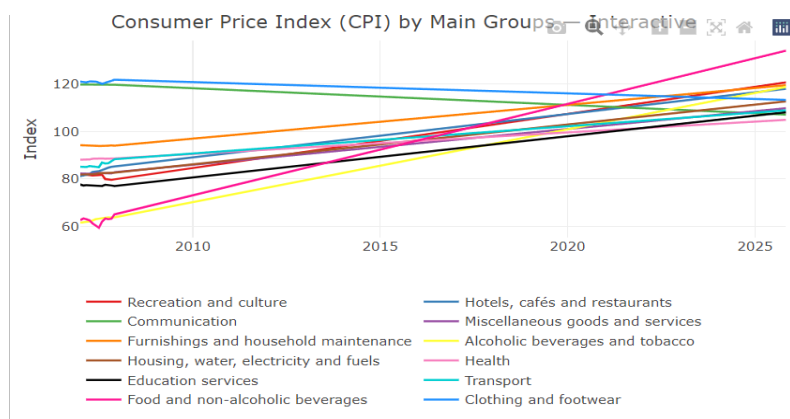


Figure 1. Dynamics of the Consumer Price Index by main COICOP groups in Albania, 2007–2025. <https://rpubs.com/Breshanaj/1383055> (Source: Processing of data obtained from INSTAT by the authors)

Figure 1 presents the long-term evolution of the Consumer Price Index for the twelve main consumption groups, highlighting significant differences in price trajectories across sectors. The graphical evidence shows that inflation in Albania has not followed a uniform pattern, but has been characterized by different structural behaviors depending on the nature of goods and services.

Some groups, especially food and non-alcoholic beverages, show a strong and continuous increase in the index throughout the observation period, with a noticeable acceleration in recent years. This trend reflects the high sensitivity of these categories to international prices, supply shocks and cost pressures. Steady increases, although with more moderate intensity, are also observed in groups such as alcoholic beverages and tobacco, household furnishings and maintenance, and miscellaneous goods and services.

In contrast, some sectors show a softer dynamic or even a long-term decline in the index. The clothing and footwear and communication groups are characterized by stagnation or relative price declines, suggesting the impact of increased competition, technological advances and structural changes in these markets. These developments confirm that inflationary pressures are not uniformly distributed in the economy.

The hotels, cafes and restaurants index occupies an intermediate position in this comparative panorama. It shows a steady upward trend throughout the period 2007–2025, but at a lower rate compared to the food group. The lack of strong fluctuations and the relatively smooth trajectory suggest a more inertial behavior of services prices, closely linked to developments in domestic demand, tourist activity and long-term structural factors.

Overall, the evidence presented in Figure 1 confirms the heterogeneous character of inflation in Albania and underlines the importance of the analysis by main consumption groups. This heterogeneity creates the methodological basis for a more detailed examination of the hotels and services sector, which represents a component of particular importance for the Albanian economy and for the overall dynamics of the CPI.

This heterogeneity not only justifies the analysis by main consumption groups, but also underlines the need for a more in-depth examination of the hotels, cafes and restaurants sub-index, which represents a sector of strategic importance and with distinct inflationary behavior. In the following section, the analysis focuses specifically on this sub-index, examining its historical and structural features.

5. Focus on the Price Index for Hotels, Cafes and Restaurants

The historical evolution of the *Hotels, Cafes and Restaurants index* during the period 2007–2025 shows a clear long-term upward trend, which develops gradually and relatively steadily. The selection of this sub-index is based on the importance of the services and tourism sector in the Albanian economy, as well as on the statistical characteristics of the time series.

In the early stages of the study period, the index is characterized by slow growth and intervals of stability, reflecting a more controlled price environment in the services sector.

In the following years, a moderate acceleration of growth is observed, especially in the last period of the series, where the index reaches historical highs. The impact of the pandemic period is reflected in a temporary interruption of the normal growth rate, followed by a gradual and consistent return to the long-term trajectory. This behavior suggests structural resilience of service prices to strong shocks, without showing extreme fluctuations or breaks in the stability of the trend.

Overall, the series presents a clear combination of long-term trend with limited short-term variations, which makes it particularly suitable for predictive analysis.

5.1 Seasonal and Structural Features

The analysis of the monthly behavior of the index reveals the presence of stable seasonality, linked to the annual cycle of economic and tourist activity. Seasonal variations appear repeatedly, without strong changes in amplitude, suggesting a cyclical structure stabilized over the years.

Unlike commodity groups, where seasonality is often associated with high volatility, the hotel index is characterized by softer seasonal fluctuations and a more inertial price behavior. This cyclical behavior, combined with a clear trend and the absence of pronounced structural breaks, makes the series statistically suitable for modeling with classical and contemporary forecasting methods.

As a result, further analytical and predictive focus on this sub-index is justified not only by the economic importance of the sector, but also by the intrinsic properties of the time series, which favor the construction of robust and interpretative forecasts.

6. Modeling and Forecasting the Price Index for Hotels, Cafes and Restaurants

This section presents the modeling framework and the main results of the predictive estimation for the *Hotels, Cafes and Restaurants* sub-index. The approach is comparative: models of different nature (benchmark, classic seasonal models and

data-driven models) are tested and the most appropriate model is selected based on out-of-sample performance, as well as through a multi-criteria ranking.

6.1 Model performance evaluation

The model evaluation was performed on the basis of an 80%–20% train–test split , with the last part of the series serving as testing. Performance comparison was based on standard indicators of predictive error, including MAE, RMSE, MAPE , as well as normalized/relative metrics to avoid dependence on a single measurement scale and to ensure more consistent interpretation across models.

In this context, basic models (Mean, Naïve and Seasonal Naïve), classical seasonal models (Holt–Winters, Theta, ETS and Auto ARIMA seasonal), as well as some data-driven models built on lag-based and seasonal features were tested. The results show that Exponential Smoothing (ETS) -type models consistently yield the lowest errors and a more stable profile compared to other alternatives, suggesting that the structure of the series (trend + seasonality) is better captured by seasonally smoothed approaches.

Rank	Model	MAE	RMSE	MAPE	sMAPE	MASS
1	ETS	3.3257	3.4797	2.9373	2.9850	21.2707
2	ANN (standard)	4.5882	5.3309	3.9944	4.1037	29.7318
3	Holt–Winters (Additive)	5.5377	5.8398	4.8743	5.0087	35.4178
4	Holt–Winters (Multiplicative)	5.8381	6.1653	5.1376	5.2876	37.3390
5	Auto ARIMA	5.9085	6.3064	5.1921	5.3486	37.7891
6	XGBoost (standard)	6.7517	7.4096	5.8881	6.1025	43.7511
7	Theta	7.8300	8.4375	6.8730	7.1554	50.0790
8	Fuzzy WM (standard)	7.6488	8.3930	6.6891	6.9668	50.6956
9	Naive	8.8870	9.6588	7.7941	8.1660	56.8388
10	Seasonal Naive	10.9848	11.6136	9.6651	10.2107	70.2560
11	Prophet (standard)	12.3349	13.5794	10.8246	11.5785	78.8913
12	SVR (RBF, standard)	15.0762	15.9227	13.1901	14.2298	97.6939
13	Mean	18.7749	19.1523	16.5945	18.1486	120.0795

Table 1. Performance of models in the test (80/20) for the index “ *Hotels, cafes and restaurants* “. (Source: Authors)

The data presented in Table 1 evidence a clear differentiation in the predictive accuracy of the tested models. Without going into numerical details, it is observed that the ETS model consistently maintains the most favorable position in all error metrics, reflecting a better fit to the structure of the time series.

Classical seasonal models, such as Holt–Winters and Auto ARIMA , provide acceptable results, but fail to surpass the stability and accuracy of ETS in out-of-sample estimation. At the same time, data-driven approaches present heterogeneous

performance, without a systematic advantage over traditional methods, suggesting that for this series the benefit of increased methodological complexity is limited.

At the lower end of the ranking are the basic models, which produce significantly higher errors and serve mainly as a reference point, confirming that the dynamics of the index require models that simultaneously address the long-term trend and the seasonal component.

In this context, the results in Table 1 support the preliminary selection of the ETS model as the most suitable candidate for forecasting. However, to ensure a balanced assessment independent of a single accuracy indicator, the final ranking of the models is further assessed through a multi-criteria approach, which is presented in the following subsection.

6.2 Multi-criteria ranking of models (PROMETHEE II)

To avoid model selection based on a single metric, performance was synthesized using the PROMETHEE II method, which allows for multi-criteria ranking of alternatives by combining information from several metrics simultaneously. This approach is particularly useful in applied forecasting, where models may have different strengths across metrics.

According to the PROMETHEE II ranking, ETS results in the most favorable model in the overall assessment, maintaining balanced performance in most criteria. This makes ETS the most reasonable choice for constructing medium- and long-term projections for this component of the CPI.

Model				RANK
ETS	4.5746	0.0000	4.5746	1
ANN	3.5267	0.0873	3.4394	2
HW (Additive)	2.9204	0.1976	2.7228	3
HW (Multiplicative)	2.7258	0.2560	2.4698	4
Auto ARIMA	2.6787	0.2769	2.4019	5
XGBoost	2.2211	0.5629	1.6583	6
Fuzzy WM	1.7929	0.9322	0.8608	7
Theta	1.7519	0.9801	0.7718	8
Naive	1.4018	1.5370	-0.1353	9
Seasonal Naive	0.8673	2.7397	-1.8724	10
Prophet	0.5821	3.6903	-3.1082	11
SVR	0.2359	5.5940	-5.3580	12
Mean	0.0000	8.4254	-8.4254	13

Table 2 Ranking of PROMETHEE II models based on performance metrics. (Source: Authors)

The data presented in Table 2 show that the multi-criteria ranking clearly confirms the structural differences between the models in terms of overall performance. The net

flux values reflect the relative ability of each model to dominate the other alternatives when all error metrics are considered simultaneously. The positioning of the models across the spectrum of positive and negative values suggests a clear hierarchy, with no significant overlap between performance groups.

In particular, the considerable distance between the top-ranked model and the models positioned at the bottom of the ranking indicates that the choice of the optimal model is not marginal, but based on stable multi-criteria differences. Models with negative values of show limited or no dominance over other alternatives, signaling lower suitability for operational predictive applications.

In this context, the PROMETHEE II ranking serves as a final validation mechanism for the model choice, providing a consolidated basis for moving from the evaluation phase towards the construction of medium- and long-term forecasts of the “Hotels, cafes and restaurants” index, which are presented in the following subsection.

7. Forecasting Results

This section presents the final forecast results for the consumer price index in the *Hotels, cafes and restaurants group*, focusing on the behavior of the forecast trajectory and its economic meaning in the long term. Since the comparative evaluation of the models was addressed in the previous section, the emphasis here is on the forecast result and its coherence with the historical dynamics of the series.

The out-of-sample assessment shows that the forecasts built on the ETS model maintain a stable structure and are consistent with the trend and seasonality observed over the period 2007–2025. Compared to other approaches, the projections of this model avoid artificial fluctuations and sudden changes, providing a smooth and reliable trajectory for medium- and long-term interpretation.

Based on this specification, monthly forecasts have been generated for the period 2026–2035, presented in the interactive chart below.

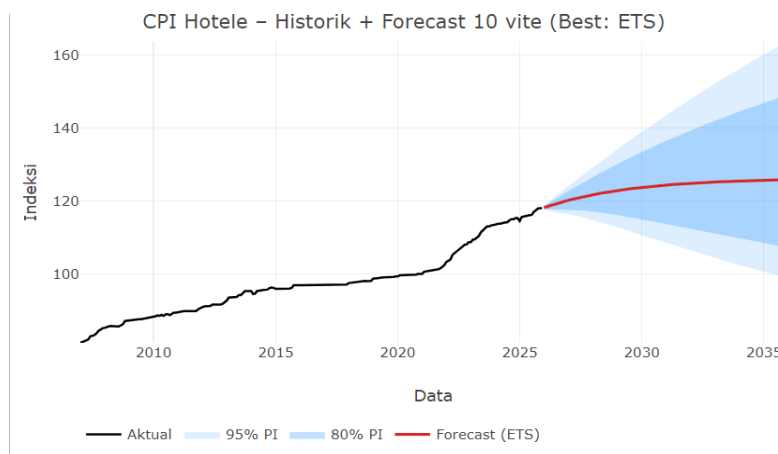


Figure 2. Long-term forecast of the price index for *Hotels, cafes and restaurants*, according to the winning ETS model. <https://rpubs.com/Breshanaj/1383098> (Source: Authors)

The graphical evidence shows a clear continuation of the index's upward trend, at a relatively stable pace throughout the forecast horizon. The gradual widening of the confidence intervals reflects the increasing uncertainty typical of long-term projections, but without signaling structural breaks or strong deviations from the central trajectory. This behavior is consistent with the inertial nature of service prices, which tend to adjust gradually to changes in demand and costs.

From an economic perspective, the forecasts suggest that inflation in the hotels and services sector is expected to continue to contribute steadily to the overall CPI dynamics, without showing extreme short-term pressures. This makes this sub-index a useful indicator for monitoring inflation in the services sector and for medium-term analyses related to tourism activity and domestic consumption.

8. Discussion

The forecast results for the consumer price index in the *Hotels, cafes and restaurants group* provide a stable picture and are consistent with the historical behavior of the series. The forecasts, built on models that directly capture the long-term trend and monthly seasonality, reflect the structural nature of this sector, which is characterized by gradual price adjustments and the absence of extreme short-term fluctuations.

The moderate and sustained growth projected for the period 2026–2035 is consistent with the dynamics observed over the past two decades, where the services sector in Albania has shown more stable inflation compared to other CPI groups, such as food or transport. This behavior suggests that prices in hotels and restaurants are affected less by immediate shocks and more by structural factors, including labor costs, seasonality of demand, and the growing role of tourism in the economy.

In a comparative perspective, although the cumulative growth of this sub-index is not among the highest, the relatively low level of volatility makes it particularly suitable for medium- and long-term predictive analysis. The trend signal remains clear and is not masked by strong monthly fluctuations, which increases the reliability of the projections and their usability for analytical and monitoring purposes.

From a methodological perspective, the better performance of ETS-type models confirms that, for time series with clear trend and seasonal structure, traditional approaches remain competitive and often more robust than more complex models. While algorithmic models offer greater flexibility, in this case they do not translate into systematic improvements in accuracy, underlining the importance of adapting the method to the empirical characteristics of the data.

However, several limitations should be considered in interpreting the results. The forecasts are based exclusively on historical series information and do not include external macroeconomic or institutional variables. Also, periods of exceptional shocks, such as pandemics, are implicitly handled by the models, without dedicated structural interventions. These factors may affect the accuracy of the projections in the event of strong changes in the economic environment.

9. Conclusion

This study analyzed the long-term dynamics of the Consumer Price Index in Albania for the period 2007–2025, with a particular focus on the *Hotels, cafes and restaurants group*. Descriptive analysis by main CPI groups showed that inflation in the services sector is characterized by gradual growth and relatively low volatility, reflecting a more stable price formation structure compared to other sectors.

The forecast results for the period 2026–2035 suggest a continuation of this development pattern, with moderate growth and no signs of extreme fluctuations. Models that directly address trend and seasonality proved to be more appropriate for this series, confirming that increasing methodological complexity does not necessarily guarantee improved accuracy when the data structure is clear.

The main contribution of the study lies in the combination of a comparative analysis of CPI groups with a focused predictive application to the hotel and services sector, which is of particular importance for the Albanian economy due to its direct link to tourism. The findings provide a useful basis for interpreting inflationary pressures in this sector and for using the CPI as an analytical tool in medium-term planning and monitoring price developments.

In the future, the analysis could be expanded by examining more detailed breakdowns within the services sector or by integrating other macroeconomic factors, with the aim of enriching the analytical perspective and increasing the explanatory capacity of the predictive models.

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Legal-social challenges for complete reporting of violence against women

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Abstract

This paper examines the legal and social challenges that hinder the full and accurate reporting of violence against women, a phenomenon that continues to pose serious concerns for human rights, public safety and gender equality. (Hereinafter under-reporting). Despite the existence of legal frameworks aimed at prevention, protection and prosecution, significant gaps remain between the law on paper and its practical implementation. Social stigma, fear of reprisal, economic dependence and lack of trust in institutions often discourage women from reporting incidents of violence. At the same time, institutional barriers – such as inadequate training of law enforcement personnel, insufficient coordination between agencies and limited victim support services – further complicate the process. This study highlights the need for a multidimensional approach that integrates legal reforms, institutional strengthening and community awareness in order to ensure comprehensive reporting mechanisms. Drawing on comparative legal perspectives and international best practices, the paper highlights strategies that can foster a more supportive environment for survivors and promote accountability for perpetrators. Ultimately, improving reporting systems is essential not only for providing justice to victims, but also for developing effective policies that address the root causes of gender-based violence and prevent its continuation in society.

Keywords: Gender-based violence; reporting mechanisms; legal challenges; social barriers; women’s rights; institutional response; victim protection; accountability; stigma; justice system.

Introduction

Reporting violence against women is one of the most important challenges in the field of human rights and gender studies. Although gender-based violence is a widespread phenomenon in all societies, many cases never manage to be documented by the responsible institutions. (European Union Agency for Fundamental Rights [FRA], 2014). This creates a significant gap between the real experiences of women and the data used to design public policies (WHO, 2021). For this reason, studying under-reporting is not only a statistical issue, but an analytical necessity to understand the mechanisms of silence, control and social pressure.

In this introduction, the phenomenon is analyzed through three main dimensions: (1) The lack of reporting as a global reality and the consequences it brings at the institutional and individual level; (2) the main factors that influence women’s decision-making not to report violence; and (3) the influence of cultural context and social norms in shaping the silence of victims. These three points create a complete framework for understanding the problem and arguing for the importance of systematic interventions.

The underreporting of gender-based violence has been widely documented by international organizations. Reports show that the number of women who report violence is significantly lower than the number who experience it. According to the

World Health Organization, more than one in three women globally experience some form of physical or sexual violence in their lifetime, but a much lower percentage report this experience (WHO, 2021). This underreporting has important consequences: institutions fail to assess the true scale of the problem, policies are designed on incomplete data, and interventions remain inadequate (UN Women, 2020). At the personal level, women who do not report often face repeated cycles of violence, social isolation, and long-term trauma.

Under-reporting does not occur by chance, it is the result of a combination of several factors that often make reporting a dangerous or painful process for the victim. Fear is one of the main factors influencing women's decision not to report violence. Studies show that threats, isolation and emotional manipulation are part of the cycle of violence and are used by aggressors to maintain control over the victim (Jewkes, 2002; Heise, 2011). Fear is one of the most common reasons: fear of retaliation, fear of losing children, fear of stigmatization, but also fear that institutions will not react. Economic dependence constitutes an important structural barrier to reporting. Women who do not have independent income or control over economic resources are less likely to leave abusive relationships (UNDP, 2020), especially in rural areas where employment opportunities are limited (Council of Europe, 2019). Social stigma and patriarchal norms play a key role in silencing victims. Violence is often perceived as a private family matter and reporting is seen as a violation of social norms, leading to victim blaming (FRA, 2014; Jewkes, 2002).

Cultural context significantly influences how women respond to the violence they experience. In societies where patriarchal norms are strong, violence against women is often seen as a private matter to be resolved within the family. This forces victims to remain silent to preserve the family's "honor" and avoid conflicts with the community. Women who decide to report often face pressure, criticism, or distrust. In rural areas, where communities are smaller and more interconnected, stigma is even stronger, making reporting almost impossible. According to INSTAT data, rural women face higher levels of economic dependence, limited access to services, and stronger community pressure (INSTAT, 2022). Lack of shelters, geographical distances, and limited information on legal rights make reporting extremely difficult (UNDP, 2020).

These dimensions – the extent of underreporting, the factors that cause it, and the influence of social norms – clearly show that the phenomenon cannot be addressed through legal interventions alone. A comprehensive approach is needed that combines social policies, institutional support, community education, and programs for the economic empowerment of women.

Analysis of Factors Driving Under-Reporting of Violence Against Women

The underreporting of violence against women is not a random phenomenon, but the result of a complex structure of psychological, economic, cultural and institutional factors. These factors interact with each other to create numerous barriers that prevent victims from seeking help. The following analysis focuses on three main factors: fear, economic dependence and social stigma.

Fear is a powerful psychological and social force that prevents many women from reporting the violence they experience. It is formed through a cycle of violence, where the aggressor uses various forms of control: physical violence, threats, isolation, humiliation and emotional manipulation. These mechanisms convince the victim that reporting is a dangerous act. Fear of physical or emotional retaliation: Many women believe that the aggressor will react with greater violence if they go to the police. Threats such as “I will kill you”, “I will take your children” or “I will ruin your life” create a constant state of psychological terror. Fear of losing children: Abusers often use children as a means of pressure. Victims fear that reporting may lead to intervention by social services or manipulation by the aggressor to take custody of them. Fear of institutional distrust: In many cases, women believe that the police or institutions will not believe them or will not react appropriately. Previous experiences of institutional bypassing create the feeling that reporting does not bring solutions, but rather aggravation of the situation. Fear of public stigmatization: In a society where the victim is often blamed, reporting is perceived as an act that brings moral judgment, shame, and isolation. Fear is not simply an emotion, but a survival strategy that the victim constructs to protect themselves from real and perceived dangers.

Economic dependence is a structural factor that keeps the victim tied to the abuser. Lack of independent income, labor market restrictions, and financial control make it difficult to leave an abusive relationship. Inability to provide income: Women who do not have stable jobs or do not have economic resources find themselves unable to survive outside the relationship. This is especially pronounced in rural areas where economic opportunities are limited. Financial control as a form of violence: Abusers often control every aspect of the victim’s economic life—salary, bank accounts, assets, even daily expenses. This makes the victim unable to take independent steps. Fear of losing housing: Without economic support or sufficient emergency housing structures, many women see reporting as a risk of homelessness, which prevents them from seeking help. Dependence for the benefit of children: Women often believe that leaving will harm their children financially, placing the burden of survival solely on them.

Economic dependence turns reporting from a means of protection into a threat to survival.

Social stigma is a powerful factor that accompanies the process of under-reporting and makes it difficult for many women. It is linked to cultural norms, patriarchal traditions and community pressure. Patriarchal norms and social pressure: In many societies, domestic violence is considered a private matter. Victims are often accused of “breaking up the family” if they report. This internal and external pressure discourages them from seeking help. Shame and victim blaming: Women often internalize guilt and are educated to tolerate, be patient and maintain family stability. This makes them see reporting as a personal failure, not as a legal right. Fear of gossip and exposure: In small rural communities, information spreads quickly. Women often choose silence to avoid prejudice and commentary.

Institutional stigma: Even institutions themselves can use stigmatizing approaches or judgmental language, leading to distrust and avoidance of reporting.

Social stigma creates a terrain where the victim is not only not protected, but is often

blamed, making reporting an emotionally and socially dangerous act. Fear, economic dependence, and social stigma interact to create a complex reality where reporting is not perceived as a solution, but as a risk. Understanding these mechanisms is essential for designing effective policies that support victims and encourage reporting of violence.

Rural context and social reality in Albania

The under-reporting of violence against women in rural areas of Albania has distinct characteristics that distinguish it from urban areas. Factors such as fear, economic dependence and social stigma are present everywhere, but in the rural context they take on more pronounced forms due to geographical, socio-economic and cultural conditions. These conditions create an environment where reporting violence becomes almost impossible, making under-reporting not just a common phenomenon, but a dominant one. Under-reporting contributes to the continuation and escalation of violence, as the lack of institutional intervention reinforces the feeling of impunity of the perpetrators (Heise, 2011).

Geographic isolation and lack of access to services. Many rural areas in Albania are characterized by long distances from urban centers, a lack of transport infrastructure, and a lack of specialized services. Police stations are often far away, understaffed, and victims lack the means of transportation or freedom of movement to report. The lack of shelters and helplines makes it even more impossible to escape from situations of violence. Communication, often difficult due to lack of telephone or internet coverage, also completely isolates victims.

Traditional family structure and gender roles. Rural families often operate according to patriarchal models where gender roles are rigid. The woman often lives with her husband's family, where authority is held by male figures in the extended family. Conflicts are handled within the home and reporting is considered "shameful". Pressure to maintain family "honour" pushes the victim towards silence, while the normalisation of violence as part of marital life makes it even more difficult to identify abusive behaviour as a social and legal problem. Psychological consequences for victims include depression, anxiety and post-traumatic stress disorder (WHO, 2021).

Deep economic dependence in rural areas. Rural women often work in agriculture without direct payment and without personal income. Economic assets and financial control remain in the hands of men or the husband's family. In cases of reporting, the risk of losing shelter, property and livelihoods is very high. Economic dependence makes reporting seem like a threat to the survival of the victim and her children.

The role of the rural community as a mechanism of social control. Rural communities are small and close-knit. Every move a woman makes is watched and judged. Reporting often leads to gossip, isolation, and exclusion from the community. Male solidarity and the minimization of violence by men in the community make the victim appear as the "causer of the conflict." This social control makes women hesitant to seek help.

Lack of information and awareness. In rural areas, women have less access to information on legal rights, reporting procedures, and protection services. This leads

them to not recognize themselves as subjects of law, but as bearers of responsibility for preserving the family. The lack of gender education and information programs reinforces this reality.

The rural context in Albania is a complex reality where cultural, economic, social, and geographical factors intertwine to create an environment that not only hinders reporting, but also normalizes silence.

The state must take measures to build effective policies aimed at increasing reporting and supporting rural women.

The Consequences of Under-Reporting Violence Against Women

The underreporting of violence against women is not only a problem of lack of accurate statistics, but a phenomenon with profound social, psychological, economic and intergenerational consequences. When violence remains unreported, it not only continues, but often escalates. The consequences of underreporting affect the victim, children, the community and society as a whole. Analyzing these consequences is essential to understanding the critical importance of reporting and early intervention. Continuation and escalation of violence. One of the most dangerous consequences of underreporting is the escalation of violence. The aggressor interprets silence as permission to continue and increase control. In the absence of institutional intervention, the cycle of violence becomes more frequent and more severe. The risk of severe physical violence and femicide increases significantly when the victim does not have access to support and protection.

Psychological and emotional harm to the victim. Underreporting leads to severe psychological consequences. Victims often develop chronic anxiety, depression, post-traumatic stress disorder (PTSD), low self-esteem, and social isolation. The ongoing environment of unreported violence creates an internal state of insecurity and loss of control, making the victim feel powerless and unable to seek help. Psychological consequences for victims include depression, anxiety, and post-traumatic stress disorder (WHO, 2021).

Consequences for children: trauma and intergenerational inheritance. Children who grow up in environments where violence is present, even without being physically affected, experience profound emotional trauma. They exhibit fear, learning problems, sleep disorders, aggressive or regressive behavior. One of the most serious consequences is the intergenerational inheritance of violence: boys are more likely to become aggressors, while girls are more likely to be victims in their future relationships. Under-reporting, therefore, does not only affect one generation, but creates behavioral patterns that can be repeated. Children who grow up in violent environments experience emotional trauma and risk reproducing similar behavioral patterns in their future lives (UNICEF, 2017).

Social normalization of violence. When violence is not reported, it is normalized by the community. Violence is viewed as a “private family matter,” minimizing its criminal nature. Victims are often blamed, and abusers are protected by social norms. This normalization makes underreporting part of a culture of silence and makes it difficult to promote social change.

Increased impunity. Under-reporting reinforces the culture of impunity. Perpetrators of violence continue without legal consequences, increasing the risk to victims and the community. Institutions cannot intervene when cases go unreported, losing credibility and weakening women's trust in the justice system.

Impeding the development of effective policies. Without accurate data on the extent of violence, public policies become inadequate or ineffective. Institutions fail to identify the most problematic areas, the most vulnerable groups, and the types of interventions needed. Under-reporting leads to insufficient allocation of resources and a lack of specialized programs.

Economic costs to the victim and society. Unreported violence carries significant economic costs. Victims experience reduced productivity, job loss, health care costs, and long-term economic dependence. Society pays significant costs for dealing with the psychological, health, and social consequences of violence. These costs increase proportionally with the degree of underreporting.

So we see that the consequences of under-reporting are numerous and the intertwining of fear, isolation, lack of support and social stigma create a chain of consequences that turn violence into part of the social structure. Under-reporting is not only a personal problem of the victim, but a deep social and institutional problem that requires coordinated, legal, psychological and systemic intervention.

Opportunities for intervention and reduction of underreporting

Addressing the underreporting of violence against women requires a multifaceted, coordinated and evidence-based approach. Fear, economic dependence and social stigma are rooted in deep cultural, political and economic structures; therefore, interventions should aim to transform these structures. We mention some key intervention measures at the institutional, social, economic and cultural levels that have a fundamental impact on increasing the confidence of women and girls to fully report violence against them and on raising public awareness in this regard. Strengthening institutional and legal mechanisms. Institutions play a key role in detecting, addressing and preventing violence against women. If they function poorly, underreporting increases.

Professionalization of the police and the justice system: The police are often the first point of contact. Professional training, prompt response, standardized procedures, and a gender-sensitive approach are essential to gain the trust of victims.

Strengthening protection orders: Protection orders must be issued quickly, implemented rigorously, and accompanied by concrete safety measures for victims.

Establishing local structures in rural areas: Rural areas require a dedicated approach due to lack of services, distances and social isolation. Reporting points in health centers, trained social workers and mobile support programs are needed.

Increasing access to support services for victims. Many women do not report because they do not know where to go or have nowhere to go. Services must be accessible and functional.

Safe shelters and quick access: Shelter centers should be sustainably funded, equipped with professional staff, and open to women with children.

Free psychological and legal services: Emotional counseling and legal assistance are essential to help the victim understand her rights and take safe steps.

24/7 hotline and secure reporting platforms: Anonymous reporting and digital tools increase the number of reports and the safety of victims.

Economic empowerment of women. Economic dependence is a strong barrier to reporting. Interventions should promote financial autonomy.

Employment opportunities and professional training. Women, especially rural ones, should have access to training and employment programs.

Emergency financial support: Immediate financial assistance after reporting reduces the risks of homelessness and lack of basic resources.

Property justice: Strengthening women's property rights helps reduce dependence and increase decision-making independence.

Changing social norms and reducing stigmatization. Cultural change is essential to reduce underreporting.

Awareness campaign: Ongoing programs in schools, media, and communities that challenge gender stereotypes and patriarchal norms.

Involving men and boys: Changing social behaviors requires the active involvement of men in anti-violence programs, and this is very important in empowering women in the fight against the phenomenon of under-reporting.

Deconstructing gender stereotypes: Challenging the myths that support victim blaming and the normalization of violence. Challenging and dismantling old and erroneous ideas about the roles and behaviors that society attributes to women and men is of great importance, as removing the erroneous ideas that say women and men should behave or be a certain way is to accept that every person is free to be themselves, without being limited by gender.

Finally and most importantly, there is increased inter-institutional cooperation. Addressing violence requires a coordinated system between the police, social services, health centers, civil society organizations, and the justice system. Coordination between these institutions ensures a rapid and unified response, avoiding gaps that hinder the victim and increase underreporting.

Strengthening institutions, increasing access to support services and women's economic empowerment have been identified as key measures to reduce underreporting (UN Women, 2020; Council of Europe, 2019). Changing social norms and deconstructing gender stereotypes are essential to challenging victim blaming and dismantling the normalization of violence (Jewkes, 2002).

Interventions to reduce underreporting need to be integrated, coordinated, and sensitive to rural and urban contexts. They need to address not only the consequences but also the root causes of violence.

Only through the empowerment of institutions, services, women, and communities can the cycle of silence that fuels violence be broken.

Conclusion

The phenomenon of underreporting of violence against women is presented as a complex reality, built by a combination of personal, cultural, institutional and

economic factors, which, acting together, create a sustainable cycle of silence that keeps violence invisible and unpunished. Analysis of this phenomenon has shown that fear, economic dependence and social stigma are not simply isolated reasons, but deep mechanisms that shape the victim's decision-making and influence the way she perceives risk, opportunities and her role within the family and community. These factors, combined with institutional shortcomings and cultural norms that consider violence as a private matter, create conditions where underreporting often seems like the safest strategy for survival, despite the high emotional and physical costs that this choice carries.

In this sense, underreporting should not be seen only as a consequence of violence, but also as a factor that reproduces and reinforces it. Without reporting, there is no institutional intervention; without intervention, violence escalates; and with escalation, the victim's sense of powerlessness and the culture of social inaction increase. Underreporting creates a domino effect that begins within the family, but extends to the community and state structures, contributing to a culture of impunity where the aggressor feels sure that his behavior will not have consequences. For this reason, the phenomenon of underreporting is not only an individual problem of abused women, but an indicator of collective irresponsibility and deficiencies in the social and legal protection system.

The rural context in Albania further deepens this reality, burdening the victim not only with fear and economic dependence, but also with strong community pressures that value the preservation of family reputation over her personal well-being. Geographic isolation, lack of services, traditional gender roles, and community social control create an environment where reporting is experienced as an impossible, dangerous, and socially unacceptable act. For this reason, women in rural areas face much greater barriers compared to women in urban areas, making under-reporting in these areas not only more common, but also more profound in its consequences.

In light of this analysis, it becomes clear that solving the problem requires an integrated and multidimensional approach. Changes cannot occur through legal reforms alone, if these reforms are not accompanied by institutional strengthening, social education, the creation of economic opportunities and the transformation of cultural norms that tolerate or normalize violence against women. Institutions must build credibility, creating an environment where victims feel protected and heard; communities must be freed from stigma and cultures of silence; and women must have real economic opportunities that enable them to break away from violent relationships. Only through the coordination of these elements can a sustainable transformation be achieved.

In conclusion, the underreporting of violence against women is not only an indicator of the difficulties of victims to seek help, but is a symptom of a social and institutional structure that still does not provide sufficient protection, real security and equal opportunities. Any strategy aimed at preventing violence against women must have as its essential goal breaking this cycle of silence and building an environment where women feel empowered to report, be supported and regain control over their lives. Without this profound transformation, violence remains invisible, unpunished and transmitted across generations — making underreporting not a problem of the

present, but a challenge that will continue to weigh on the future. Under-reporting is the result of complex interrelated factors: fear, economic dependence, stigma. The solution requires a multifaceted and coordinated approach between institutions, the community and public policies.

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Shortest path analysis for dairy product distribution: A graph-theoretic approach applied to Lufra company

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Abstract

The need for efficient distribution systems has increased due to Albania's agro-industry sector's explosive growth, particularly in the dairy sector. Transportation time, operating expenses, and environmental effect must all be decreased by these methods. The efficiency of their logistics operations becomes crucial to competitiveness and service quality as businesses like Lufra increase their market share. Traffic jams in urban and interurban areas, particularly in and around Tirana, cause delays, increase fuel use, raise emissions, and lower overall supply-chain performance. Existing studies stress the importance of improving transport routes, but there has been little research on using graph-theoretic algorithms in real distribution networks in the Albanian agro-industry. This study addresses that gap by evaluating the shortest transportation routes from Lufra's main facility in Tirana to key distribution points such as Durrës, Rrëshen, Kruja, and Paskuqan. The goal is to see how algorithm-based decision tools can enhance logistical efficiency by finding minimum-distance paths that cut delivery time and costs. The study uses two classic algorithms that are well-known in operations research and network optimization. The Bellman-Kalaba algorithm finds the shortest paths from one fixed point to all other points in the network. The Roy-Floyd (Floyd-Warshall) algorithm calculates the shortest paths between all pairs of points across the whole network. This study mapped and weighted the distances between Tirana and the selected cities for the construction of a weighted directed graph representing real transportation routes. Through repeated matrix transformations, the Bellman-Kalaba algorithm produced the shortest path lengths from Tirana to each location. At the same time, the Roy-Floyd algorithm generated a complete matrix of optimal distances between every pair of nodes. The findings show that both algorithms provide consistent results. They confirm the shortest routes from Tirana to the target destinations and highlight their practical value for improving distribution schedules. For instance, the calculated minimal distances help Lufra lower fuel costs, improve delivery timing, and reduce environmental impacts related to transportation. Besides, from a computational point of view, the algorithms comparison shows that Bellman-Kalaba is more suitable for those cases when the starting point is fixed, while Roy-Floyd is better for the analysis of multiple pairs of origin and destination. These results prove the importance of graph approaches and mathematical modeling in the improvement of supply-chain efficiency in the agro-industrial sector. While this work considers only static data on distances without taking into account changes in road traffic in real-time, it gives a good methodological basis for future research related to dynamic routing, cost-based optimization, and digital logistics systems. With the help of those algorithms, companies like Lufra can significantly improve the efficiency of their distribution networks, reduce operational costs, and increase the sustainability of transportation.

Keywords: graphs, transportation, Bellman-Kalaba algorithm, Roy-Floyd algorithm, shortest path.

JEL classification: C02, C61, R41, R42, L66

1. Introduction: General issues and focus of the study

The problem that our country faces most today is road congestion. Traffic has become a serious problem, which also affects companies that distribute their products to various supply points. Road congestion brings a number of problems such as time delays, increased fuel costs, and increased stress levels among drivers and passengers. The growth of the population in the city has increased traffic, while the road infrastructure has remained almost the same. Even the interventions carried out, such as the small or large ring road, have not completely solved the traffic problem. This situation has also contributed to the increase in environmental pollution. According to the report on the costs that air pollution causes to people's health, the World Bank estimated that in Albania, during 2020, 2,257 people lost their lives. Environmental pollution was responsible for 10% of total deaths that year (Monitor.al, 2022).

Many ways to reduce traffic have been explored, especially in urban areas. One of them is to encourage the use of public transport (Le and Trinh, 2016). However, in our country, especially in Tirana, it seems that the level of private car use is still very high. This is also clearly seen from an excerpt from Dorina Laci's article for the New York Times: "While Albanian politicians claim to have chauffeur-driven service cars, 915 Swiss parliamentarians take public transport to work. While many Albanians see their cars as an expression of hard-won individual freedom after dictatorship, for our European brothers, owning a car is a burden — and in urban areas, a double burden." Although mentality has its role, equally important is the analysis of the efficiency of public transport lines: how well do these lines meet the needs of citizens?

The main purpose of this paper is to evaluate the shortest distances on the urban transport lines of the "Lufra" company, with the aim of avoiding factors such as heavy traffic, delays, fuel costs and environmental pollution. Two algorithms were used to carry out the paper: Bellman-Kalaba and Roy-Floyd, which serve to evaluate and identify the shortest distances from the departure point.

2. Literature Review

Bellman-Kalaba Algorithm

It is a variant of the previous algorithm, using dynamic programming techniques. It is based on the following property, which is a feature of the Bellman principle: every maximally valued path of length r consists of elementary paths of length k ($k \leq r$) and maximally valued.

The matrix $[T]$ of values (running times) is defined as follows: represents the duration of the operation between E_i and E_j , if $(E_i E_j) \in A$, $i \neq j$, respectively $-\infty$, if $(E_i E_j) \notin A$, and $i \neq j$, and for $i = j$ it is zero. If the graph is in a certain order, then all elements in the lower triangle of $[T]$ are $-\infty$.

Floyd Warshall Algorithm

The Floyd-Warshall algorithm is an old algorithms that calculates shortest paths

between all pairs of nodes in a graph that is weight-weighted and may have both positive and negative edge weights, though no negative cycles can exist. This algorithm is also known by some of these names: Floyd Algorithm, Roy-Warshall Algorithm, Roy-Floyd Algorithm, WFI Algorithm [1]. This famous algorithm was discovered by Robert Floyd himself in 1962 [1]. The Floyd–Warshall algorithm takes as input an matrix of path lengths, commonly referred to as the distance matrix. This matrix holds the shortest path distances between vertices that do not use any intermediate vertices. Unless there is an edge between vertices u and v , the corresponding entry in the matrix contains the weight of that edge. The diagonal elements of the matrix are set to zero, as the distance from any vertex to itself is zero. If no direct edge exists between vertices u and v , the entry (i,j) is assigned a value of positive infinity [2].

In the course of the algorithm, the distance matrix is updated step by step, examining each vertex in turn as a possible intermediate vertex. In each step, the algorithm examines whether the addition of a new vertex as the intermediate vertex makes the distance between all pairs of vertices smaller and updates the distance matrix accordingly. Once all vertices are examined, the distance matrix is left with the minimum distance between all pairs of vertices of the graph.

According to Algorithmist (2005), the Floyd–Warshall algorithm is an efficient algorithm for finding the shortest paths of all pairs in a graph. That is, it is guaranteed to find the shortest path between any pair of vertices in a graph. The graph can have edges of negative weight, but not cycles of negative weight (since then the shortest path is undefined). The algorithm can also be used to detect the presence of negative cycles. A graph has negative cycles if, at the end of the algorithm, the distance from a vertex (v) to itself is negative. The Floyd–Warshall algorithm is also an application of dynamic programming.

Sung-Chul et al. (2006), focused on the all-pairs shortest path problem (APSP), which finds the length of the shortest path for all source-destination pairs in a (positively) weighted graph. It is one of the most fundamental problems in graph theory, and almost all dynamic programming problems can be seen equivalently as problems that require the shortest path in a directed graph. The all-pair shortest path (APSP) is solved by the well-known Floyd-Warshall (FW) algorithm, which computes the solution in place from the graph weight matrix using a triple loop similar to matrix-matrix multiplication (MMM). To optimize cache performance, Venkataraman et al. (2003) introduced a tiled version of the Floyd-Warshall algorithm. Further improvements were also made by Park et al. (2004), who showed that tiling can be done recursively up to a chosen base case and combined with a Z-Morton data layout to increase performance. The tiling rate and the size of the base case were found by searching using the adaptive library framework.

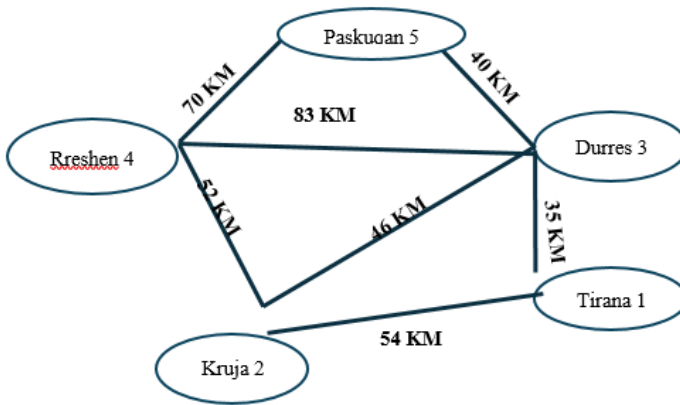
3. Methods and Applications

Find minimum distances from a fixed verte to other vertes of the graph (Bellman-Kallaba algorithm)

The Lufra company is one of the main producers and distributors of dairy products

in Albania. Although it extends its distribution network to many cities in the country, its main center is located in Tirana. In this paper, we aim to analyze the distances between the company's location and some of its main distribution points, including: Tirana, Durrës, Paskuqani, Rrëshen and Krujë. These distances will be calculated through two well-known graph theory algorithms: Bellman–Kalaba and Roy–Floyd, which are used to find the shortest paths, although they operate with different methodologies.

Figure 1: Graph of distances taken in the study



Source: Author

Bellman-Kallaba Algorithm

Unlike Roy–Floyd, the Bellman–Kalaba algorithm is used to find the shortest path from a single point to all other points in a graph. This algorithm:

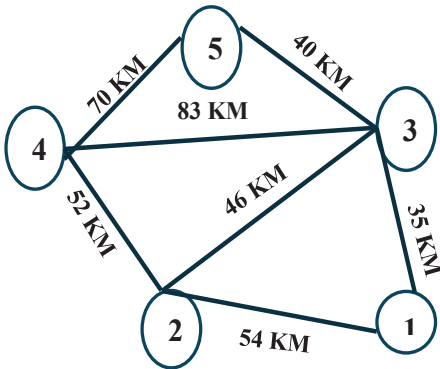
- is suitable when we have an initial vertex (e.g., the center of Lufra in Tirana);
- updates the distance values by iteratively applying the dynamic formula of dynamic programming;
- has high efficiency in graphs where distances are required to be calculated progressively and in different ways for each point.

The combination of these two methods allows for a complete analysis both from the perspective of the fastest route for distribution from the center, and from the perspective of the overall structure of the logistics network.

The first step of the Bellman-Kallaba algorithm is the formation of the direct distances A of the graph

Figure 2: Graph A of the formation of direct distances

Figure 2: Graph A of the formation of direct distances



Source: Author

We form the matrix of direct distances:

$$A = \begin{pmatrix} 0 & 54 & 35 & \infty & \infty \\ \infty & 0 & \infty & 52 & \infty \\ \infty & 46 & 0 & 83 & 40 \\ \infty & \infty & \infty & 0 & \infty \\ \infty & \infty & \infty & 70 & 0 \end{pmatrix}$$

We place on the right side of matrix A in the form of columns the elements of the first row of this matrix.

$$A = \begin{pmatrix} 0 & 54 & 35 & \infty & \infty \\ \infty & 0 & \infty & 52 & \infty \\ \infty & 46 & 0 & 83 & 40 \\ \infty & \infty & \infty & 0 & \infty \\ \infty & \infty & \infty & 70 & 0 \end{pmatrix} \begin{matrix} 0 \\ 54 \\ 35 \\ \infty \\ \infty \end{matrix}$$

With the help of this column and matrix A we form a second column, and with the help of the second column formed outside matrix A we form the third column and so on until two columns with the same elements of one row are formed. At the moment when two columns with the same elements of one row are formed, then in those columns are the minimum distances from the fixed vertex to the other vertices.

$$A = \begin{pmatrix} 0 & 54 & 35 & \infty & \infty \\ \infty & 0 & \infty & 52 & \infty \\ \infty & 46 & 0 & 83 & 40 \\ \infty & \infty & \infty & 0 & \infty \\ \infty & \infty & \infty & 70 & 0 \end{pmatrix}$$

From the formula:

$l'_{1k} = \min \{l_{11} + l_{1k}, l_{12} + l_{2k}, l_{13} + l_{3k}, l_{14} + l_{4k}, l_{15} + l_{5k}\}$ për $k=1,2,3,4,5$ we find:

$$l'_{11} = \min \{l_{11} + l_{11}, l_{12} + l_{21}, l_{13} + l_{31}, l_{14} + l_{41}, l_{15} + l_{51}\}$$

$$l'_{11} = \min \{0 + 0; 54 + \infty; 35 + \infty; \infty + \infty; \infty + \infty\} = 0$$

$$l'_{12} = \min \{l_{11} + l_{12}, l_{12} + l_{22}, l_{13} + l_{32}, l_{14} + l_{42}, l_{15} + l_{52}\}$$

$$l'_{12} = \min \{0 + 54; 54 + 0; 35 + 46; \infty + \infty; \infty + \infty\} = 54$$

$$l'_{13} = \min \{l_{11} + l_{13}, l_{12} + l_{23}, l_{13} + l_{33}, l_{14} + l_{43}, l_{15} + l_{53}\}$$

$$l'_{13} = \min \{0 + 35; 54 + \infty; 35 + 0; \infty + \infty; \infty + \infty\} = 35$$

$$l'_{14} = \min \{l_{11} + l_{14}, l_{12} + l_{24}, l_{13} + l_{34}, l_{14} + l_{44}, l_{15} + l_{54}\}$$

$$l'_{14} = \min \{0 + \infty; 54 + 52; 35 + 83; \infty + \infty; \infty + 70\} = 106$$

$$l'_{15} = \min \{l_{11} + l_{15}, l_{12} + l_{25}, l_{13} + l_{35}, l_{14} + l_{45}, l_{15} + l_{55}\}$$

$$l'_{15} = \min \{0 + \infty; 54 + \infty; 35 + 40; \infty + \infty; \infty + 0\} = 75$$

Elements of the second column:

$$l'_{21} = \min \{l_{21} + l_{11}, l_{12} + l_{21}, l_{23} + l_{31}, l_{24} + l_{41}, l_{25} + l_{51}\}$$

$$l'_{21} = \min \{0 + 0; 54 + \infty; 35 + \infty; 106 + \infty; 75 + \infty\} = 0$$

$$l'_{22} = \min \{l_{21} + l_{12}, l_{22} + l_{22}, l_{23} + l_{32}, l_{24} + l_{42}, l_{25} + l_{52}\}$$

$$l'_{22} = \min \{0 + 54; 54 + 0; 35 + 46; 106 + \infty; 75 + \infty\} = 54$$

$$l'_{23} = \min \{l_{31} + l_{13}, l_{32} + l_{23}, l_{33} + l_{33}, l_{34} + l_{43}, l_{35} + l_{53}\}$$

$$l'_{23} = \min \{0 + 35; 54 + \infty; 35 + 0; 106 + \infty; 75 + \infty\} = 35$$

$$l'_{24} = \min \{l_{41} + l_{14}, l_{42} + l_{24}, l_{43} + l_{34}, l_{44} + l_{44}, l_{45} + l_{54}\}$$

$$l'_{24} = \min \{0 + \infty; 54 + 52; 35 + 83; 106 + \infty; 75 + 70\} = 106$$

$$l'_{25} = \min \{l_{51} + l_{15}, l_{52} + l_{25}, l_{53} + l_{35}, l_{54} + l_{45}, l_{55} + l_{55}\}$$

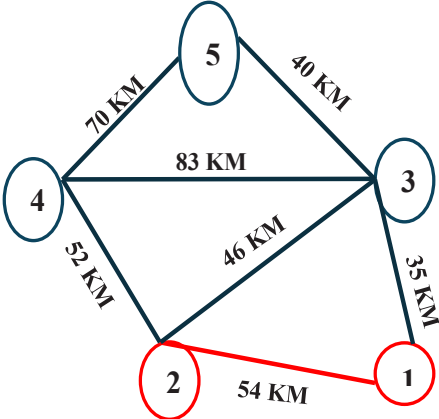
$$l'_{25} = \min \{0 + \infty; 54 + \infty; 35 + 40; 106 + \infty; 75 + 0\} = 75$$

$$A = \begin{pmatrix} 0 & 54 & 35 & \infty & \infty \\ \infty & 0 & \infty & 52 & \infty \\ \infty & 46 & 0 & 83 & 40 \\ \infty & \infty & \infty & 0 & \infty \\ \infty & \infty & \infty & 70 & 0 \end{pmatrix} \quad \begin{array}{cc} \text{I} & \text{II} \\ 0 & 0 & 0 \\ 54 & 54 & 54 \\ 35 & 35 & 35 \\ \infty & 106 & 106 \\ \infty & 75 & 75 \end{array}$$

After repeating two columns with the same elements one after the other, we have obtained the minimum distances from the fixed vertex to the other vertices:

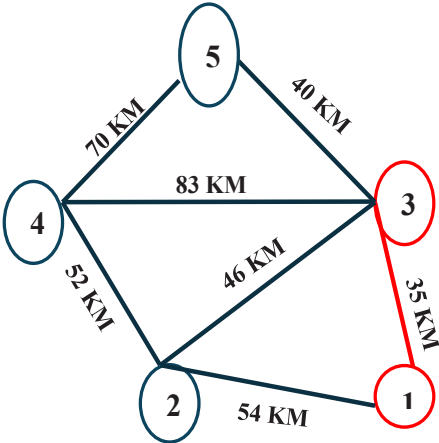
$$m_{11} = 0, m_{12} = 54, m_{13} = 35, m_{14} = 106, m_{15} = 75$$

Figure 3: The shortest path in the graph from Tirana, which is the fixed vertex, to Kruja:



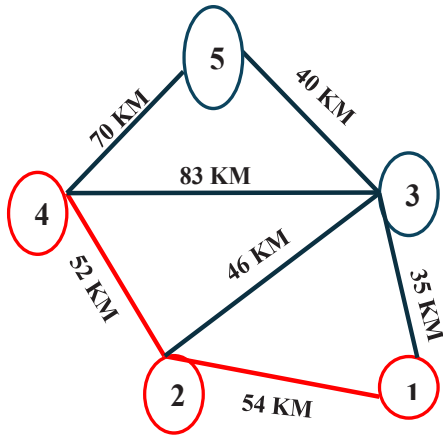
Source: Author

Figure 4: Shortest path in the graph from Tirana (fixed vertex) to Durrës:



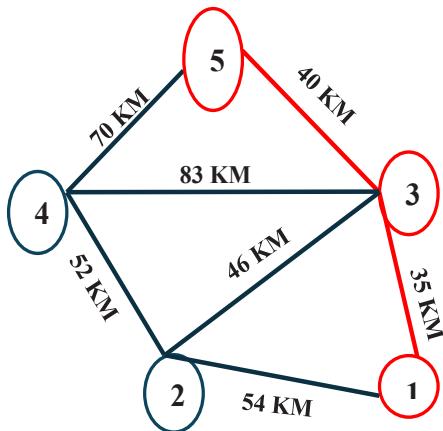
Source: Author

Figure 5: Shortest path in the graph from Tirana (Fixed Vertex) to Rrëshen:



Source: Author

Figure 6: Shortest path in the graph from Tirana (Fixed Vertex) to Paskuqan:

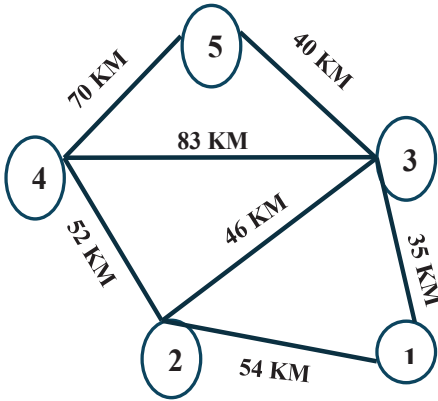


Source: Author

Roy-Floyd Algorithm

With the Roy-Floyd algorithm, we can find all the elements of the matrix M , this means that through the matrix M we can find the shortest paths in the graph from any vertex. It is a more modified method than the Bellman Kallaba Algorithm, where we have the opportunity to find the shortest path from a fixed vertex to other vertices, while this method does not need to specify a fixed vertex.

Figure 7: Graph A of direct distance formation



Source: Author

We form the matrix of direct distances:

$$A = \begin{pmatrix} 0 & 54 & 35 & \infty & \infty \\ \infty & 0 & \infty & 52 & \infty \\ \infty & 46 & 0 & 83 & 40 \\ \infty & \infty & \infty & 0 & \infty \\ \infty & \infty & \infty & 70 & 0 \end{pmatrix}$$

From matrix A, we find the matrix A_1 :

$$A = \begin{pmatrix} 0 & 54 & 35 & \infty & \infty \\ \infty & 0 & \infty & 52 & \infty \\ \infty & 46 & 0 & 83 & 40 \\ \infty & \infty & \infty & 0 & \infty \\ \infty & \infty & \infty & 70 & 0 \end{pmatrix}$$

From the formula $l'_{ij} = \min\{l_{ij}, l_{1j}\}$ we find the matrix A_1 .

$$l'_{22} = \min\{l_{22}, l_{21} + l_{12}\} = \min\{0, \infty + 54\} = 0$$

$$l'_{23} = \min\{l_{23}, l_{21} + l_{13}\} = \min\{\infty, \infty + 35\} = \infty$$

$$l'_{24} = \min\{l_{24}, l_{21} + l_{14}\} = \min\{52, \infty + \infty\} = 52$$

$$l'_{25} = \min\{l_{25}, l_{21} + l_{15}\} = \min\{\infty, \infty + \infty\} = \infty$$

$$l'_{32} = \min\{l_{32}, l_{31} + l_{12}\} = \min\{46, \infty + 54\} = 46$$

$$l'_{33} = \min\{l_{33}, l_{31} + l_{13}\} = \min\{0, \infty + 35\} = 0$$

$$l'_{34} = \min\{l_{34}, l_{31} + l_{14}\} = \min\{83, \infty + \infty\} = 83$$

$$l'_{35} = \min\{l_{35}, l_{31} + l_{15}\} = \min\{40, \infty + \infty\} = \infty$$

$$l'_{42} = \min\{l_{42}, l_{41} + l_{12}\} = \min\{\infty, \infty + 54\} = \infty$$

$$l'_{43} = \min\{l_{43}, l_{41} + l_{13}\} = \min\{\infty, \infty + 35\} = \infty$$

$$l'_{44} = \min\{l_{44}, l_{41} + l_{14}\} = \min\{0, \infty + \infty\} = 0$$

$$l'_{45} = \min\{l_{45}, l_{41} + l_{15}\} = \min\{\infty, \infty + \infty\} = \infty$$

$$l'_{52} = \min\{l_{52}, l_{51} + l_{12}\} = \min\{\infty, \infty + 54\} = \infty$$

$$l'_{53} = \min\{l_{53}, l_{51} + l_{13}\} = \min\{\infty, \infty + 35\} = \infty$$

$$l'_{54} = \min\{l_{54}, l_{51} + l_{14}\} = \min\{70, \infty + \infty\} = 70$$

$$l'_{55} = \min\{l_{55}, l_{51} + l_{15}\} = \min\{0, \infty + \infty\} = 0$$

The formed matrix A_1 :

$$A_1 = \begin{pmatrix} 0 & 54 & 35 & \infty & \infty \\ \infty & 0 & \infty & 52 & \infty \\ \infty & 46 & 0 & 83 & 40 \\ \infty & \infty & \infty & 0 & \infty \\ \infty & \infty & \infty & 70 & 0 \end{pmatrix}$$

From matrix A_1 we find the matrix A_2 :

$$A_1 = \begin{pmatrix} 0 & 54 & 35 & \infty & \infty \\ \infty & 0 & \infty & 52 & \infty \\ \infty & 46 & 0 & 83 & 40 \\ \infty & \infty & \infty & 0 & \infty \\ \infty & \infty & \infty & 70 & 0 \end{pmatrix}$$

From the formula $l'_{ij} = \min\{l_{ij}, l_{i1} + l_{1j}\}$ we find the matrix A_2 .

$$l'_{11} = \min\{l_{11}, l_{12} + l_{21}\} = \min\{0, 54 + \infty\} = 0$$

$$l'_{13} = \min\{l_{13}, l_{12} + l_{23}\} = \min\{35, 54 + \infty\} = 35$$

$$l'_{14} = \min\{l_{14}, l_{12} + l_{24}\} = \min\{\infty, 54 + 52\} = 106$$

$$l'_{15} = \min\{l_{15}, l_{12} + l_{25}\} = \min\{\infty, 54 + \infty\} = \infty$$

$$\begin{aligned}
l'_{31} &= \min\{l_{31}, l_{32} + l_{21}\} = \min\{\infty, 46 + \infty\} = \infty \\
l'_{33} &= \min\{l_{33}, l_{32} + l_{22}\} = \min\{\infty, 46 + \infty\} = 0 \\
l'_{34} &= \min\{l_{34}, l_{32} + l_{24}\} = \min\{83, 46 + 52\} = 83 \\
l'_{35} &= \min\{l_{35}, l_{32} + l_{25}\} = \min\{40, 46 + \infty\} = 40
\end{aligned}$$

$$\begin{aligned}
l'_{41} &= \min\{l_{41}, l_{42} + l_{21}\} = \min\{\infty, \infty + \infty\} = \infty \\
l'_{43} &= \min\{l_{43}, l_{42} + l_{23}\} = \min\{\infty, \infty + \infty\} = \infty \\
l'_{44} &= \min\{l_{44}, l_{42} + l_{24}\} = \min\{0, \infty + 52\} = 0 \\
l'_{45} &= \min\{l_{45}, l_{42} + l_{25}\} = \min\{\infty, \infty + \infty\} = \infty
\end{aligned}$$

$$\begin{aligned}
l'_{52} &= \min\{l_{52}, l_{52} + l_{21}\} = \min\{\infty, \infty + \infty\} = \infty \\
l'_{53} &= \min\{l_{53}, l_{52} + l_{23}\} = \min\{\infty, \infty + \infty\} = \infty \\
l'_{54} &= \min\{l_{54}, l_{52} + l_{24}\} = \min\{70, \infty + 52\} = 70 \\
l'_{55} &= \min\{l_{55}, l_{52} + l_{25}\} = \min\{0, \infty + \infty\} = 0
\end{aligned}$$

$$A_2 = \begin{pmatrix} 0 & 54 & 35 & \infty & \infty \\ \infty & 0 & \infty & 52 & \infty \\ \infty & 46 & 0 & 83 & 40 \\ \infty & \infty & \infty & 0 & \infty \\ \infty & \infty & \infty & 70 & 0 \end{pmatrix}$$

From matrix A_2 we find the matrix A_3 :

From the formula $l'_{ij} = \min\{l_{ij}, l_{i1} + l_{1j}\}$ we find the matrix A_3 .

$$\begin{aligned}
l'_{11} &= \min\{l_{11}, l_{13} + l_{31}\} = \min\{0, 35 + \infty\} = 0 \\
l'_{12} &= \min\{l_{12}, l_{13} + l_{32}\} = \min\{54, 35 + 46\} = 54 \\
l'_{14} &= \min\{l_{14}, l_{13} + l_{34}\} = \min\{106, 35 + 83\} = 106 \\
l'_{15} &= \min\{l_{15}, l_{14} + l_{35}\} = \min\{\infty, 35 + 40\} = 75
\end{aligned}$$

$$\begin{aligned}
l'_{21} &= \min\{l_{21}, l_{23} + l_{31}\} = \min\{\infty, \infty + \infty\} = \infty \\
l'_{22} &= \min\{l_{22}, l_{23} + l_{32}\} = \min\{0, \infty + 46\} = 0 \\
l'_{24} &= \min\{l_{24}, l_{23} + l_{34}\} = \min\{52, \infty + 83\} = 52 \\
l'_{25} &= \min\{l_{25}, l_{23} + l_{35}\} = \min\{\infty, \infty + 40\} = \infty
\end{aligned}$$

$$\begin{aligned}
l'_{41} &= \min\{l_{41}, l_{43} + l_{31}\} = \min\{\infty, \infty + \infty\} = \infty \\
l'_{42} &= \min\{l_{42}, l_{43} + l_{32}\} = \min\{\infty, \infty + 46\} = \infty \\
l'_{44} &= \min\{l_{44}, l_{43} + l_{34}\} = \min\{0, \infty + 83\} = 0 \\
l'_{45} &= \min\{l_{45}, l_{43} + l_{35}\} = \min\{\infty, \infty + 40\} = \infty
\end{aligned}$$

$$\begin{aligned}
l'_{51} &= \min\{l_{51}, l_{53} + l_{31}\} = \min\{\infty, \infty + \infty\} = \infty \\
l'_{52} &= \min\{l_{52}, l_{53} + l_{32}\} = \min\{\infty, \infty + 46\} = \infty \\
l'_{54} &= \min\{l_{54}, l_{53} + l_{34}\} = \min\{70, \infty + 83\} = 70 \\
l'_{55} &= \min\{l_{55}, l_{53} + l_{35}\} = \min\{0, \infty + 40\} = 0
\end{aligned}$$

$$A_3 = \begin{pmatrix} \mathbf{0} & \mathbf{54} & \mathbf{35} & \mathbf{106} & \mathbf{75} \\ \infty & \mathbf{0} & \infty & \mathbf{52} & \infty \\ \infty & \mathbf{46} & \mathbf{0} & \mathbf{83} & \mathbf{40} \\ \infty & \infty & \infty & \mathbf{0} & \infty \\ \infty & \infty & \infty & \mathbf{70} & \mathbf{0} \end{pmatrix}$$

From the formula $l'_{ij} = \min\{l_{ij}, l_{i1} + l_{1j}\}$ we find the matrix A_4 .

$$\begin{aligned}
l'_{11} &= \min\{l_{11}, l_{14} + l_{41}\} = \min\{\mathbf{0}, \mathbf{106} + \infty\} = \mathbf{0} \\
l'_{12} &= \min\{l_{12}, l_{14} + l_{42}\} = \min\{\mathbf{54}, \mathbf{106} + \infty\} = \mathbf{54} \\
l'_{13} &= \min\{l_{13}, l_{14} + l_{43}\} = \min\{\mathbf{35}, \mathbf{106} + \infty\} = \mathbf{35} \\
l'_{15} &= \min\{l_{15}, l_{14} + l_{45}\} = \min\{\mathbf{75}, \mathbf{106} + \infty\} = \mathbf{75}
\end{aligned}$$

$$\begin{aligned}
l'_{21} &= \min\{l_{21}, l_{24} + l_{41}\} = \min\{\infty, \mathbf{52} + \infty\} = \infty \\
l'_{22} &= \min\{l_{22}, l_{24} + l_{42}\} = \min\{\mathbf{0}, \mathbf{52} + \infty\} = \mathbf{0} \\
l'_{23} &= \min\{l_{23}, l_{24} + l_{43}\} = \min\{\mathbf{52}, \mathbf{52} + \infty\} = \mathbf{52} \\
l'_{25} &= \min\{l_{25}, l_{24} + l_{45}\} = \min\{\infty, \mathbf{52} + \infty\} = \infty
\end{aligned}$$

$$\begin{aligned}
l'_{31} &= \min\{l_{41}, l_{34} + l_{41}\} = \min\{\infty, \mathbf{83} + \infty\} = \infty \\
l'_{32} &= \min\{l_{42}, l_{34} + l_{42}\} = \min\{\infty, \mathbf{83} + \infty\} = \infty \\
l'_{33} &= \min\{l_{44}, l_{34} + l_{43}\} = \min\{\mathbf{0}, \mathbf{83} + \infty\} = \mathbf{0} \\
l'_{35} &= \min\{l_{45}, l_{34} + l_{45}\} = \min\{\infty, \mathbf{83} + \infty\} = \infty
\end{aligned}$$

$$\begin{aligned}
l'_{51} &= \min\{l_{51}, l_{54} + l_{41}\} = \min\{\infty, \mathbf{70} + \infty\} = \infty \\
l'_{52} &= \min\{l_{52}, l_{54} + l_{42}\} = \min\{\infty, \mathbf{70} + \infty\} = \infty \\
l'_{53} &= \min\{l_{53}, l_{54} + l_{43}\} = \min\{\mathbf{70}, \mathbf{70} + \infty\} = \mathbf{70} \\
l'_{55} &= \min\{l_{55}, l_{54} + l_{45}\} = \min\{\mathbf{0}, \mathbf{70} + \infty\} = \mathbf{0}
\end{aligned}$$

$$A_4 = \begin{pmatrix} \mathbf{0} & \mathbf{54} & \mathbf{35} & \mathbf{106} & \mathbf{75} \\ \infty & \mathbf{0} & \infty & \mathbf{52} & \infty \\ \infty & \mathbf{46} & \mathbf{0} & \mathbf{83} & \mathbf{40} \\ \infty & \infty & \infty & \mathbf{0} & \infty \\ \infty & \infty & \infty & \mathbf{70} & \mathbf{0} \end{pmatrix}$$

From matrix A_4 we find the matrix A_5 :

$$A_4 = \begin{pmatrix} \mathbf{0} & \mathbf{54} & \mathbf{35} & \mathbf{106} & \mathbf{75} \\ \infty & \mathbf{0} & \infty & \mathbf{52} & \infty \\ \infty & \mathbf{46} & \mathbf{0} & \mathbf{83} & \mathbf{40} \\ \infty & \infty & \infty & \mathbf{0} & \infty \\ \infty & \infty & \infty & \mathbf{70} & \mathbf{0} \end{pmatrix}$$

$$\begin{aligned} l'_{11} &= \min\{l_{11}, l_{15} + l_{51}\} = \min\{\mathbf{0}, \mathbf{75} + \infty\} = \mathbf{0} \\ l'_{12} &= \min\{l_{12}, l_{15} + l_{52}\} = \min\{\mathbf{54}, \mathbf{75} + \infty\} = \mathbf{54} \\ l'_{13} &= \min\{l_{13}, l_{15} + l_{53}\} = \min\{\mathbf{35}, \mathbf{75} + \infty\} = \mathbf{35} \\ l'_{14} &= \min\{l_{14}, l_{15} + l_{54}\} = \min\{\mathbf{106}, \mathbf{75} + \mathbf{70}\} = \mathbf{106} \end{aligned}$$

$$\begin{aligned} l'_{21} &= \min\{l_{21}, l_{25} + l_{51}\} = \min\{\infty, \infty + \infty\} = \infty \\ l'_{22} &= \min\{l_{22}, l_{25} + l_{52}\} = \min\{\mathbf{0}, \infty + \infty\} = \mathbf{0} \\ l'_{23} &= \min\{l_{23}, l_{25} + l_{53}\} = \min\{\infty, \infty + \infty\} = \infty \\ l'_{24} &= \min\{l_{24}, l_{25} + l_{54}\} = \min\{\mathbf{52}, \infty + \mathbf{70}\} = \mathbf{52} \end{aligned}$$

$$\begin{aligned} l'_{31} &= \min\{l_{31}, l_{35} + l_{51}\} = \min\{\infty, \mathbf{40} + \infty\} = \infty \\ l'_{32} &= \min\{l_{32}, l_{35} + l_{52}\} = \min\{\mathbf{46}, \mathbf{40} + \infty\} = \mathbf{46} \\ l'_{33} &= \min\{l_{33}, l_{35} + l_{53}\} = \min\{\mathbf{0}, \mathbf{40} + \infty\} = \mathbf{0} \\ l'_{34} &= \min\{l_{34}, l_{35} + l_{54}\} = \min\{\mathbf{83}, \mathbf{40} + \mathbf{70}\} = \mathbf{83} \end{aligned}$$

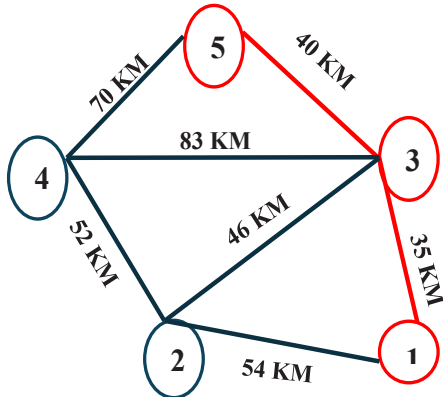
$$\begin{aligned} l'_{41} &= \min\{l_{41}, l_{45} + l_{51}\} = \min\{\infty, \infty + \infty\} = \infty \\ l'_{42} &= \min\{l_{42}, l_{45} + l_{52}\} = \min\{\infty, \infty + \infty\} = \infty \\ l'_{43} &= \min\{l_{43}, l_{45} + l_{53}\} = \min\{\infty, \infty + \infty\} = \infty \\ l'_{44} &= \min\{l_{44}, l_{45} + l_{54}\} = \min\{\mathbf{0}, \infty + \mathbf{70}\} = \mathbf{0} \end{aligned}$$

$$A_5 = \begin{pmatrix} \mathbf{0} & \mathbf{54} & \mathbf{35} & \mathbf{106} & \mathbf{75} \\ \infty & \mathbf{0} & \infty & \mathbf{52} & \infty \\ \infty & \mathbf{46} & \mathbf{0} & \mathbf{83} & \mathbf{40} \\ \infty & \infty & \infty & \mathbf{0} & \infty \\ \infty & \infty & \infty & \mathbf{70} & \mathbf{0} \end{pmatrix}$$

In the matrix A_5 which is also the required matrix “M” the shortest distances from any vertex to any other vertex of the graph are presented.

Some examples of minimum distances from one vertex to another vertex of the graph:

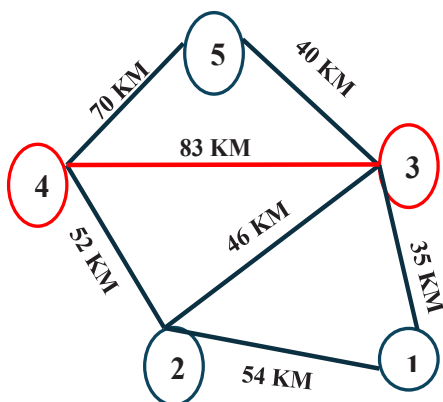
Figure 8: Minimum distance from Tirana to Paskuqan: $l_{15} = 75$ (km)



Source: Author

The Roy-Floyd algorithm allows us to find the minimum distances from any vertex to any other vertex of the graph.

Figure 9: Minimum distance from Durrës to Rreshen $l_{32} = 83$ km



Source: Author

By applying two methods for finding the minimum distances in the graph we have come to the conclusion that:

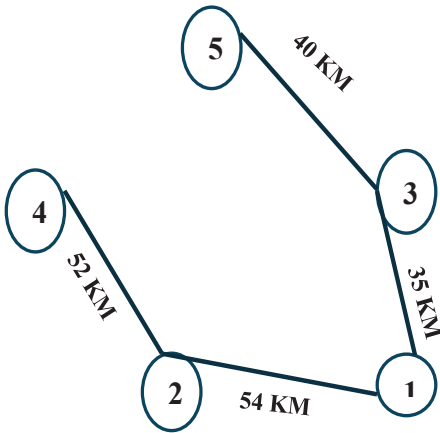
The minimum distance from Tirana to Kruje is $l_{12} = 54 \text{ km}$

The minimum distance from Tirana to Durres is $l_{13} = 35 \text{ km}$

The minimum distance from Tirana to Rreshen is $l_{14} = 106 \text{ km}$

The minimum distance from Tirana to Paskuqan is $l_{15} = 75 \text{ km}$

Figure 10: The final shortest path graph. Minimum distances from a fixed vertex to other vertices of the Graph



Burimi: Autori

4. Conclusion

The two algorithms used have given the same results of the minimum distances from Tirana to the cities of the customers. Considering that the study in our case was to find the minimum distances from a fixed vertex to the other vertices of the graph, namely to find the minimum distances from Tirana to the cities of the customers, the most adequate method would be the Bellman Kallaba Algorithm method. Thus, we have found the shortest routes that will increase the efficiency of the company, by sending the product to the customer's destination faster and minimizing fuel costs and saving time.

The implementation of the Roy-Floyd and Bellman-Kalaba algorithms allows the Lufra company to scientifically analyze the road distances between its distribution points. This calculation helps:

- optimizing the routes of supply vehicles,
- reducing transportation costs,
- faster and more efficient distribution of products,
- making more accurate logistics decisions.

References

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The Role of Managerial Decision-Making in the Internationalization of Albanian SMEs: An Empirical Study

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Abstract

Companies pursue internationalization to achieve strategic objectives, influenced by opportunities in foreign markets and the availability of internal resources. SMEs often initiate international expansion in response to managerial decision-making shaped by internal and external incentives. This study examines the relationship between management decision-making and the internationalization of Albanian SMEs. The analysis is based on data collected through structured questionnaires administered to 200 SMEs registered in Albania, employing 5–249 employees. Micro-enterprises, NGOs, government institutions, farmers, and construction companies were excluded from the sample. The study applies a two-phase analytical approach, beginning with bivariate analysis and followed by a multiple linear regression model to examine the multivariate relationship between internationalization and managerial decision-making. The independent variables include business strategy, target market segment, international objectives, form of internationalization, foreign market information, and the number of international trips undertaken by management. The findings contribute to a better understanding of SME internationalization in Albania and offer practical insights for managerial decision-making.

Keywords: Role, Decision-Making, Internationalization, Albanian SMEs, Study.

1. Introduction

In the current era of globalization, economies are increasingly interconnected through free trade and coordinated policies. Within this landscape, internationalization represents the strategic process by which enterprises increase their participation in global markets to survive and compete. Consequently, this phenomenon has become a focal point for researchers, policymakers, and practitioners alike. Historically, internationalization research prioritized large multinational corporations. However, attention has recently shifted toward small and medium-sized enterprises, whose role in the global economy has grown substantially. Driven by the need to access larger markets, improve performance, and acquire new technologies, SMEs are now internationalizing more rapidly and effectively. A complex interplay of external macroeconomic conditions and internal factors, such as organizational culture, technological resources, and managerial capacity, shapes this process. This study focuses specifically on the internationalization of SMEs in Albania. The research is motivated by a significant gap in the existing literature: while Albanian SMEs are increasingly engaging in cross-border activities, there is a scarcity of empirical work examining the relationship between SME characteristics, decision-making, and

international performance. The economic significance of these firms is profound. According to the Ministry of Finance and Economy's Business Development and Investment Strategy (2021–2027), SMEs constitute approximately 99.8% of all active enterprises in Albania, contributing 73% to the national GDP and 71% to total employment. While 43.4% of these operate in the trade sector and are primarily domestic, strengthening their competitiveness and facilitating access to European and global markets remains a key strategic objective for the country. The primary novelty of this research lies in its empirical examination of Albanian SMEs, specifically investigating how management decision-making influences internationalization success. By addressing this unexplored area, the study aims to provide critical insights into the mechanisms that drive performance in the Albanian context.

2. Literature review

Yet, a universally accepted definition remains elusive. Welch and Luostarinen (1988) describe it as the process by which companies increase their involvement in international operations—a perspective aligned with the foundational Uppsala model by Johanson and Vahlne (1977). Similarly, Calof and Beamish (1995) define it as the adaptation of a company's commercial operations to the international environment. However, aligned with the specific objectives of this research, this study adopts the OECD (1988) definition, which describes internationalization as the process by which a company seeks to compete beyond its national borders. This research specifically focuses on Small and Medium-sized Enterprises (SMEs). While SMEs are generally classified using quantitative and qualitative indicators, such as market position, profits, and capital, the most common metrics are annual turnover and the number of employees. Under current Albanian legislation, the definition is specific: Micro, Small, and Medium-sized enterprises are defined as companies with fewer than 250 employees and an annual turnover or balance sheet total not exceeding 250 million ALL. The primary driver for SME internationalization is the pursuit of new markets to enhance overall performance, often coupled with the need to access technology and knowledge to remain competitive. To capitalize on these opportunities, management must navigate three essential strategic decisions: *market selection*, choosing the target market based on a rigorous assessment of potential benefits, costs, and risks; *timing of entry*: deciding when to enter in early entrants initiate activities before competitors, aiming for first-mover advantages, while late entrants arrive after others have established operations, often to mitigate risk; *scale of entry*: determining the level of resource commitment. A *broad scale* involves rapid penetration and significant resources, while a *narrow scale* allows for a gradual, learning-oriented approach. Figure 1 presents the conceptual framework guiding this research (Source: Hoxholli, 2021). This framework is synthesized from foundational models by Aaby and Slater (1989), Madsen (1989), Bijmolt and Zwart (1994), and Peskova (2006). The review of existing literature suggests that internationalization is driven heavily by internal factors, elements within the control of the firm. Consequently, this study emphasizes optimizing these internal determinants to provide actionable recommendations for managers. Adopting the classification by Bijmolt and Zwart (1994) and Peskova (2006),

the framework categorizes internal factors into: stable factors, fixed elements such as company characteristics and the specific nature of the product/service, and unstable factors, elements that evolve during the process, specifically managerial decision-making and international experience. Based on the literature review, the emphasis on managerial decision-making, and the developed conceptual framework, the study posits that managerial behaviour is closely linked to international performance. To test this relationship, the following main research hypothesis was formulated:

Company management decision-making is not significantly associated with the internationalization of SMEs.

Company management decision-making is significantly associated with the internationalization of SMEs. While the main research hypothesis establishes the overarching relationship between management behaviour and internationalization, the concept of 'decision-making' is a multidimensional construct that cannot be measured by a single metric. Therefore, to ensure empirical rigor and statistical precision, the main hypothesis was operationalized by breaking it down into seven specific, measurable variables identified in the literature review.

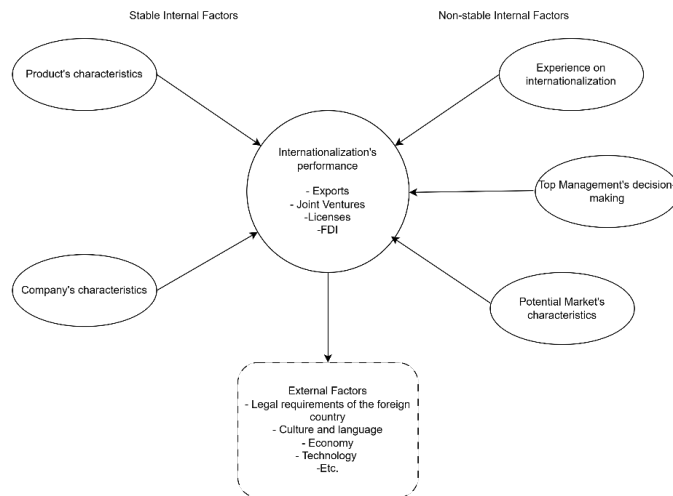


Figure 1. Conceptual framework of internationalization and its role in the SME's performance

Source: Hoxholli (2021)

This decomposition is necessary to move beyond general associations and identify exactly which types of decisions, whether strategic (e.g., defining objectives, segmentation) or operational (e.g., business trips, distribution channels), act as the primary drivers of success. By testing these seven distinct sub-hypotheses, the study aims to provide granular insights and targeted recommendations, rather than a generic conclusion regarding management behaviour:

Sub-Hypothesis	Null Hypothesis Statement
H ₀₁	There is no significant association between the choice of business strategy and the internationalization success of Albanian SMEs.
H ₀₂	The market segment is not significantly associated with the internationalization of Albanian SMEs.
H ₀₃	Distribution channels are not significantly associated with the internationalization of Albanian SMEs.
H ₀₄	The countries where the company chooses to internationalize are not significantly associated with internationalization success.
H ₀₅	The number of trips abroad made by the manager/owner is not significantly associated with the internationalization of Albanian SMEs.
H ₀₆	Foreign market information is not significantly associated with the internationalization success of Albanian SMEs.
H ₀₇	Objectives set on the foreign market are not significantly associated with the internationalization success of Albanian SMEs.

Table 1. Summary of statistical sub-hypotheses that have been tested
Source: Authors

3. Methodology and data

The study utilized a sample of 200 Albanian SMEs, selected using data provided by the Institute of Statistics (INSTAT). In accordance with Law No. 17/2018 "On Official Statistics", INSTAT granted access to anonymized data for research purposes. From this database, a final list of 200 independent Albanian SMEs was compiled. The selection criteria included firms with 5 to 249 employees registered at the National Business Centre; entities such as farmers, construction firms, non-profit organizations, and government institutions were excluded to ensure a homogeneous commercial focus. Data were collected using a highly structured questionnaire, a method selected for its efficiency and consistency in gathering standardized data, as supported by West (1999). The instrument was designed to reflect the specific research objectives and hypotheses. To ensure validity and reliability, a pilot study was conducted with 39 SMEs (representing 20% of the total sample) across various sectors. Following the pilot phase and necessary adjustments, the final version was distributed to the full sample. Consistent with established methodological approaches in the field (Geyer, 2001; Jaupi, 2015), Multiple Linear Regression (MLR) was employed to quantify how management decision-making influences SME internationalization. This statistical technique allows for the estimation of the linear relationship between a dependent variable and multiple predictors. The regression model is expressed as follows:

- X₁, X₂, X₃... represent the independent variables taken into study
- Y represents the dependent variable that we want to predict
- α_0 - constant term
- $\alpha_1, \alpha_2, \alpha_3$ - represent the slope coefficient for each independent variable

The study specifically tests whether the internal factor of “management decision-making” influences internationalization. Table 1 summarizes the research question, the null hypothesis, and the specific independent variables derived from the questionnaire. To provide a comprehensive answer to the research question, the analysis was conducted in two distinct phases: the first phase is the bivariate analysis, this phase examined the individual relationships between each independent variable and the dependent variable (internationalization) using correlation coefficients (Kendall’s Tau), without accounting for the influence of other covariates and the second phase is the multivariate analysis that addressed the complexity of the decision-making process by developing the MLR model described above. This allowed for the isolation of the specific impact of each decision-making variable while holding others constant, providing a robust test of the research hypothesis.

4. Research results

The study’s findings directly addressed the research objective by measuring how SME management decision-making characteristics influence internationalization and success in foreign activities. To test this, the analysis included independent variables such as business strategy, market segment selection, distribution channels, countries of international operation, number of trips, target-market information, and internationalization objectives. Out of 200 SMEs contacted, 164 completed the questionnaire, and only 84 were engaged in international activities. Licensing, joint ventures, and direct investment were used rarely (11 direct investments, 4 licensing, 2 joint ventures), providing insufficient data for reliable statistical analysis. Consequently, correlation coefficients and the multiple linear regression model were applied only to SMEs that internationalize through exports, totalling 67 firms.

4.1 Bivariate analysis

Kendall’s correlation coefficient was used to determine the relationships between SMEs’ management decision-making characteristics, specifically coded as SBIZ (Business Strategy), SEG (Market Segment), OBJ (Foreign Objectives), SHTE (Market Information), and NRT (Business Trips), and their impact on internationalization success. Table 2 visualizes the correlation coefficients on a colour scale from red (-1) to green (+1), with yellow representing 0. This gradient allows for an immediate interpretation of the strength and direction of the relationships: strong negative correlations appear in red; no correlation is shown in yellow, and strong positive correlations appear in green. By cross-referencing the reported coefficients with the study’s definitions, the column acronyms reveal specific dimensions of performance: PERND represents overall internationalization success, KDRE corresponds to management satisfaction, PABS and PREL signify absolute and relative profitability, respectively, AOBJ denotes the achievement of objectives, and INAN measures the intensity of international activities. This visualization facilitates the identification of significant patterns between these specific management decision factors and internationalization outcomes.

N		PERND	AOBJ	KDRE	PREL	PABS	INAN
		67	67	67	67	67	
The country where it is exported	Correlation Coefficient	-0.127	-0.075	-0.026	0.302	-0.145	0.174
	Sig. (2-tailed)	0.268	0.529	0.828	0.009	0.232	0.13
Presence in the market	Correlation Coefficient	0.144	0.296	0.039	0.106	0.069	-0.02
	Sig. (2-tailed)	0.191	0.01	0.733	0.342	0.553	0.859
Distribution channels	Correlation Coefficient	0.064	0.2	0.095	0.072	-0.03	-0.045
	Sig. (2-tailed)	0.563	0.081	0.404	0.516	0.801	0.682
Volume of sales	Correlation Coefficient	0.299	-0.16	0.507	0.015	0.511	-0.062
	Sig. (2-tailed)	0.01	0.183	0	0.9	0	0.598
Company growth	Correlation Coefficient	-0.53	-0.259	-0.3	-0.187	-0.704	-0.15
	Sig. (2-tailed)	0	0.03	0.011	0.108	0	0.195
Market segment	Correlation Coefficient	0.343	0.187	0.107	0.053	0.439	0.05
	Sig. (2-tailed)	0.003	0.12	0.371	0.648	0	0.666
Share of the market	Correlation Coefficient	0.095	0.12	-0.079	-0.132	0.14	0
	Sig. (2-tailed)	0.413	0.319	0.507	0.258	0.257	1
Products	Correlation Coefficient	0.272	0.231	0.22	0.093	0.285	0.051
	Sig. (2-tailed)	0.019	0.055	0.065	0.428	0.02	0.662
Other	Correlation Coefficient	0.263	0.048	0.342	0.203	0.294	0.066
	Sig. (2-tailed)	0.023	0.69	0.004	0.083	0.017	0.572
Objective set on foreign markets	Correlation Coefficient	-0.517	-0.349	-0.357	-0.329	-0.654	-0.237
	Sig. (2-tailed)	0	0.002	0.002	0.003	0	0.032
Years of exporting	Correlation Coefficient	0.137	0.106	0.153	0.067	0.227	0.102
	Sig. (2-tailed)	0.198	0.338	0.162	0.532	0.044	0.339
Business Strategy	Correlation Coefficient	0.245	-0.095	0.396	0.167	0.345	-0.041
	Sig. (2-tailed)	0.028	0.411	0.001	0.138	0.004	0.716
No. years since the beginning of the export.	Correlation Coefficient	0.136	0.08	0.21	0.22	0.056	0.028
	Sig. (2-tailed)	0.221	0.485	0.066	0.048	0.63	0.799

No. of business trips abroad	Correlation Coefficient	-0.184	-0.097	-0.079	-0.315	-0.13	-0.234
	Sig. (2-tailed)	0.084	0.377	0.469	0.003	0.249	0.028

Table 2. Summary of correlation coefficients between elements of management decision-making and internationalization
Source: Authors

The analysis of the correlation matrix confirms that strategic planning factors such as business Strategy, Market Segmentation, and Sales Volume Targets are the strongest predictors of internationalization success for Albanian SMEs, while logistical factors such as distribution channels, country selection, and number of business trips abroad play a lesser role.

Hypothesis	Variable	Result	Statistical results	Interpretation
H1	Business Strategy (SBIZ)	Confirmed	Positive correlations with PERND (0.245), KDRE (0.396), and PABS (0.345)	Selecting the appropriate business strategy improves Absolute Profitability and Management Satisfaction, leading to higher Overall Performance.
H2	Market Segment (SEG)	Confirmed	Positive correlations with PABS (0.439) and PERND (0.343)	Choosing the correct market segment is crucial for economic stability, showing a strong link specifically to the firm's Absolute Profitability.
H3	Distribution Channels	Not Significant	All cells in the row are yellow ($p > 0.05$)	The choice of distribution channel does not statistically impact any dimension (Intensity, Profitability, or Satisfaction).
H4	Country Selection	Partially Confirmed	No relationship with PERND, but a link to PREL (0.302)	The country's exports do not drive overall success, but they do affect Relative Profitability, likely due to varying costs/margins across domestic and foreign markets.
H5	Business Trips (NRT)	Partially Confirmed	No relationship with PERND; negative link to PREL (-0.315) and INAN (-0.234)	Business trips do not increase success; frequent travel negatively correlates with Relative Profitability and Intensity, likely due to travel costs.
H6	Market Information (SHTE)	Confirmed	Significant positive correlations with PERND (0.272) and KDRE (0.342)	Possessing accurate market information significantly increases Overall Performance and Management Satisfaction by enabling better planning.
H7	Objectives (OBJ)	Confirmed	Strongest correlations in the study: Growth (0.530) and Sales Volume (0.511)	Setting targets for Growth and Sales is the strongest driver of Absolute Profitability, whereas failing to set objectives actively destroys value.

Table 3. Summary of hypothesis verification for management decision-making and internationalization success
Source: Authors

The main research hypothesis of this study, that management decision-making has no significant impact on SME internationalization, is rejected based on the results of all seven statistical sub-hypotheses. The findings show clearly that strategic decisions are the primary drivers of international success. Business strategy, market segmentation, market information, and objective setting all show significant positive correlations, indicating that actions such as defining sales targets ($r = 0.511$), pursuing

company growth ($r = 0.530$), and gathering competitive intelligence substantially improve absolute profitability and management satisfaction. In contrast, operational and logistical decisions such as distribution channels, country selection, and business trips were non-significant or affected only secondary dimensions like relative profitability. This suggests that, for Albanian SMEs, the mechanics of exporting play a limited role compared to the impact of strategic planning. Management decision-making has a significant and positive effect on the internationalization of Albanian SMEs, particularly when it focuses on strategic planning, goal setting, and market intelligence rather than logistical or operational choices.

4.2 Regressive analysis

The correlation table above has demonstrated a statistically significant relationship between certain dimensions of SME management decision-making and internationalization. To investigate whether these factors influence the prediction of internationalization, we examined a multiple linear regression model. In the analysis for building the model, through which we analysed the impact that management decision-making regarding the international activities of SMEs has on internationalization, we considered the following independent variables: business strategy, market segment targeted, objectives set in the foreign market, number of target markets, information on the foreign market, and number of business trips abroad. By analysing this model, we test the following hypothesis:

H_0 : The model is globally insignificant.

H_1 : The model is globally significant.

Theoretically, the linear form of the multilinear regression model is:

The table below presents the data generated by the SPSS program, which was used to test the hypothesis:

Model	R	R2	R2 corrected	Estimated standard error
1	.728a	.530	.483	1.95045

Independent Variables: (Constant), SHTE, SBIZ, NRT, TSY, SEG, OBJ

Table 4. Summary of the model

Source: Authors

The significance of the hypothesis for the model was tested, and since the significance coefficient (Sig.) is less than 0.05, the null hypothesis is rejected, supporting the alternative hypothesis. The model is globally significant, and the independent variables related to management decision-making exhibit a significant linear relationship with the dependent variable. Thus, internationalization can be predicted based on management decisions.

	Sum of squares	Df.	Square Average	F Report	Sig.
Regression	257.361	6	42.893	11.275	.000 ^b
Residual	228.255	60	3.804		
Total	485.616	66			

Dependent Variable: Internationalization

Independent Variables: (Constant), SHTE, SBIZ, NRT, SEG, OBJ, TSY

Table 5. ANOVA for the model**Source: Authors**

An econometric model was developed using estimated coefficients to predict internationalization as a function of SME management decision-making in international activities.

Model	Non-standard coefficients		Standard Coefficients	Report (t)	Sig.
	B	Std. Error	Beta		
(Constant)	2.105	2.104		4.001	.021
TSY	.916	1.042	.081	2.879	.003
SEG	-.221	.602	-.039	-3.367	.015
OBJ	1.975	.308	.602	6.416	.000
SBIZ	-.933	.388	-.218	-2.408	.019
NRT	.747	.211	.347	3.545	.001
SHTE	.423	.114	.378	3.823	.001

a. Dependent Variable: Internationalization

Table 6. Model's coefficients**Source: Authors**

The model is globally significant (), indicating that SMEs' internationalization can be successfully predicted based on the top management's decision-making process. As indicated by the coefficient of determination (R^2) in Table 4, approximately 53% of the variation in internationalization is explained by the variables related to management decision-making. Furthermore, as shown in Table 6, all independent variables have a significance level less than 0.05, confirming that they are statistically important contributors to the model. Consequently, a multiple linear regression equation was developed to predict internationalization success. Based on the estimated coefficients, the final predictive equation is

$$\text{Internationalization} = 2.105 + 1.975(\text{OBJ}) + 0.916(\text{TSY}) + 0.747(\text{NRT}) + 0.423(\text{SHTE}) - 0.933(\text{SBIZ}) - 0.221(\text{SEG})$$

The regression analysis confirms a significant relationship between management decision-making and internationalization performance. Holding other variables constant, setting appropriate objectives proves to be the strongest predictor, increasing the likelihood of success by 1.975 for each unit increase. Similarly, expanding the number of target markets, increasing business trips, and gathering market information positively boost success by 0.916, 0.747, and 0.423, respectively. Conversely, the negative coefficients for Business Strategy (-0.933) and Market Segment (-0.221) indicate that inappropriate choices in these areas lead to a measurable decline in performance. In conclusion, all predictor variables are statistically significant, confirming that specific management decisions are critical determinants of internationalization success.

5. Conclusion and recommendations

Based on empirical analysis, the main research hypothesis, that management decision-making has no significant impact on SME internationalization, is rejected. The multiple linear regression model was highly significant, explaining 53% of the variance in international success, and the findings reveal a clear hierarchy: strategic decisions are the primary drivers of success, while operational and logistical factors play a much smaller role. Strategic decision-making emerges as the strongest predictor of international performance. Establishing measurable objectives, particularly for sales volumes and company growth, is the single most powerful driver of internationalization. By setting clear targets, SMEs increase absolute profitability, maintain control of growth, and improve management satisfaction, as activities are objectively profitable. Similarly, selecting the right business strategy directly influences management satisfaction and relative profitability, ensuring that international operations are not only active but also more profitable than domestic alternatives. Market segmentation also plays a crucial role: targeting the appropriate foreign customer base strengthens absolute profitability and stabilizes export operations. Gathering detailed market information before initiating international activities further boosts success, as SMEs that base decisions on competitive intelligence and consumer insights perform better than those relying on intuition. In contrast, operational and logistical factors have limited or non-significant effects. The choice of distribution channels, whether agents, intermediaries, or direct sales, does not significantly affect outcomes, suggesting that different channels provide similar opportunities for Albanian SMEs. Cultural distance or the selection of countries with closer cultural alignment does not guarantee higher success, reflecting the permeability of cultural barriers in today's globalized economy. The number of business trips shows little correlation with overall success, as modern tools such as e-commerce and e-banking allow managers to efficiently oversee international activities without frequent travel. Prior experience in foreign markets similarly does not guarantee better performance, indicating that even "born-global" firms can succeed if their current strategic decisions are sound. These findings provide clear guidance for both SME managers and the public sector. For SMEs, success depends on prioritizing the pre-entry phase of international activities and focusing on strategic planning rather than operational logistics. Management should invest in understanding market conditions, consumer needs, and pricing, while setting measurable targets for growth and sales to ensure international activities generate absolute profitability. For the public sector, support should focus on enhancing management capacity through training and consultancy, providing accessible market and regulatory information, and facilitating financial and networking opportunities such as international fairs and regional exchange events. Future research should adopt longitudinal approaches to track SME performance over time, identify barriers, and assess the long-term impact of public support programs. In conclusion, management decision-making has a significant and positive effect on the internationalization of Albanian SMEs, and its impact is greatest when decisions emphasize strategic planning, setting goals, and market intelligence rather than operational or logistical considerations.

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Minimalist Expression and Emotional Sensibility in Kosovan Film: A Critical Analysis

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Abstract

This study examines the impact of minimalist expression on emotional sensitivity within Kosovan cinema, focusing on the short film *Pa Vend*. The research aimed to elucidate the formal techniques of visual and auditory minimalism, investigate their role in fostering psychological depth and cultural memory, and situate Kosovan cinema within the broader debate on global minimalist aesthetics. A qualitative methodology was used, including textual and visual evaluations of fifteen selected characters from the film. The methodology consisted of three phases: (1) a formal analysis of cinematic elements, including framing, sound, editing, and *mise-en-scène*; (2) an interpretive analysis of how these elements generated empathy, introspection, and collective memory and (3) a comparative contextualization employing interdisciplinary perspectives from psychology, media studies, and aesthetics. The results showed that minimalist techniques including silence, absence, static framing, muted color palettes, and soft music made feelings stronger instead of weaker. Using quiet and few pictures moved the attention to little gestures, symbolic imagery, and emotions, giving commonplace places cultural and psychological meaning. These ways of thinking made it seem like suffering, moving, and being strong were all part of a movie following the war in Kosovo. The study showed that *Pa Vend*'s core idea has made stories better by establishing settings that let people experience, think about, and interact with diverse cultures. This contribution was both theoretical and practical; it expanded debates on the emotional impact of minimalism in global cinema and acknowledged Kosovan film as a significant addition to global aesthetic discourse. Future research should include cross-cultural audience analysis and experimental approaches to more accurately evaluate the emotional effectiveness of minimalist tactics.

Keywords: Minimalist Cinema, Emotional Sensibility, Kosovan Film, Symbolism, Aesthetics
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1. Introduction and background

Minimalist expression in film is recognized as one of the most powerful tools for generating emotional depth through restraint, silence, and the reduction of cinematic elements. Many researchers have argued that minimalism was not merely an artistic tendency but an aesthetic philosophy that reshaped how viewers engaged with image, sound, and narrative (Zempelin, Sejunaite, Lanza, & Riepe, 2021). Minimalism provided a framework in which the absence of excess created space for contemplation, intensifying emotional sensibility by directing attention to small gestures, subtle visuals, and ambient silence (Yang, 2019). In this sense, it also connected to traditions of silent cinema, where narrative meaning was constructed through visual form and the resonance of stillness (Wester & Wejlander, 2024).

From a psychological perspective, a large number of researchers have shown that film viewing stimulates measurable emotional reactions in audiences, often captured through facial expressions and physiological indicators (Zempelin,

Sejunaite, Lanza, & Riepe, 2021). Minimalist films, by reducing narrative and sensory overload, have directed viewers' emotions toward empathy, introspection, and memory. Emotional resonance has been further amplified through the careful use of minimalist soundscapes and musical scores, which have guided the spectator's inner journey from repression toward realization (Eaton, 2008). In Kosovan cinema, these mechanisms have become particularly evident in the representation of silence, absence, and trauma, where minimalist expression has served to evoke collective memory and unresolved histories (Best, 2011). From a cultural and national perspective, we conclude that Kosovan cinema was born in the aftermath of conflict, where directors employed minimalist strategies to convey fragility, displacement, and resilience. Thus, symbolic imagery, prolonged takes, and visual austerity were used to communicate collective experiences of mourning and survival, situating local cinema within broader international trends of art cinema and post-minimalist aesthetics (Geffken, 2024). Thus, Kosovan short and art films connected national narratives with global discourses on memory, identity, and emotional storytelling, offering a unique case of how minimalism intersected with cultural sensibility.

The aim of the study was to examine how minimalist expression shaped emotional sensibility in Kosovan film. Specifically, this study aimed to identify the formal strategies of visual and auditory minimalism, to analyze their role in evoking psychological depth and cultural memory, and to situate Kosovan cinema within broader debates on global minimalist aesthetics. In this way, through this research, the intention was to demonstrate that minimalist form not only amplified individual emotional responses but also carried collective meaning within Kosovo's postwar cultural landscape.

Methodology – The study adopted a qualitative research design grounded in film analysis. The selected case was the short film *In Postwar Kosovo* (2021), which gained international recognition through a nomination at the European Film Academy Awards during the Cannes Film Festival and a Special Mention at the Sarajevo Film Festival. The methodological approach relied on textual and visual analysis to examine how the film employed minimalist strategies—including prolonged silences, symbolic absence, austere mise-en-scène, and restrained soundscapes—to construct emotional resonance.

The methodology consisted of three stages:

1. Formal Analysis – the systematic identification of minimalist cinematic elements in framing, sound, editing, and narrative structure.
2. Interpretive Analysis – the evaluation of how these elements functioned to evoke emotional depth, empathy, and cultural memory within the Kosovan postwar context.
3. Comparative Contextualization – the positioning of the findings within global minimalist aesthetics and prior scholarship on emotional sensibility in cinema, drawing on interdisciplinary references from psychology, media studies, and aesthetics.

Through this methodological approach, the study ensured both empirical rigor in the description of formal strategies and theoretical depth in linking these strategies to broader aesthetic and cultural debates.

Research Question

- To what extent and in what ways had minimalist expression shaped emotional sensibility in Kosovan cinema, and how had it mediated psychological depth and cultural memory in the postwar context?

This study generated several important scientific contributions, while also facing certain limitations. It contributed to theoretical discussions on the emotional functions of minimalism in film, demonstrating that aesthetic reduction was not merely a stylistic choice but a powerful mechanism for evoking emotional resonance and cultural memory. By analyzing silence, absence, and symbolic austerity, it provided empirical insight into how minimalist strategies shaped audience perception and positioned Kosovan cinema within international debates on minimalist aesthetics.

2. Literature review

For a very long time, it has been acknowledged that movies have the power to evoke strong feelings in individuals, alter their cultural identities, and bring back memories of times gone by. Films are said to work as “emotion machines,” influencing audiences via elaborately structured narratives and formal structures, according to a considerable body of research that spans various domains, including clinical research, aesthetics, media studies, psychology, and tourism. According to a number of studies, the narrative of a movie and the production process of the movie may both have an impact on how people feel about it. Through the cultivation of empathy, the improvement of relationships, and the promotion of personal progress, character development, controlled aesthetics, and simplicity may all work together. According to the findings of psychophysiological research, films have the ability to evoke emotional responses that are distinct across all stages of life. With quantitative changes evident in self-reports and facial recognition technologies, validated video segments have demonstrated the potential to trigger fundamental emotions such as wrath, contempt, pleasure, and sadness in both younger and older persons during controlled trials (Youvan, 2024). These emotions include rage, scorn, joy, and grief. The relationship between subjective and objective evaluations that are influenced by personality variables demonstrates that cinema has the potential to be used as a therapeutic approach due to its ability to induce a certain mood.

The advancements that have been achieved in computer vision and systems modeling, in conjunction with static assessments, have made it feasible to observe the changes that occur in people’s facial expressions while they are viewing a movie (Jeganathan, Campbell, Hyett, Parker, & Breakspear, 2022). The findings of the research indicate that in spite of the fact that all individuals experience emotions concurrently and under comparable conditions, those who suffer from depression have dramatically different responses. Therefore, paradigms that are based on films have the potential to assess whether or not individuals exhibit genuine emotional reactions. The inability to recognize or generate facial expressions is a symptom of autism spectrum disorder, which illustrates that the ability to both recognize and make facial emotions is an essential component of being able to connect with other people. The findings of this study offer a training hierarchy that is intended to enhance the emotional

competence of susceptible persons via the use of filmic stimuli. These stimuli include both straightforward posed photos and complicated cinematic settings that include a variety of contextual variables. This sector has benefited greatly from the use of artificial intelligence. At this time, it is possible to ascertain a person's emotional condition by studying face pictures and film evaluations. This is due to the fact that algorithms that determine how individuals feel utilize models that are both robust and lightweight within their framework. The use of these computational methodologies places cinematic-emotion research at the intersection of artificial intelligence and psychology, showing the potential for both therapeutic and commercial applications of the field. There is a lot of interest in the field of cinema studies right now on minimalism as a style of filmmaking. The reoccurring melodies, drone harmonies, and ambient sounds that may be heard in film soundtracks are a great example of the intricacy of psychological stories (Smith, 2022). Studies on minimalist scoring in narrative and documentary settings imply that these techniques may elicit existential disquiet, contemplative stillness, and human vulnerability (Ponce, 2016). A number of studies have been conducted on that topic. The versatility of minimalist sound design is shown by the fact that it may be effectively used in a wide variety of film genres. The technology was once innovative, but now it is little more than a means by which individuals may communicate with one another in the film industry.

It's possible that the minimalist approach may be successful in a number of different fields, such as art, philosophy, and technology. This assists individuals in comprehending topics that are difficult to comprehend. In order to demonstrate that aesthetic minimalism is more than simply a passing trend, these strategies place an emphasis on fundamental form and effect. They demonstrate that aesthetic minimalism is a psychological tool that encourages cognition and emotional involvement with visual stimuli. According to the findings of a theoretical and historical investigation, the earliest application of minimalist themes in humanistic and artistic realms as metaphors for automatism, alterity, and repetition in popular culture was discovered. The word "Filminimalism" has been used in recent academic discussions to define postminimalist techniques in contemporary Hollywood film scoring, particularly those applied by Jóhann Jóhannsson, Trent Reznor, and Mica Levi specifically. Despite the fact that the Golden Age was characterized by the prevalence of complex orchestration, these two eras are remarkably distinct from one another. It is very obvious that they make use of peculiar instruments, fundamental textures, and fabricated sounds. Research has shown that some individuals have a more difficult time emotionally engaging with certain pieces of music due to the presence of embodied simulation and multimedia incongruence elements. In the context of wider conversations about the connection between art and emotions, unconventional interpretations of minimalism are adding to the conversation. A reassessment of works of art from the avant-garde and late modern periods reveals that austerity and reduction heighten emotional responses, so challenging the notion of affectlessness (Best, 2011). The continuing significance of minimalism and abstraction in the development of culture and in human perception has been shown by research that draws from a variety of disciplines.

Expressions of the Arts, Narratives, and the Subtle Refinement thereof - According to research conducted on the aesthetics of silent cinema, symbolic representation, exaggerated acting, camera placement, and mise-en-scène are all ways in which

meaning may be communicated without the need of spoken dialogue, which is comparable to the concept of aural minimalism.” These results provide credence to the idea that the use of visual austerity has a substantial impact on narrative, hence modifying the emotional reaction and understanding of the spectator. These strategies are still commonly employed in movies today, particularly when it comes to depicting “silent heroes” who communicate without words via the use of powerful body language (Epton, 2024). Based on the findings of research conducted on the formal aspects of cinema, it has been determined that aesthetic selection has a significant impact. There are a number of factors that may influence how involved and empathetic you feel, including the size of the shot, the quality of the editing, and the clarity of the visuals. It is up to the tale to decide how severe these consequences are, but in most cases, they are not quite as severe as they might be (Lankhuizen, 2025). The findings of this research lend credence to the notion that cinematic experiences are formed by the interaction between form and content, with the participation of audiovisual components that amplify the portrayal of events and the emotional resonance they evoke.

The cinema of Kosovo is renowned for its uncomplicated images and lack of meaning, particularly in the short films that were produced following the conflict. There are themes of loss, diaspora, and strength that are expressed via the use of desolate locations, extended silences, and shattered mise-en-scene. These methods demonstrate a minimalist approach that is prevalent all across the globe and is specific to each culture. The fact that their films deal with concerns of national identity is the reason why people have such a strong emotional connection to them. There are three things that make a tale more interesting: the people, the vacation sites, and the method by which the audience is engaged. Many individuals consider them to be instances of real-life situations and locations where they might acquire knowledge about topics that aren’t already in their minds (Smith, 2022). According to research on tourism, persons who participate in illegal activities have the potential to increase the attraction of a location by surprising, intriguing, and captivating tourists (Yao & Yang, 2024). These findings are said to be impacted by justice sensitivity, according to structural theories, which suggests that individual moral predispositions have an effect on the translation of cinematic experiences into behaviors that occur in the real world.

It has been shown via research on a variety of film genres that cinematic emotion is intricate. Studies have shown that horror films are more exciting and enjoyable when they have elements of dread and realism, but horror films are less exciting and fun when they contain elements of disgust (Kiss, Deak, Veszprémi, Blénessy, & Zsido, 2024). According to the findings of a developmental study on aesthetic pleasure (Geffken, 2024), the affective experience of cinematic experiences develops from simple emotional reactions during infancy to more complex cognitive processing throughout the adolescent years. Overall, our findings indicate that film genre conventions and developmental trajectories have a significant impact on the degree to which films are able to keep the attention of audiences in a variety of different ways. The Movies Have the Potential to Be Both Reverential and Therapeutic Researchers have also investigated the potential health benefits that going to the cinema may offer. Another method for coping with feelings of melancholy is cinematherapy. Through the process of being emotionally invested and immersed in the narrative, it assists

individuals in working through their thoughts and gaining a better understanding of their stories. In the future, there will be a combination of virtual reality and artificial intelligence. The ability to utilize it will be available to anybody who want more customized and immersive experiences.

A number of studies have been conducted to study the significance of religious components in films. It has been found via research conducted on both ancient and modern religious films that the use of symbolic metaphors, the representation of rituals, and the investigation of religious topics have the potential to contribute to the preservation of cultural heritage, the criticism of society, and the satisfaction of spiritual needs (Hua, 2025). Through the portrayal of a wide range of values, including cultural, societal, and individual viewpoints, these tactics illustrate how cinema may be used to confront existential and moral concerns. One such aspect that is investigated by cinema studies is the manner in which films depict significant historical and cultural events. Among the things that fall within this category are minimalist expressiveness, emotional history, and cultural memory. In French poetic realism, you may be able to grasp how creative form and national sensibility are connected in order to get an understanding of how realist and poetic methods work together to generate cultural meaning. The simple expressiveness of Kosovar films, according to similar points of view, shows both the individual hardship and the collective resilience of the people inside the country. An additional point to consider is that research conducted on aesthetic participation in postmodern and contemporary art has shown that feelings are an important component of the creative process (Best, 2011). It is not the case that minimalism, tranquility, and austerity indicate a lack of feeling; rather, they modify the environments in which emotions are evoked and interpreted. Kosovan films, which are characteristic of having few words, minimal settings, and symbolic themes, contribute to the tradition by demonstrating that a less cinematic approach may actually add to the emotional depth of a film rather than taking away from it. The majority of this more extensive part is devoted to discussing the location of the Kosovo film. There are a number of short films from Kosovo that deal with topics such as loss, persistence, and memory in a straightforward manner. These films make use of techniques such as limited images, symbolic absence, and lengthy silences. In this way, individuals are able to demonstrate their cultural identity and how they align with the current worldwide trend toward minimalism. This is consistent with the findings of earlier research that imply that minimalism may have a significant impact on mental health, encourage conscious engagement, and convey captivating stories with little elaboration (Wester & Wejlander, 2024). When it comes to explaining how people remember things and what it means to be a citizen of Kosovo, Kosovar filmmakers convey it using fundamental ways. Because of this, it is now much simpler for folks to talk about the ways in which simple films may alter the way people think and feel all over the world, even in Kosovo.

3. Film analysis

To meet the aim of this study and its central research question, a visual analysis of fifteen figures from *Pa Vend* (Displaced, 2021) had been conducted. The figures illustrated key minimalist techniques visual austerity, symbolic absence, restrained sound, static framing, and muted color—which, through formal, interpretive, and

comparative analysis, had shown how silence and reduction amplified emotional resonance and cultural memory. The study demonstrated that minimalist expression in *Pa Vend* intensified narrative power, opening space for empathy, reflection, and collective identity.

The poster of *Pa Vend* adopts a minimalist graphic style, eliminating facial features and reducing forms to abstract shapes and colors. This aesthetic choice echoes the broader discourse on minimalism as an art philosophy, where the absence of detail directs attention to symbolic structures (Chase, 2020). The faceless figures reinforce the theme of displacement and anonymity, aligning with Kosovan cinema's tendency to externalize collective trauma through visual reduction (Andrew, 2021).



Figure 1. Film poster of *Pa Vend* – minimalist graphic representation as entry point for formal analysis

The confined, dimly lit garage functions as an austere mise-en-scène, where silence and darkness dominate the frame. Minimalist strategies such as visual emptiness and spatial reduction guide the spectator's affective engagement by emphasizing absence rather than presence (Yang, 2019). From a methodological perspective, this scene illustrates the formal analysis of setting, showing how space itself becomes an emotional signifier in postwar Kosovan cinema (Wester & Wejlander, 2024).



Figure 2. Closed garage space – visual austerity and symbolic absence in mise-en-scène

The duel framed by shadow and partition exemplifies how minimalism can generate tension through fragmentation rather than action. By limiting sensory input, the scene channels psychological intensity and highlights endurance as a theme (Eaton, 2008). The reduced composition resonates with theories of aesthetic economy, where even small gestures acquire symbolic depth (Chase, 2020).



Figure 3. Ping-pong duel in darkness – fragmented framing as formal strategy of tension

The static shot of a road intersected by wires represents minimalism’s capacity to transform landscapes into meditations on absence and isolation. Such images correspond to findings that reduced visual complexity encourages introspection and contemplative engagement (Lankhuizen, 2025). The lack of human presence situates the viewer in an open interpretive space, consistent with art cinema’s use of landscape minimalism to evoke cultural memory (Webster, Wang, & Li, 2021).



Figure 4. Mountain road with electric wires – static landscape shot as minimalist visual reduction

The barren field and lone chair symbolize emptiness, displacement, and unresolved histories. Minimalist strategies of visual austerity amplify emotional resonance by foregrounding absence over action (Best, 2011). As psychological studies show, sparse stimuli can intensify emotional processing (Jeganathan, Campbell, Hyett, Parker, &

Breakspear, 2022). This scene embodies Kosovan cinema's effort to express postwar trauma through minimalist symbolism (Geffken, 2024).



Figure 5. Dried field with solitary chair – symbolism of absence and displacement

The restrained dialogue and prolonged silences in this scene exemplify narrative economy, where minimalist soundscapes direct attention to the characters' inner states (Yang, 2019). Research on minimalist scores confirms that repetition and reduction can externalize psychological journeys (Ponce, 2016). Here, the everyday act of driving becomes a space for reflection, aligning with Kosovan film's exploration of fragility and resilience through understated expression (Geffken, 2024).



Figure 6. Two protagonists in the car – restrained dialogue and silence as narrative economy

The empty hall conveys paradoxical grandeur and absence, using minimalism to critique cultural rituals disrupted by dislocation. The mise-en-scène emphasizes silence and space, echoing silent cinema's strategies of meaning through visual form (Wester & Wejlander, 2024). This aligns with interpretive analysis, where cultural spaces are stripped of their social function, amplifying collective memory of disruption (Andrew, 2021).



Figure 7. Empty wedding hall – visual austerity as cultural critique

The same hall, bathed in cold blue light, illustrates how minimalist manipulation of color and illumination shapes atmosphere. Studies on minimalist art suggest that reduced palettes deepen affective responses (Best, 2011). The transformation of the same setting underscores comparative contextualization, situating Kosovan film within global minimalist aesthetics that use light and color as emotional strategies (Youvan, 2024).

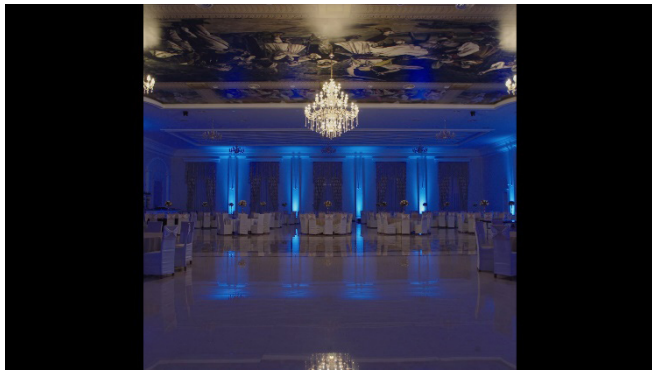


Figure 8. Wedding hall under blue lighting – minimalist play of color and atmosphere
The silhouette of the building against the fading light exemplifies minimalist landscape composition. As research shows, static visuals with low complexity foster reflective engagement (Lankhuizen, 2025). The absence of movement or dialogue directs viewers toward contemplation, echoing the traditions of poetic realism and art cinema as affective strategies (Andrew, 2021).



Figure 9. Building at sunset – landscape minimalism and symbolic horizon

The frontal, austere framing conveys rigidity and discipline, transforming a simple group shot into a meditation on endurance and survival. This visual minimalism aligns with theories of embodied simulation, where reduction invites viewers to project meaning onto static figures (Chase, 2020). Within the Kosovan context, the image reflects collective efforts to preserve continuity despite displacement (Geffken, 2024).



Figure 10. Children and coach at the ping-pong table – austerity in framing and social memory

The subdued lighting and restrained dialogue highlight introspection and nostalgia. Research confirms that minimalist sound and silence intensify memory and emotional resonance (Best, 2011). This interpretive moment exemplifies how minimalist cinema mediates between personal reflection and collective identity (Smith, 2022), situating Kosovan narratives in the global discourse on affective storytelling.



Figure 11. Men in the bar – subdued lighting and restrained dialogue reflecting introspection

The stillness of the snow-framed doorway underscores minimalism’s connection to silence and frozen temporality. Such symbolic images operate within cultural and religious traditions, where austerity conveys endurance and transcendence (Hua, 2025). From a methodological perspective, the formal analysis of static framing demonstrates how absence can become a vehicle for emotional depth (Wester & Wejlander, 2024).

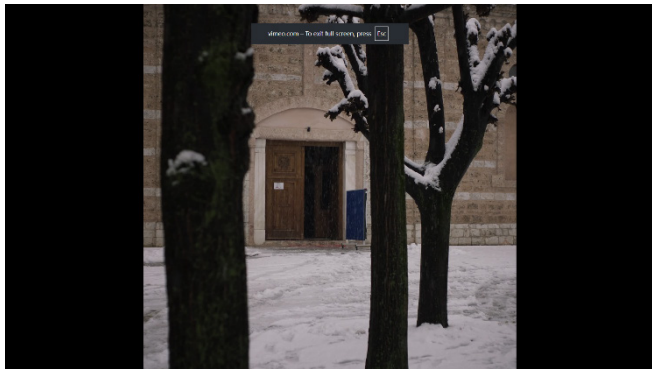


Figure 12. Snow-covered doorway – visual stillness as cultural and historical reference
The striking red umbrella against a monochrome landscape exemplifies minimalist symbolism, where a single element acquires heightened emotional meaning. Similar to findings on minimalist art’s capacity to intensify affect through contrast (Best, 2011), this frame evokes fragility, displacement, and resilience in the postwar context (Geffken, 2024).



Figure 13. Man under red umbrella on snowy street – symbolic image of fragility and resilience

The image of the protagonists covered in snow illustrates endurance under hardship, where silence and austerity become metaphors for survival. Psychological studies confirm that reduced but emotionally charged stimuli foster empathy and introspection (Zempelin, Sejunaite, Lanza, & Riepe, 2021). Here, minimalism amplifies emotional sensibility by externalizing the characters' vulnerability.



Figure 14. Two protagonists in heavy snowfall – silence and endurance as emotional depth

4. Results

The results of the analysis had emerged from the three methodological stages—formal analysis, interpretive analysis, and comparative contextualization and were illustrated through fifteen selected figures from *Pa Vend* (Displaced, 2021). Collectively, these results had demonstrated how minimalist strategies had shaped emotional sensibility in Kosovan film by transforming silence, absence, and reduction into carriers of psychological depth and cultural memory.

Formal Analysis: Figures such as the poster (Fig. 1), the closed garage (Fig. 2), and

the ping-pong duel in darkness (Fig. 3) had shown how minimalism operated at the level of framing, space, and composition. Reduced visual detail, austere settings, and fragmented imagery had guided attention away from spectacle and toward symbolic interpretation, echoing prior research on aesthetic economy (Best, 2011). Similarly, the road with electric wires (Fig. 4) and the solitary chair in the field (Fig. 5) had demonstrated how landscapes and objects, when stripped of human presence, had been transformed into symbolic markers of trauma and displacement (Lankhuizen, 2025).

Interpretive Analysis: Emotional depth had been highlighted in figures where silence and restrained soundscapes shaped character experience. The two protagonists in the car (Fig. 6) and the empty wedding hall (Fig. 7) had revealed how silence and absence functioned as narrative tools of fragility and resilience (Wester & Wejlander, 2024). The blue-lit hall (Fig. 8) and the building at sunset (Fig. 9) had illustrated how minimalism in lighting and color created atmosphere and emotional resonance (Youvan, 2024). Similarly, the children with coach (Fig. 10) and the men in the bar (Fig. 11) had embodied memory, nostalgia, and survival, reinforcing cinema's role as a mediator between individual and collective identity (Smith, 2022).

Comparative Contextualization: When situated within global minimalist aesthetics, several figures had reinforced Kosovan cinema's distinct voice. The snow-covered doorway (Fig. 12), the man with the red umbrella (Fig. 13), and the two protagonists in snowfall (Fig. 14) had symbolized endurance, fragility, and resilience, resonating with broader minimalist strategies documented in art cinema and modernist traditions (Best, 2011). Finally, the title frame (Fig. 15) had condensed the film's thematic concerns into minimalist typography and space, connecting the local narrative of displacement with international cinematic discourse (Youvan, 2024). The results had shown that minimalist expression in *Pa Vend* had not reduced narrative power but had intensified it, producing emotional sensibility through silence, absence, and austerity. By transforming ordinary spaces and gestures into sites of contemplation, the film had amplified empathy, reflection, and cultural memory, thereby directly addressing the research question: minimalist expression had shaped emotional sensibility in Kosovan cinema by mediating psychological depth and embedding postwar trauma into visual and auditory reduction.

5. Summary and conclusions

With the use of the short film *Pa Vend* (Displaced, 2021), this research had analyzed the ways in which minimalist expression had influenced the emotional sensitivity of Kosovar cinema. Silence, absence, austere mise-en-scène, restrained soundscapes, and muted color palettes are all expressions of minimalism. A rigorous visual examination of fifteen figures proved that this style had the opposite effect, increasing the narrative strength.

Through an emphasis on nuanced movements, static framing, and symbolic images, the results demonstrated that minimalist design enhanced psychological depth. According to earlier studies that emphasized the "emotion machine" function of cinema, these techniques have mediated emotional resonance, leading viewers to

experience empathy, reflection, and memorization.]. In the postwar Kosovar film, minimalism was a cultural instrument that incorporated themes of displacement, pain, and resilience into the medium. This aligns with larger conversations about how symbolic absence and visual austerity externalize communal memory.

In addition, the findings were in agreement with the research that has been conducted on minimalist music and sound, which posits that repetition and reduction serve as vehicles for psychological journeys. A similar connection has been made between the visual methods of quiet and stillness and the traditions of silent film. Additionally, these strategies have been linked to current theories of affect, where austerity and reduction are used to heighten emotional involvement. The research has established that minimalist expression is not just a preference in terms of aesthetics, but also a psychological and cultural approach that resonates across settings. This was accomplished by positioning Kosovan cinema within these global discourses. In the future, research should include cross-cultural audience studies and experimental measurements in order to investigate the ways in which minimalist tactics create emotional reactions in a variety of cultural contexts. In order to get comparative insights into the ways in which Kosovan cinema engages with other post-conflict film traditions, expanding beyond a single case study would be beneficial. In addition, the emotional effect of minimalism might be better understood by the use of multidisciplinary methodologies that combine cinema theory, psychology, and affective computing. The film *Pa Vend* has showed substantial scientific worth by serving as an example of how minimalist cinema acts as a phenomenon that is both artistic and socio-cultural. It had provided empirical evidence that visual and auditory reduction could amplify emotional sensibility, it had contributed to theoretical debates on the affective power of minimalism in film and it had positioned Kosovan cinema as a meaningful participant in international cinematic discourse. This film demonstrated that minimalism might be used as a medium for healing, introspection, and cultural memory. It did this by converting silence and absence into expressive instruments. As a result, the film reinforced the function of cinema as both an artistic and scientific lens on human experience.

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Cancer Registry in the University Hospital Center 'Mother Teresa' and its Deficiencies in reflecting information on patients diagnosed with malignant Neoplasms

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Abstract

The cancer registry is an information system created to collect, store, manage, and analyze data on patients diagnosed with malignant neoplasms. According to GLOBOCAN in 2022, 8019 tumor cases (4587 males and 3432 females) were diagnosed in Albania. The age-standardized incidence is 176.9 for males and 147.7 for females, with a rate of 160.8 per population in Albania. In males, the most common malignant tumors are those of the lungs, stomach, and pancreas. In females, the most common malignant tumor is breast cancer, followed by lung and stomach cancers. Approximately 3049 male deaths and 1906 female deaths were reported by GLOBOCAN, with an age-standardized mortality rate of 116.6 for males, 66.3 for females, and 90.5 in the Albanian population.

In the specific registry at the University Hospital Center "Mother Teresa" for the year 2022, 3806 cases of malignant tumors were diagnosed (1996 females and 1810 males). The age-standardized incidence is 164.1 cases per 100,000 inhabitants. The most commonly reported tumors in males are colorectal, followed by lung and prostate cancers. In females, the most commonly reported malignant neoplasms are breast cancer, followed by colorectal and endometrial cancers.

However, the Cancer Registry faces several issues such as:

- Lack of necessary infrastructure (Technology and equipment, integrated data systems)
- Problems in data collection (Insufficient reporting and data quality)
- Limited human resources (Insufficient staff)
- Lack of coordination between hospitals in QSUNT
- Lack of awareness and education (Insufficient awareness of the importance of reporting and educating medical personnel)
- Access to laboratory data at the tumor diagnostic laboratory -Challenges in integrating new data (Updating the registry)

Improving the cancer registry in Albania will require coordinated efforts to address these issues and ensure a robust and effective system for collecting, analyzing, and reflecting more accurate data on cancer.

Keywords: Cancer registry, data collection, systematic review, cancer incidence ,data quality, collaboration, evidence based, health policy, public health.

Introduction

The health information system in Albania has been revamped to enable better management and appropriate evaluation of the health system, to ensure the use of health information in support of evidence-based policy development and rational planning of health services. The harmonization of data and information from health institutions provides a complete picture of the health status of the population. This has been achieved by building national disease registries and electronic medical

records. Evidence generated through health information systems and disease/cancer registries is used to influence the prioritization of health interventions, as well as to monitor the implementation of these policies.

The cancer registry is an essential tool for:

- Monitoring cancer incidence and mortality;
- Planning health policies;
- Evaluating prevention and treatment programs;
- Provideing data for scientific research and international comparisons;

Cancer is now the second leading cause of death in Albania. Most cancers are diagnosed at a late stage, making them difficult to treat. Fortunately, the knowledge is now available to prevent one-third of all cancers, cure one-third of them, and alleviate pain and suffering in most cancers. The WHO Public Health Strategy provides the best approach to translating new knowledge and skills into effective, evidence-based interventions that can reach everyone in Albania.

A cancer registry is “the office or institution responsible for collecting, storing, analyzing, and interpreting data on people with cancer.” A cancer registry is used to enable program planning and evaluation, to determine the Cancer Burden, to observe trends, and to make future predictions about cancer in the country.

The use of health information is necessary to ensure safe and quality healthcare for the client/patient, as well as to develop quality accreditation throughout the health service.

It should be noted that the effective use of health information depends indisputably on the skills and knowledge of health service personnel, the culture and the environment in which they work. In this situation, numerous problems are briefly highlighted, among which the most important are:

- Lack of oncological health services throughout the country, which leads to a lack of accurate and periodic information on tumor diseases.
- Lack of population stability (demographic movement), which is directly related to population registration or what are called “loss of cases”, which directly affects significant deficiencies in information.
- Identification of individuals due to the lack of a unique code for identifying cases with tumor diseases.
- Lack of trained health personnel to accurately collect the information required regarding these pathologies.

Methodology

This study is a observational descriptive study, focus on identifying structural, operational and data-related deficiencies in the Albania cancer registry.

The data sources are from national cancer registry reports, official documents from Ministry of

Health, Public Health Institute and Oncology hospital at University Hospital Center “Mother Teresa”. Interviews with registry staff and health professionals. Literature review of regional and international best practices.

Discussion

In the registry based specifically at the Oncology Hospital at the University Hospital Center "Mother Teresa" for the year 2025 (January-November), 3587 cases diagnosed with malignant tumors are reported (1783 women and 1804 men.) With an age-standardized incidence of 164.1 cases per 100,000 inhabitants. In men, the most common tumor is the colorectal tumor, followed by the lung and prostate. While in women, the most common malignant neoplasm is the breast tumor, followed by the colorectal and endometrial tumors.

Information to enrich the Cancer Registry is collected systematically in several forms. Each new case that has been confirmed through biopsy, with a malignant tumor, is registered for the first time through the Cancer Registry Form approved by the Ministry of Health. The form is completed based on the oncological card through which the patient is followed throughout the treatment at the Oncology Hospital. The Cancer Registry Form is organized into 4 spaces: sociodemographic information about the patient, tumor data, treatment, follow-up. The form also contains the date of first registration of the patient at the Oncology Hospital, the date of diagnosis of the patient with a malignant tumor, as well as the date of last contact with the patient at the Oncology Hospital. The form is then registered in the relevant databases. This practice of collecting information for patients diagnosed with cancer is followed for at least 1 year after the patient is diagnosed at the Oncology Hospital.

Information on cases with malignant tumors, with general, non-specific data, for patients presented at the Oncology Hospital, is collected every month by referring to the structures with the relevant registers operating at the Oncology Hospital. The register at this stage is enriched with data such as gender, profession, place of residence, type of malignant tumor.

In parallel, the source of information is also the Public Health Information System, (SISP) an electronic system that has an inter-hospital function at QSUNT.

The entire information necessary to identify cases with malignant tumors, routinely tracked and enriched with new information about the patient, although it is abundant, encounters some difficulties of misorganization to collect and use.

The Albanian cancer registry near University Hospital Center "Mother Teresa" faces several significant challenges, including underreporting of cases, fragmented and incomplete data, this is due to the lack of recording and management according to a standard method of information collection, poor adherence to standardized classifications such as ICD-O. The registry also suffers from insufficient digital infrastructure, limited integration of hospital records, and inadequate human resources, with a lack of trained personnel and inconsistent training programs. Furthermore, the available data are underutilized for health policy planning, scientific analysis, and public transparency, resulting in difficulties for effective cancer control, accurate assessment of disease burden, and international comparisons.

Results

-Underreporting of case

Not all cases are reporting at registry of cancer, also have lack of effective legal obligation.

-Poor data quality

Sometimes we are in front of incomplete or non-standardized data, also lack of ICD_O classification.

-Lack of necessary and digital infrastructure (Technology and Equipment, Integrated Data Systems)

The health information system in Albania has been renewed, enabling better management and appropriate evaluation of the health system, so in this aspect the need for advanced technology as well as more detailed data collection methods is seen.

-Human resources lack of trained personnel and rare and inconsistent training.

Recommendation

-Digitalization and standardization of reporting.

-Improve collaboration with data-generating sub-services, including diagnostic and treatment services, linkages to cancer screening programs, and death registration centers.

-Improve the digitalization of the reporting process by assigning responsibilities and resources for training and maintaining a digital platform that stores all information about the patient and their cancer characteristics.

- Improve and expand the data collected from the patient, including not only data on diagnosis and treatment, but also data on their lifestyle, diet, alcohol consumption, smoking, physical activity, mental health, and cancer information.

-Improve the interaction of this platform with electronic data systems (Electronic Healthcare Systems - EHS) of patients in hospitals to have a more complete patient history (Electronic Healthcare Records - EHRs).

-Improve collaboration with hospitals to improve the completeness of information on diagnoses, histological confirmation and cancer treatment.

-Implement techniques to assess the validity and completeness of case reporting

Conclusion

Improving the cancer registry is a crucial step toward:

- Better cancer control;
- Evidence-based health policies;
- Enhanced quality of oncology services in Albania;

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Machine translation in Diplomacy and Global Governance

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Abstract

The increasing reliance on machine translation (MT) technologies is reshaping linguistic practices within diplomacy and global governance. International organizations, diplomatic missions, and transnational institutions operate in highly multilingual environments where speed, accuracy, and consistency of communication are critical. This paper examines the expanding role of machine translation in diplomatic contexts, focusing on its practical applications, benefits, and limitations.

Drawing on recent developments in neural machine translation, the study analyzes how MT is used to support the drafting, dissemination, and internal processing of diplomatic documents, policy statements, and multilateral communications. Particular attention is paid to issues of terminological precision, cultural and pragmatic nuance, confidentiality, and accountability, factors that are especially sensitive in diplomatic discourse. While MT systems offer significant efficiency gains and facilitate faster information exchange, they also raise concerns regarding mistranslation, bias, data security, and the erosion of human linguistic expertise.

The paper argues that, rather than replacing professional translators and interpreters, machine translation currently functions most effectively as an assistive tool within hybrid workflows, where human oversight remains essential. By situating MT within the broader framework of global governance, the study highlights the need for clear institutional guidelines, ethical standards, and quality assurance mechanisms governing its use. Ultimately, the paper contributes to ongoing debates on language, technology, and power in international relations, emphasizing the importance of balancing technological innovation with linguistic accuracy and diplomatic responsibility.

Keywords: machine translation, diplomacy, global governance, multilingual communication, neural machine translation.

Introduction

Diplomacy and global governance are fundamentally multilingual endeavors. International institutions such as the United Nations (UN), the European Union (EU), the World Trade Organization (WTO), and numerous regional organizations operate across multiple official and working languages, reflecting both political commitments to linguistic equality and practical necessities of international cooperation. Language is not merely a technical medium in these contexts; it is a constitutive element of diplomatic practice, shaping negotiation, representation, and the exercise of power (Baker, 2018).

Historically, multilingual communication in diplomacy has relied on highly trained professional translators and interpreters. Their work ensures accuracy, terminological consistency, and sensitivity to pragmatic and cultural nuance, all of which are essential in high-stakes political environments. However, the rapid digitalization of global governance and the exponential growth in the volume of

multilingual communication have placed increasing pressure on traditional language services. Diplomatic actors are now expected to process information and respond to developments with unprecedented speed, often under conditions of crisis or political urgency.

Against this backdrop, machine translation (MT) technologies have gained growing prominence. Recent advances in neural machine translation (NMT) have significantly improved the fluency and perceived quality of automated translations, encouraging international organizations and diplomatic missions to experiment with MT for a wide range of tasks. These developments have prompted both optimism about increased efficiency, and concern about the risks associated with automating diplomatic language.

This paper examines the expanding role of machine translation in diplomacy and global governance. It explores how MT is currently used, the benefits it offers, and the limitations it presents in institutional settings where linguistic precision, confidentiality, and accountability are paramount. By situating MT within broader debates on language, technology, and power, the paper argues that MT functions most effectively as an assistive tool within hybrid human–machine workflows rather than as a replacement for professional translators.

Objectives

The study pursues five interrelated objectives:

- To examine the growing use of machine translation in diplomatic and global governance institutions.
- To analyze the practical advantages of MT in managing multilingual communication.
- To identify the linguistic, ethical, and institutional challenges associated with MT use in diplomacy.
- To assess the evolving role of professional translators in MT-assisted workflows.
- To contribute to discussions on governance, accountability, and ethical standards for MT in international contexts.

Methods

This paper employs a qualitative, literature-based methodology. It draws on interdisciplinary sources from translation studies, applied linguistics, international relations, and science and technology studies. Peer-reviewed journal articles, academic monographs, and institutional reports from international organizations form the core of the data corpus.

Rather than conducting empirical testing of MT systems, the study adopts a conceptual and analytical approach. It synthesizes existing research on neural machine translation, institutional translation practices, and diplomatic discourse analysis. This method is particularly appropriate given the exploratory nature of the research and the ethical and practical constraints surrounding access to confidential diplomatic materials.

The focus is placed on recent developments (post-2015), reflecting the rise of NMT

as the dominant paradigm in machine translation. Attention is also paid to policy-oriented documents that reveal how institutions conceptualize and regulate MT use.

Analysis

The Linguistic Environment of Diplomacy and Global Governance

Diplomatic communication is characterized by a high degree of formality and strategic ambiguity. Treaties, resolutions, and policy statements often employ carefully calibrated language designed to balance competing interests and avoid explicit confrontation (Schäffner, 2012). Even minor shifts in wording can have significant legal or political implications.

Moreover, global governance institutions operate within complex multilingual regimes. The EU, for example, recognizes 24 official languages, while the UN operates with six official languages and multiple working languages. This linguistic diversity reflects principles of inclusivity and equality but also creates substantial logistical challenges. Translation and interpretation are not ancillary services but core infrastructural components of institutional functioning (Koskinen, 2020).

The Rise of Neural Machine Translation

Neural machine translation represents a major shift from earlier rule-based and statistical approaches. By using deep learning architectures and large parallel corpora, NMT systems generate translations that are more fluent and context-sensitive than previous models. These improvements have led to increased institutional interest in MT as a tool for managing multilingual communication more efficiently (Pym, 2019). In diplomatic settings, MT is primarily used for internal purposes: rapid comprehension of foreign-language documents, preliminary drafting, and information triage. For example, policy officers may rely on MT to gain an initial understanding of documents before deciding whether full human translation is required. In this sense, MT functions as a filter that helps prioritize linguistic resources.

Benefits of Machine Translation in Diplomatic Contexts

The primary benefit of MT in diplomacy is speed. Automated translation enables near-instantaneous access to information across languages, which is particularly valuable in crisis situations or fast-moving negotiations. MT also supports cost-efficiency by reducing the workload associated with routine or repetitive translation tasks. Additionally, MT enhances accessibility within institutions. Staff members who do not share a common working language can use MT to communicate more effectively, potentially democratizing access to information. From a governance perspective, this may contribute to more inclusive internal decision-making processes.

Terminological Precision and Pragmatic Risk

Despite its advantages, MT remains limited in its ability to handle specialized diplomatic terminology and pragmatic nuance. Diplomatic texts often contain institutional jargon, legal concepts, and culture-specific references that require contextual interpretation. MT systems may produce fluent but subtly inaccurate translations, a phenomenon sometimes described as “illusory accuracy” (O’Brien, 2012).

Pragmatic failures are particularly problematic in diplomacy. Errors in modality, politeness, or evaluative stance may alter the perceived tone of a message, potentially affecting diplomatic relations. These risks underscore the continued necessity of human expertise in reviewing and validating MT output.

Confidentiality, Security, and Ethical Concerns

Confidentiality is a central concern in diplomatic communication. Many widely used MT systems rely on cloud-based infrastructures that may store or process data externally, raising concerns about data protection and unauthorized access. As a result, international organizations increasingly explore secure, in-house MT solutions, though these require significant technical and financial investment (European Commission, 2020).

Ethical issues also arise from the opacity of MT systems. Decisions about training data, algorithmic design, and output evaluation are often outside the control of end users. This lack of transparency complicates accountability when errors occur and raises questions about institutional responsibility.

Human–Machine Hybrid Workflows

The analysis suggests that MT is most effective when integrated into hybrid workflows that combine automation with human oversight. Professional translators play a crucial role in post-editing, quality assurance, and terminological management. Rather than diminishing the role of human translators, MT reshapes professional competencies, placing greater emphasis on evaluative judgment and domain expertise.

This hybrid model aligns with broader trends in professional translation, where technology is understood as augmenting rather than replacing human labor (Pym, 2019).

Results and Discussion

The findings of this study indicate that machine translation has become an established, though carefully regulated, component of diplomatic communication. Its use reflects institutional pressures for efficiency and responsiveness, as well as confidence in recent technological advances. However, the analysis also highlights persistent limitations related to accuracy, nuance, security, and ethical governance.

These findings support a cautious, context-sensitive approach to MT adoption in

diplomacy. While MT can enhance institutional capacity, it cannot fully account for the political and cultural dimensions of diplomatic language. Overreliance on automated systems risks eroding linguistic expertise and obscuring responsibility for communicative outcomes.

From a global governance perspective, the integration of MT raises broader questions about power and inequality. Languages with abundant digital resources tend to receive higher-quality MT support, potentially reinforcing existing hierarchies in international communication (Baker, 2018). Addressing these asymmetries requires both technological and policy-level interventions.

Conclusion

Machine translation is reshaping the linguistic infrastructure of diplomacy and global governance. Advances in neural machine translation have made automated systems more usable and appealing to international institutions facing growing multilingual demands. Nevertheless, the high-stakes nature of diplomatic communication necessitates ongoing human involvement.

This paper has argued that MT functions most effectively as an assistive technology embedded within hybrid human-machine workflows. To ensure responsible use, international organizations should develop clear institutional guidelines addressing confidentiality, quality assurance, ethical standards, and professional training.

Future research could build on this study by examining empirical case studies of MT use in specific institutions or by analyzing translator perspectives on technological change. Ultimately, balancing technological innovation with linguistic accuracy and diplomatic responsibility remains a central challenge for global governance in the digital age.

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Reimbursement of Direct-Acting Antivirals (DAA) for Hepatitis C in Albania: A Health Economic Perspective

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Abstract

The objective of this study is to evaluate Albania's reimbursement framework for Direct-Acting Antivirals (DAAs) used in the treatment of chronic Hepatitis C Virus (HCV) infection, through an integrated analysis of clinical effectiveness, health economic impact, and regulatory alignment with the European Union acquis, particularly Directive 89/105/EEC on the transparency of measures regulating pharmaceutical pricing and reimbursement. HCV remains a significant public health burden in Albania, disproportionately affecting vulnerable populations, while the advent of DAAs has transformed HCV into a curable disease with sustained virologic response rates exceeding 95%.

The analysis synthesizes real-world clinical data from Albanian tertiary care cohorts, demonstrating high SVR-12 rates across genotypes and disease stages, alongside economic evaluations assessing treatment costs against healthcare expenditures avoided through prevention of cirrhosis, hepatocellular carcinoma, liver transplantation, and hospitalizations. The findings indicate that despite high upfront acquisition costs, DAA therapy yields substantial net savings for the healthcare system and represents a highly cost-effective intervention.

The study further examines Albania's legal and institutional pricing framework, focusing on Law No. 105/2014 and Decision of the Council of Ministers No. 645/2014, and assesses their convergence with EU transparency requirements. While Albania has established a structured and transparent system for price regulation and reimbursement, gaps remain regarding binding decision timelines, detailed justification of pricing decisions, and universal access criteria.

The research concludes that expanding DAA reimbursement without fibrosis-based restrictions, strengthening integration with harm reduction services, and further harmonizing regulatory procedures with EU standards are essential to maximize clinical outcomes, ensure equity, and achieve WHO HCV elimination targets.

Keywords: hepatitis C, direct-acting antivirals, reimbursement policy, cost-effectiveness, pharmaceutical pricing, EU transparency directive, Albania.

Introduction

Hepatitis C Virus infection represents a critical public health challenge globally and within Albania specifically. The World Health Organization estimates approximately 71 million people live with chronic hepatitis C infection worldwide, with nearly 1 million new infections occurring annually [3]. In Albania, the prevalence of HCV ranges from 0.9-1% according to data from the Institute of Public Health, affecting diverse population segments including people who inject drugs (PWID) and vulnerable populations with limited healthcare access.

The clinical landscape for HCV treatment has undergone revolutionary transformation since the introduction of Direct-Acting Antivirals (DAAs). Unlike previous interferon-

based regimens requiring lengthy treatment periods with significant adverse effects, modern DAA therapies achieve sustained virologic response (SVR) rates exceeding 95% across all genotypes within 8-12 weeks of treatment [4]. These advances directly translate to improved patient outcomes, enhanced quality of life, and prevention of disease progression toward cirrhosis and hepatocellular carcinoma.

However, the integration of DAA therapies into national reimbursement systems presents multifaceted challenges across clinical, economic, and regulatory dimensions. The high acquisition costs of DAAs, ranging from €16,000-€25,000 per treatment course, create substantial budgetary pressures for healthcare systems, particularly in countries with constrained pharmaceutical expenditures [1]. Simultaneously, policymakers must navigate complex regulatory frameworks demanding alignment with European Union standards [2] while ensuring equitable patient access and fiscal sustainability.

This paper examines Albania's current DAA reimbursement framework through three integrated perspectives: (1) clinical efficacy and treatment outcomes among Albanian patient populations, (2) health economic analysis including cost-effectiveness and budget impact, and (3) regulatory harmonization with EU Directive 89/105/EEC [2] on transparency in pharmaceutical pricing and reimbursement. By synthesizing evidence across these domains, this analysis identifies opportunities for strategic policy optimization to maximize health benefits while managing economic constraints.

Disease Burden and Natural History

Hepatitis C virus infection follows a complex clinical trajectory with significant heterogeneity in disease progression. Approximately 15-30% of infected individuals spontaneously clear the virus within six months; however, 70-85% develop chronic HCV infection [4]. Among those with chronic infection, disease progression presents substantial variation, with approximately 15-30% developing cirrhosis within 20 years [4]. More critically, patients with advanced liver fibrosis experience accelerated disease progression, with estimated annual risks of 2.9% for liver failure, 3.2% for hepatocellular carcinoma, and 2.7% for liver-related death [4].

In Albania's context, HCV predominantly affects vulnerable populations with limited baseline healthcare access. Between 2014-2019, the University Hospital Center of Tirana treated 207 chronic hepatitis C patients with advanced liver fibrosis, with 66% (127 patients) presenting F3-F4 stage fibrosis, indicating either advanced fibrosis or established cirrhosis [5]. The male predominance (56% male vs. 44% female) and mean age of 47.9±12 years reflect typical epidemiological patterns within the PWID community.

Evolution of Antiviral Therapy

The therapeutic options for hepatitis C have progressed through distinct generations. Historical interferon-based regimens achieved SVR rates of only 40-50%, required 48-72 weeks of treatment, and produced severe adverse effects limiting tolerability [5].

The transition to interferon plus ribavirin improved outcomes modestly to 55-70%, yet treatability remained substantially constrained by toxicity profiles.

The 2011-2013 introduction of first-generation protease inhibitors represented a critical inflection point, achieving higher SVR rates (approximately 70-75%) but maintaining prolonged treatment durations and complex regimens. Direct-Acting Antivirals (DAAs) introduced in 2013-2014 fundamentally transformed treatment paradigms. Contemporary DAA regimens including sofosbuvir/velpatasvir (SOF/VEL) and glecaprevir/pibrentasvir (GLE/PIB) achieve SVR rates of 95-98% regardless of genotype, require only 8-12 weeks of treatment, and demonstrate excellent tolerability profiles with minimal drug-drug interactions [5].

HCV Genotype Distribution in Albania

HCV exhibits substantial genetic heterogeneity, with six major genotypes and numerous subtypes distributed differentially across geographic regions. Genotype 1 predominates in Albania, representing 73% of cases, with genotype 1b representing 64% of all infections [5]. This distribution has direct implications for treatment selection and pricing, as certain genotypes have historically commanded higher treatment costs due to limited therapeutic options.

In Albania's 207-patient cohort treated 2014-2019, genotype distribution reflected regional patterns: genotype 1 comprised 152 cases (73%), genotype 2 represented 24 cases (11.5%), genotype 3 accounted for 9 cases (4.3%), and genotypes 4-5 comprised 6.2% of cases [5]. This genotype prevalence has implications for reimbursement policy design, as pangenotypic regimens may be more cost-effective than genotype-specific options despite higher per-unit acquisition costs.

Treatment Outcomes and Sustained Virologic Response

Real-world evidence from Albania's tertiary treatment center demonstrates exceptional clinical efficacy of DAA therapy across diverse patient populations. Among 207 patients (naive and treatment-experienced) treated 2014-2019, overall sustained virologic response at 12 weeks post-treatment (SVR-12) reached 93.2% [5]. This outcome represents outstanding clinical performance compared to historical interferon-based regimens and aligns with efficacy data from randomized controlled trials.

Genotype-specific analysis reveals consistent efficacy across the HCV genetic spectrum [5]:

Genotype	Patients (n)	SVR-12 Rate (%)
Genotype 1	152	95.0
Genotype 2	24	95.8
Genotype 3	9	88.8
Genotype 4	14	78.5
Unassigned	7	71.4

Efficacy in Advanced Liver Fibrosis and Cirrhosis

A critical consideration for health policy is treatment efficacy among patients with advanced disease. Within Albania's cohort, 127 patients (66%) presented F3-F4 stage fibrosis, representing either advanced fibrosis (F3) or established cirrhosis (F4). Among this advanced fibrosis group, SVR-12 was achieved in 85 of 97 cirrhotic patients (87.6%), compared to 107 of 110 non-cirrhotic patients (97.2%) [5].

This differential efficacy has profound policy implications. While SVR rates remain excellent in cirrhotic populations, the lower response rates (87.6% vs. 97.2%) suggest that urgent treatment prioritization in advanced-stage disease is clinically warranted. Patients achieving SVR experience dramatically improved overall survival [5].

Treatment Efficacy by Prior Treatment Experience

Albanian data demonstrate that prior treatment experience does not substantially compromise DAA efficacy. Among 101 treatment-naïve patients, SVR-12 was achieved in 98 (97%), compared to 91 of 106 treatment-experienced patients (85.8%) [5]. This finding indicates that DAA therapy should not be restricted based on prior interferon exposure, supporting universal treatment access policies.

The distinction between genotypic and pangenotypic regimens reveals important clinical considerations. Genotypic treatment (152 patients) achieved 95.3% SVR-12, while pangenotypic treatment (55 patients) achieved 98% SVR-12 [5]. Although pangenotypic regimens demonstrated marginally superior efficacy, the clinical differences are modest and must be weighed against cost considerations during policy deliberation.

Treatment Costs and Financial Burden

Albania's investment in DAA therapy between 2015-2024 totaled €12,602,742 for 414 patients, averaging €30,445 per treatment course [1]. This substantial expenditure reflects the high acquisition costs of DAA regimens. Sofosbuvir/velpatasvir (Epclusa) is priced at €25,416.46 per course (reference price) or €19,062.34 per course (confidential price) [6], with ledipasvir/sofosbuvir (Harvoni) similarly priced [6]. For comparison, Albania's reference price list indicates that innovative therapies command premium acquisition costs relative to historical comparators, representing significant budget impact for national healthcare systems with constrained pharmaceutical expenditures [7].

Healthcare Costs Avoided Through DAA Treatment

The fundamental economic justification for reimbursement of direct-acting antivirals (DAAs) lies in the quantification of downstream healthcare costs that are avoided through curative therapy. In the absence of treatment, the natural history of chronic hepatitis C infection generates substantial lifetime medical expenditures due to progressive liver-related complications [1]. Approximately 20% of untreated patients develop cirrhosis over a 20-year period, with average management costs of €20,000

per patient annually, resulting in cumulative lifetime expenses exceeding €400,000 per cirrhotic patient [1]. Applied to Albania’s cohort of 414 patients, cirrhosis development in 20% of untreated individuals (83 patients) would translate into €1,656,000 in annual cirrhosis-related healthcare costs.

In addition to cirrhosis, more advanced and resource-intensive complications further increase the economic burden. Hepatocellular carcinoma (HCC) develops in approximately 5% of chronic HCV patients, with average treatment costs of €50,000 per patient annually [1]. Within the same cohort, HCC would affect an estimated 21 patients, generating €1,035,000 in cumulative treatment costs. Liver transplantation, required in roughly 1% of untreated patients, carries an average cost of €100,000 per procedure [1]; this corresponds to approximately 4 transplantations and €414,000 in direct transplant expenditures in the Albanian cohort.

Hospitalizations for HCV-related complications represent an additional and substantial cost driver. Around 30% of untreated patients require at least one hospitalization, with an average cost of €5,000 per admission [1], resulting in €621,000 in hospitalization costs for the 414-patient cohort. When these avoided complications are aggregated, total direct healthcare costs prevented through DAA treatment amount to €3,726,000 per cohort. Projected across multiple treatment cohorts over a 10-year analytical horizon, the cumulative avoided healthcare expenditures reach €37,260,000, underscoring the strong economic rationale for DAA reimbursement [1].

Net Budget Impact Analysis

The net budget impact calculation compares treatment expenditures against healthcare costs avoided [1]:

Table 2. Net Budget Impact Analysis of Direct-Acting Antiviral (DAA) Therapy for Hepatitis C in Albania			
Scenario	Total Treatment Cost	Healthcare Costs Avoided	Net Expenditure
High-Cost Scenario	€12,602,742	€37,260,000	€24,657,258 SAVINGS
Low-Cost Scenario	€8,400,000 (est.)	€37,260,000	€28,860,000 SAVINGS

This analysis demonstrates that even in high-cost scenarios with full retail pricing, DAA therapy generates substantial net savings through prevented complications. The financial case for DAA reimbursement is exceptionally strong from a healthcare economics perspective, particularly considering that analyses typically apply conservative estimates of complication prevention and may not fully capture indirect costs of untreated disease including productivity losses, caregiver burden, and quality-of-life impacts.

Albania’s Current Reimbursement Architecture

Albania’s pharmaceutical pricing and reimbursement framework has undergone substantial modernization through Law No. 105/2014 On Drugs and Pharmaceutical

Service [8] and Decision of the Council of Ministers (DCM) No. 645/2014 On the establishment and functioning of the Drug Pricing Commission [9]. These instruments establish a structured, transparent, and rule-based system for price setting, incorporating reference pricing to five European countries (Italy, Greece, Serbia, North Macedonia, and Croatia), annual price declaration and approval procedures, and the functioning of a permanent Drug Pricing Commission under the Ministry of Health and Social Protection [9].

The Medicines Pricing Commission (MPC) operates as an inter-institutional mechanism ensuring that price regulation decisions are grounded in expertise, inter-agency coordination, and procedural transparency [9]. The Commission's composition includes representatives from the Ministry of Health, the Ministry of Finance, the Compulsory Health Care Insurance Fund, and the National Agency for Medicines and Medical Devices, ensuring that decisions reflect balance between public health priorities, fiscal sustainability, and regulatory integrity [9].

EU Directive 89/105/EEC and Convergence Analysis

Albania's pharmaceutical pricing framework demonstrates substantial alignment with the requirements of the EU Transparency Directive 89/105/EEC [2]. Article 38 of Law No. 105/2014[8] establishes a centralized institutional structure through the Medicines Pricing Commission, reflecting the European Union's emphasis on specialized and accountable pricing authorities [2]. In addition, the annual publication of approved prices by 31 December enhances regulatory transparency, improves market predictability, and ensures visibility for both public institutions and private stakeholders, thereby supporting informed decision-making within the pharmaceutical market [9].

Despite these structural strengths, significant divergences from EU standards remain and warrant targeted policy attention [2]. Although DCM No. 645/2014[9] defines procedural deadlines for submission and administrative opening of price declarations, it does not establish binding time limits for final approval or rejection decisions. In contrast, Directive 89/105/EEC [2] mandates that competent authorities issue pricing decisions within a maximum period of 90 days. The absence of definitive decision-making timeframes in the Albanian framework introduces administrative uncertainty for marketing authorization holders and may negatively affect the timely market entry and continuity of supply for new medicinal products.

Further gaps relate to decision transparency and procedural safeguards. While Albania publishes final lists of approved CIF (Cost, Insurance, Freight) and EXW (Ex-Works) prices, it does not provide written, case-specific justifications explaining individual pricing outcomes [9]. This diverges from Directive 89/105/EEC [2], which requires explicit reasoning based on objective and verifiable criteria to allow applicants and the public to assess regulatory compliance. Moreover, the Directive establishes the principle of administrative authorization by silence, whereby proposed prices are automatically approved if authorities fail to respond within 90 days [2]. Albanian legislation does not incorporate this safeguard, leaving applicants fully dependent on administrative discretion and without a legal mechanism to address procedural inaction.

International Reference Pricing Mechanism

Albania's international reference pricing system, as established through the Order on price methodology [10], uses the lowest available price among five comparator countries as the baseline for domestic pricing, effectively constraining potential overpricing and supporting fiscal responsibility [9]. This mechanism aligns with EU objectives of price convergence across member states, particularly benefiting smaller or transitioning markets.

However, implementation exhibits certain limitations requiring policy refinement. The exclusive reliance on a fixed set of reference countries without periodic reassessment risks producing structural distortions in price setting [9]. Additionally, delays in obtaining verified external price data or exchange rate fluctuations can undermine accuracy and timeliness of evaluation, leading to conservative or outdated benchmarks and incomplete public documentation of calculation methods and data sources [9].

Current DAA Inclusion in Albania's Reimbursement System

Albania has successfully incorporated Direct-Acting Antivirals into its national reimbursement system, representing significant advancement in treatment accessibility compared to many regional peer countries. Sofosbuvir/velpatasvir (Epclusa, reference price €25,416.46, confidential price €19,062.34) and ledipasvir/sofosbuvir (Harvoni, reference price €25,416.46, confidential price €19,062.34) are included on the reimbursement list alongside other DAA regimens [6][11]. This inclusion demonstrates national commitment to equitable access for HCV-affected populations.

Additionally, Albania has implemented Managed Entry Agreements (MEA) to reduce medicine prices through negotiated arrangements for medicinal products, including innovative DAA therapies [9]. This mechanism provides financial, performance-based, and hybrid pathways for conditional reimbursement of innovative medicines, mitigating access barriers created by high acquisition costs.

Eligibility Restrictions and Treatment Prioritization Barriers

Despite measurable progress toward the inclusion of direct-acting antivirals (DAAs), eligibility restrictions continue to limit full coverage and equitable access to treatment. Between 2015 and 2024, Albania treated only 414 patients with DAAs, corresponding to an average of approximately 41 patients per year; a treatment rate that remains substantially below World Health Organization elimination targets [1]. This low level of treatment uptake reflects policy-driven reimbursement criteria rather than clinical contraindications or therapeutic limitations, indicating that access barriers are primarily regulatory in nature.

Current reimbursement policies prioritize DAA therapy for patients with advanced liver fibrosis (F3–F4) or specific comorbid conditions such as co-infections, while excluding individuals with earlier stages of fibrosis despite strong evidence supporting universal treatment as a key driver of HCV elimination [1]. These disease severity based

restrictions result in clinically suboptimal outcomes, as delaying therapy until advanced disease stages allows continued progression and increases the risk of complications. Moreover, treatment effectiveness is lower among cirrhotic patients, with SVR-12 rates of 87.6% compared with 97.2% in non-cirrhotic individuals [5], suggesting that earlier intervention would improve overall population-level cure rates.

Beyond clinical considerations, these eligibility constraints raise significant equity concerns [3]. Severity-based access criteria disproportionately affect vulnerable populations, including people who inject drugs (PWID), who often experience delayed diagnosis and barriers to timely care. Limiting treatment to patients with advanced disease perpetuates existing healthcare inequities and conflicts with WHO elimination strategies, which emphasize broad, simplified, and universal access to curative therapy as essential for sustainable HCV control [3].

Barriers Among High-Risk Populations

People who inject drugs (PWID) represent a critical population for HCV elimination efforts, yet access barriers persist in Albania. Healthcare infrastructure gaps, limited harm reduction service integration, and social stigma collectively constrain treatment initiation and completion among PWID [1]. While DAA therapy is clinically suitable for PWID exhibiting efficacy equivalent to general populations and excellent tolerability profiles; implementation barriers limit real-world treatment reach.

Comparative International Perspectives and Best Practice Standards: European Union Member State Comparisons

Comparative analyses with other European countries indicate that further policy adjustments in Albania could substantially enhance HCV treatment uptake, particularly among marginalized populations [1]. Several EU member states have adopted more permissive reimbursement frameworks grounded in epidemiological evidence demonstrating that universal access to direct-acting antivirals (DAAs) is essential for achieving HCV elimination targets. These approaches reflect a strategic shift from disease severity-based prioritization toward population-level public health impact.

European best practices highlight key policy dimensions that Albania could consider adopting [4]. Many EU countries now permit DAA reimbursement irrespective of fibrosis stage, acknowledging that early treatment prevents disease progression, reduces long-term complications, and improves healthcare system efficiency. In parallel, simplified treatment algorithms based on pangenotypic DAA regimens such as sofosbuvir/velpatasvir or glecaprevir/pibrentasvir allow treatment of all genotypes without prerequisite genotyping, thereby minimizing diagnostic delays and facilitating treatment initiation in non-specialist and primary care settings [4].

In addition, several leading European jurisdictions have successfully integrated HCV treatment delivery within established harm reduction services. This model enables people who inject drugs (PWID) to access therapy in familiar and trusted healthcare environments, reducing stigma, improving engagement, and addressing structural barriers to care. Such integrated approaches have been shown to increase treatment

uptake among high-risk populations and are central to comprehensive, equity-oriented HCV elimination strategies [1].

Real-World Evidence from European Cohorts

Real-world effectiveness data from large European cohorts validates DAA efficacy across diverse populations and practice settings. Analysis of 5,541 patients treated with sofosbuvir/velpatasvir for 12 weeks without ribavirin demonstrated SVR rates of 99% in patients with compensated cirrhosis and 97% in patients without cirrhosis, irrespective of HCV genotype [4]. These outcomes substantially exceed pre-DAA historical comparators and support confidence in universal treatment policies.

Drug-drug interaction (DDI) analysis from Italian patient populations demonstrates manageable safety profiles even among patients with multiple comorbidities requiring concomitant medications [4]. Sofosbuvir/velpatasvir required fewer changes of contraindicated concomitant drugs compared to glecaprevir/pibrentasvir, suggesting that SOF/VEL may be preferred in older patients with substantial comorbidity burden [4].

Policy Recommendations for enhanced DAA Reimbursement in Albania

Albania should expand reimbursement coverage for direct-acting antivirals without restrictions based on fibrosis stage or patient risk factors. Available evidence shows that early treatment prevents progression to cirrhosis and hepatocellular carcinoma, achieves higher sustained virologic response rates in non-cirrhotic populations (97.2% versus 87.6%), reduces lifetime healthcare expenditures by avoiding high-cost complications, and accelerates progress toward WHO hepatitis C elimination targets [3]. Adoption of universal eligibility would align Albania with leading EU member state practices and maximize the population-level health impact of curative therapies. To ensure that expanded eligibility translates into effective access, Albania should strengthen healthcare infrastructure by integrating HCV diagnosis and treatment into established harm reduction services, particularly for people who inject drugs [3]. This integration should involve co-location of screening and treatment services, targeted training of harm reduction personnel in HCV care navigation, implementation of simplified protocols suitable for primary care settings, and structured patient education and support measures addressing stigma and social barriers. Linking universal eligibility with service integration would directly reduce access gaps among vulnerable populations and increase real-world treatment uptake.

In parallel, Albania should adopt simplified treatment algorithms based on pangenotypic regimens that allow treatment initiation without prerequisite genotyping [4]. Clinical protocols should prioritize sofosbuvir/velpatasvir as first-line therapy across all genotypes, given its efficacy, tolerability, and favorable drug-drug interaction profile [6]. Eliminating genotype-based differentiation and unnecessary diagnostic steps, while leveraging contemporary regimens achieving SVR within eight weeks, would facilitate decentralized treatment initiation in primary care and reduce reliance on tertiary referral pathways.

Finally, expanded access and simplified delivery should be supported by optimized pharmaceutical pricing strategies to ensure financial sustainability. Albania should strengthen DAA price negotiations by leveraging EU harmonization processes and regional purchasing opportunities, including volume-based commitments linked to universal treatment policies, reference pricing using broader EU comparisons [2], conditional reimbursement arrangements tied to epidemiological outcomes, and systematic assessment of generic DAA availability, particularly for older regimens. Together, these measures could reduce per-treatment acquisition costs from the current €19,062–€25,416 range and expand fiscal capacity for higher and more equitable treatment coverage.

Conclusion

Albania has achieved significant alignment with EU Transparency Directive standards through establishment of a structured legal framework encompassing Law No. 105/2014[8] and DCM No. 645/2014[9], ensuring state supervision, annual price declaration, international reference pricing, and mandatory publication of approved prices within fixed deadlines [2]. The creation of the Medicines Pricing Commission as a specialized authority and implementation of Managed Entry Agreements demonstrate clear progress toward EU-level transparency and access mechanisms.

Clinical evidence from Albanian patient populations confirms exceptional efficacy of Direct-Acting Antivirals across diverse populations and disease stages, with overall SVR-12 rates of 93.2% and sustained benefits among patients with advanced liver fibrosis [5]. These outcomes provide clinical justification for expanded treatment access and universal DAA reimbursement policies.

Health economic analysis demonstrates exceptionally favorable cost-effectiveness profiles for DAA therapy. Treatment investment of €12,602,742 for 414 patients generates €37,260,000 in prevented healthcare costs through avoidance of cirrhosis management, hepatocellular carcinoma treatment, liver transplantation, and hospitalizations [1]. Even in high-cost scenarios, net analysis yields €24,657,258 in healthcare savings, representing outstanding return on pharmaceutical investment.

Nonetheless, further harmonization with EU standards requires several critical policy reforms: introduction of binding administrative appeal processes with explicit decision reasoning, explicit and publicly available criteria for inclusion or exclusion from the reimbursement list, periodic revision of reference country and exchange parameters, and detailed publication of reasoning behind pricing and reimbursement decisions [2].

Most critically, Albania must expand DAA reimbursement coverage without restrictions based on fibrosis stage or patient risk factors to achieve national and WHO HCV elimination targets [3]. Strengthening healthcare infrastructure through integration of harm reduction services, implementing simplified treatment algorithms with pangenotypic regimens, and ensuring universal treatment access remain essential components of Albania's public health strategy against hepatitis C [4]. Strategic policy decisions, including expanded treatment eligibility criteria, enhanced regulatory transparency, and continued price negotiations, are essential

to maximize clinical benefits and accelerate progress toward WHO 2030 HCV elimination objectives.

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Visual Narrative in Kosovan Cinema: The Role of Symbolism and Aesthetics in Short Films

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Abstract

This study analyzed the impact of symbolism and aesthetics on the visual story of the Kosovan short film *Në Mes* (In Between), directed by Samir Karahoda. The objective was to examine how aesthetic frameworks and visual motifs in post-conflict Kosovo reflected identity, memory, and social criticism. A qualitative technique was used, including a visual examination of selected film stills and sequences. The research indicated that recurring architectural motifs and disjointed landscapes represented migration and diaspora ties, whereas vast, tranquil visuals, such as vacant seats, expressed sentiments of absence, loss, and grief. Weddings and traditional dances exemplify rituals and cultural events that demonstrate the resilience and longevity of people. Individuals may like to be in such a location and contemplate it. The findings indicated that Kosovan short films used symbolism and aesthetics rather than straightforward narratives to convey their messages. This transformed ordinary settings into sites where individuals may recall their cultural heritage. The inquiry revealed that symbolism and aesthetics were not just decorations of the tale; they were integral components of it. Kosovan short films use imagery to depict individuals' identities, emotions, and coping mechanisms. Consequently, they have significant roles in broader discussions on minimalism and art cinema. They have preserved their cultural identity. This research improved the analysis of national cinema and global discourse by demonstrating the consistency of concise visual narratives in post-war civilizations.

Keywords: Visual Narrative, Kosovan Cinema, Symbolism, Aesthetics, Short Films.

JSI:JEL 023;JEL E26

1. Introduction and background

The study of visual narrative in cinema has increasingly emphasized the interplay between aesthetics, symbolism, and cultural context as decisive factors shaping filmic meaning. Recent research on short-form and micro-short productions has shown that condensed visual narrative emphasizes aesthetic intensity and symbolic representation in manners distinct from feature-length works (Narrative and aesthetic features of micro-short plays on short video platforms: A case study of Douyin micro-short plays, 2024). These dynamics are especially pertinent to Kosovan short films, where narrative brevity, symbolic richness, and artistic innovation converge with the nation's socio-political and cultural changes (Mehmetaj, 2022). In larger cinematic theory, where pictures are thought to shape cognition, memory (Tujani, 2022), and emotional involvement (Zupancic, 2020), the link between visual form and affective experience has been identified as a crucial concept. When it comes to Kosovan cinema, short films often use visual symbols, such as architectural settings, objects of recollection, or repeating metaphors, as vehicles for communal recall and identity creation (Aleksić, 2025). In the context of art and experimental film, where the aesthetic function of color, framing, and stillness takes on explicit narrative

importance (Shiping & others, 2025) this symbolic use of images is in line with emerging worldwide patterns (Correia & Barbosa, 2018). Furthermore, Kosovan short films' visual narratives situate cinematic images as both emotional triggers and communication markers, reflecting the nexus of semiotics and aesthetics (Ehrt, 2005). Visual culture scholars have highlighted that filmic-pictures contain multimodal meaning: they represent psychological impacts (Freedman, 2025), symbolic codes (Branigan, 2012), and aesthetic interest that go beyond simple narrative (Bardini & others, 2020). In this way, Kosovan short films encode local histories, traumas (Grgić & Bego, 2024), and cultural identities inside their visual grammar while also engaging in a larger transnational conversation (Asani & Pollozhani, 2023).

In this context, this research examines the influence of symbolism and aesthetics on the visual story of Kosovan short films. Through the examination of pivotal instances, it illustrates how symbolic themes, aesthetic frameworks, and visual composition functioned as both stylistic elements and narrative techniques that expressed psychological complexity, cultural heritage, and socio-political critique. The research contextualizes Kosovan cinema within international discourses on visual narrative and minimalism, highlighting its distinctive contribution to the lexicon of modern short film. The objective of this study was to examine the aesthetic and symbolic influences on the visual narrative of Kosovan short films. Its objectives were to establish Kosovar cinema within the broader discourse on minimalism and art film aesthetics, to define the fundamental aesthetic frameworks, and to investigate the narrative function of symbolic motifs in the transmission of memory and identity. The integration of Kosovan short films into international cinematic dialogues, an enhancement of theoretical discourse regarding visual symbolism, and a framework for comprehending non-verbal narrative techniques were all significant scientific contributions that advanced film studies both nationally and globally. The qualitative research methodology of this study was primarily concerned with the visual analysis of specific Kosovar short films, such as Samir Karahoda's *Në Mes* (In Between). The selection of technique was determined by the research's articulated objective, which was to examine the impact of aesthetics and symbols on the visual narrative of Kosovan cinema.

Using concepts from aesthetic experience (Marković, 2012), narrative condensing (Asani & Pollozhani, 2023), meaningful form (Shiping & others, 2025) and cultural memory (Aleksić, 2025) film stills and sequences were assessed by closely examining the sights, circumstances, and symbolic motifs. The investigation concentrated on aesthetic components, including color, repetition, and framing. Other symbolic subjects that were discussed included architecture, ritual, and absence. Lastly, the narrative function of these elements in the transmission of identity, memory, and socio-political critique was underscored. The study employed a comparative literature methodology to contextualize its findings within the broader discourses on minimalist film and art cinema. The research aimed to clarify the manner in which Kosovar short films employ non-verbal techniques to convey meaning by incorporating visual analysis and theoretical interpretation.

Research question:

How have symbolism and aesthetics shaped the construction of visual narrative in Kosovan short films, particularly in relation to identity, memory, and socio-political commentary?

2. Literature review

Short-form screen media emphasizes condensed narratives and heightened aesthetic intensity. On Douyin, “micro-short plays” use platform-specific narration-rapid setups, character-focused emphasis, and topical/IP-driven storylines demonstrating how distribution mechanisms impact narrative pace and visual aesthetics (Asani & Pollozhani, 2023). The dynamics of such platforms are enlightening for Kosovan short films, where time limitations equally enhance symbolic richness. At its conceptual essence, visuals hardly exist independently of narrative; audiovisual content inherently has a continuous narrativity that facilitates the emergence of legendary forms in modern media. Modernist explorations of form-ritual length and the interplay of form and content-demonstrate how the aesthetics of film structure memory and emotion beyond narrative mechanics. Bell’s concept of “significant form” elucidates how visual arrangements (shape, rhythm, montage) embody cultural significance that evokes aesthetic emotion in viewers; complementary socio-cultural linguistics expand this notion to language and dialogue as vessels of cultural aesthetics in literature and cinema. Collectively, these frames position the symbolic picture as both a signifier and an emotion-integral to brief Kosovan tales of identification and commemoration. Regional and political films illustrate the interconnection between aesthetics and ideology. The Albanian socialist cinema created a “emancipated” female representation via a propagandistic framework, while concealing individuality and agency. Archival non-fiction from Albania and Yugoslavia used industrial modernity as visual rhetoric, embedding work and gender within stylistic choices (Grgić & Bego, 2024). In modern Kosovo, short and feature films convey pain, patriarchal limitations, and “agonistic mourning,” use symbolic imagery (home items, rural structures, ritualistic gestures) to navigate memory and resistance (Aleksić, 2025).

These thematic elements illustrate how aesthetics color schemes, composition, and tranquility serve as vessels of social significance in post-conflict environments. Technique links symbols with perception. The configuration of the camera, including lenses, depth of field, and movement, influences narrative clarity and stylistic expression in both animation and live-action formats (Garcia, 2023). Point-of-view theory elucidates the encoding of subjectivity, perception, and internal states visually (Branigan, 2012) while chromatic design functions as a narrative mechanism that communicates geometry, emotion, and systematic order (Attademo, 2021). Digital visual effects, often seen as undermining traditional dramaturgy, may simultaneously enhance narrative causality when harmonized with the script and tone (McClellan, 2007). Fundamental taxonomies enhance analytical accuracy in articulating such selections (Beaver, 2006) while Peircean semiotics provides a robust framework for connecting sign systems to cinematic significance (Ehrat, 2005).

Empirical research in reception studies indicates that interpretative audio description conveys film emotion more effectively to blind and low-vision audiences than purely “objective” descriptions, demonstrating that cinematic meaning is both multimodal and aesthetic rather than only propositional (Al-Abbas, Al-Atoum, Alsaggar, & Abu-Hammad, 2024). In clinical settings, the narrative and aesthetic qualities of film promote contemplation, identification, and optimism in therapeutic environments, emphasizing the practical significance of artistic form (Alcolea-Banegas, 2009).

Ultimately, discussions in visual culture education and digital interaction emphasize how audiences acquire the skills to interpret pictures as social texts (Freedman, 2025). Research on visual argumentation considers films as rhetorically organized, multimodal arguments that need active interpretation by knowledgeable viewers (Alcolea-Banegas, 2009) while multimodal analyses of Arab short films correlate sociopolitical semiotics with visual language and identity (Al-Abbas, Al-Atoum, Alsaggar, & Abu-Hammad, 2024). Kosovan short films use aesthetics (color, framing, cinematography), semiotics (symbolic systems), and platform/context (festival circuits, regional history) to collaboratively create visual narratives that condense stories into symbolic motifs-scenes that convey meaning as visuals and assert cultural arguments. Previous research in platform studies, mythic and modernist aesthetics (Zupancic, 2020) significant form and language/culture (Shen, Zhao, & Zaib, 2025) regional and political cinemas (Tujani, 2022) and technique/semiotics/reception (Ehrt, 2005) establishes a cohesive basis for examining how Kosovan short films utilize symbolism and aesthetics to convey themes of identity, memory, and social critique within succinct cinematic formats.

3. Visual narrative

Në Mes (In Between), a short documentary shot in Kosovo, was created by Samir Karahoda. Discussed at length were the social and architectural trends of brothers and sons living abroad constructing identical houses. The building of these houses demonstrates that all people are equal and capable of coexisting peacefully. In addition, they prompted contemplation of migrations, international connections, and ancestral sacrifices committed by other cultures. Karahoda used a tender and lyrical tone to depict families “in between” two worlds: their own nation and their host country, old and new, physically present and absent. The film dealt with themes of belonging, memory, and identity while also functioning as a documentary. This research showed how visual storytelling in Kosovar short films dealt with themes of cultural identity, memory, and sociopolitical critique via the use of aesthetics and symbols. A visual metaphor for transformation, the first photo depicts a vast plain under an ominous sky and has the words “*Në Mes*” inscribed onto it. Dark and light symbolize a schism between the past and the future, optimism and pessimism. Short, engaging images may convey a story, according to Li’s concept of condensed storytelling.



Fig 1. Opening Frame – “Në Mes / In Between”

The picture of a grandfather and grandson represents the continuation of life from one generation to the next. “I never faced bitterness from my children” is a subtitle that emphasizes how the story and the characters’ emotions interact. Theoretically, audiovisual pictures constantly include myth, memory, and recurrent emotions, as Zupancic (Zupancic, 2020) contends. This moment represents the passing on of ideals in the midst of shared memory and tragedy in the Kosovan setting. Professor Aleksić (Aleksić, 2025).



Fig 2. Generations – Grandfather and Grandson

The scattered row of buildings in the field represents migration via its symbolism of displacement and spatial fragmentation. The idea that visual structure may communicate cultural and emotional meaning is central to Shiping’s (Shiping & others, 2025) “significant form” hypothesis. Large, vacant buildings constructed as symbols of homecoming and belonging in Kosovo convey the existence of the diaspora via such images.



Fig 3. Landscape with Scattered Houses

Isolation and a suspended life, characterized by absence, are evoked by the night landscape with its dimly lighted dwellings. Long shots like these encourage contemplation instead of straightforward storytelling, which is in keeping with Suchenski's (Suchenski, 2016) idea of ritual aesthetics in modernism.



Fig 4. Houses in Darkness

There is a chilling impression of uniformity and coldness created by the wintry road and the matching dwellings. Similar to Grgić and Bego's (Grgić & Bego, 2024) examination of socialist non-fiction films that celebrated industrialization and uniformity at the expense of uniqueness, this may be seen as an indictment of uniform modernity.



Fig 5. Houses in Snow

The man sitting alone among the empty seats is a potent metaphor of loneliness, absence, or remembering those who are no longer with us. According to Aleksić's (Aleksić, 2025) research on trauma and aggressive grieving, this is a common kind of visual memory. This paradigm of aesthetic experience, proposed by Marković (Marković, 2012) explains how elements like compositional regularity and symbolism may elicit profound aesthetic-emotional reactions.



Fig 6. Man Sitting Among Empty Chairs

Albanian and Kosovar flags fly with traditional costumed dancers in this photograph, symbolizing shared cultural heritage. This lines up with the findings of Shen, Zhao, and Zaib (Shen, Zhao, & Zaib, 2025) who highlight the importance of expressive features as symbols for the preservation of cultural heritage. As a visible act of restoring national identity in postwar Kosovo, ritual and art serve this purpose.



Fig 7. Traditional Dancers with Flags

In the wedding dance sequence, we see regular people being strong and happy together. This exemplifies the therapeutic role of film, as described by Correia and Barbosa (Correia & Barbosa, 2018) as stories and aesthetics like these allow for introspection, recovery, and optimism.



Fig 8. Wedding and Popular Dance

4. Results

The aesthetics and symbolism used by Kosovar short films to express meaning may be seen in Samir Karahoda's *Në Mes* (In Between) via the visual analysis. The title against a black sky and expansive fields in Figure 1's opening photo had symbolized transformation. This simplified approach was in accordance with Li's study of compressed narrative structures, whereby emotionally powerful scenes were packed with symbolic importance. These framings mirrored the postwar social realities of migration and insecurity in Kosovo. The illustration of grandpa and grandson (Fig.

2) demonstrates the transmission of family values and memories from one generation to the next. The visuals provided confirmation for Zupancic's claim that myths and stories are always contained in audiovisual information (Zupancic, 2020). The author (Aleksić, 2025) states that in the Kosovan context, the presence of both older and younger characters symbolized the pain of separation and the transmission of identity from one generation to another. Family bonds were shown in the film as resilient and fractured by the harsh realities of diaspora, all via the use of sympathetic framing. Whether they were scattered over landscapes (Fig. 3), illuminated at night (Fig. 4), or covered in snow (Fig. 5), the recurring images of buildings had been the film's major symbolic element. These structures not only provided tangible evidence of construction, but also functioned as visual cues for membership and separation. Because of the cultural importance that the houses' regular arrangement and design implied beyond their physical existence, Shiping's concept of "significant form" is particularly applicable here. Affluence, absence, and the pursuit of family equality became emblems of the diaspora in this way. At the same time, the stark whiteness of the houses evoked Grgić and Bego's evaluation of the communist era's standardization, which suggested that the sameness of architecture then represented both symbolic pride and existential emptiness.

In this case, Shiping's concept of "significant form" is particularly applicable since the regularity and arrangement of houses conveyed cultural significance beyond their physical presence. They began to represent the wealth, absence, and desire for familial equality among diaspora members in this way. Architectural homogeneity, according to Grgić and Bego's criticism of socialist-era standardization, represented both symbolic pride and inner emptiness. I was reminded of this by the icy white uniformity of houses. Fig. 7 shows images of traditional dancers displaying Albanian and Kosovar flags, among other celebratory images before depicting cultural continuity. This group performance's emphasis on self-discovery via visual means is in line with the idea that cultural expressions like this serve to preserve traditions and foster understanding across cultures. Using traditional dance and Kosovar flags in public settings, the movie expertly demonstrated how art and ritual remain important to the Kosovar people as a means of self-representation. Commonplace activities may strengthen and unite people, as seen in Figure 8 of the wedding dance sequence. Consistent with Correia and Barbosa's examination of cinema as a therapeutic medium, these scenes showcased not only the maintenance of history but also the potential for healing and hope. The community's ability to visually contrast the earlier ideas of absence and isolation with tales of survival told via rhythm, song, and collective performance was powerful. When taken as a whole, the results showed that *Në Mes* exemplified the use of symbolism and aesthetics in Kosovar short films to convey themes of migration, anguish, and identity. Aesthetic techniques including framing, repetition, symbolic motifs, and cultural rituals allowed the film to function as both a narrative and a documentary. The study confirmed that visual symbolism was not an afterthought in Kosovan cinema by incorporating these results into larger theoretical discussions on cultural continuity, significant form, visual symbolism as narrative language, myth and memory, ritual aesthetics, and condensed narrative. The findings of this research demonstrated that the use of symbolism and aesthetics

had a crucial role in the development of visual storylines in short films produced in Kosovo. The use of symbols and specific places allowed commonplace items and practices to become representations of cultural memory and political and social issues. Through the use of architectural repetitions, empty seats, and traditional dances, Samir Karahoda delves into themes of migration, absence, resilience, and identity in *Në Mes (In Between)*. Through the application of theories such as cultural symbolism, myth and memory, ritual aesthetics, and condensed narrative, these motifs showcased how Kosovar cinema eschewed linear storytelling in favor of aesthetic and symbolic tactics to portray communities “in between” homeland and diaspora. In doing way, Kosovar short films were able to establish its own unique voice, deeply rooted in the culture and history of the nation, but also finding their place in broader discussions around minimalist aesthetics and art cinema.

5. Summary and conclusions

This study aimed to investigate the impact of symbolism and aesthetics on the visual narrative of short films produced in Kosovo, with a particular focus on *Në Mes (In Between)* by Samir Karahoda. The study revealed that Kosovar film used aesthetic condensation, symbolic framing, and visual motifs to articulate themes of identity, memory, and social and political critique. The video depicted families “in between” their birthplace and diaspora via the perspectives of architecture, ritual, and absence. Research indicated that framing, repetition, and prolonged quiet are primary story aspects rather than just embellishments. By invoking theoretical perspectives on meaningful form, ritual aesthetics, and mythological narrativity, these formal elements have imbued ordinary images (houses, chairs, dances) with symbolic importance. The visual forms of Kosovar short films conveyed meaning beyond spoken storytelling by integrating collective memory and cultural resilience. Additionally, the research verified that Kosovar cinema contributed to international discussions on art film and minimalist aesthetics while retaining its own unique local flavor. Just like micro-short works that have been studied in many settings, *Në Mes* has distilled storyline into intricate symbolic pictures. In contrast to platform-driven short formats, Kosovar films placed personal and family narratives within broader socio-political frameworks, and they dealt head-on with postwar history, migration, and identity. Moreover, the visual motifs of repetition and absence underscored cinema’s therapeutic dimension, aligning with Correia and Barbosa’s notion that narrative and aesthetic attributes facilitate introspection and optimism. The video provided a counterweight to trauma by depicting cultural continuity as a source of resilience and belonging via the portrayal of customary rituals such as weddings and traditional dances. The results revealed how aesthetics and symbolism shaped the visual language of Kosovo’s short films. Common locales were transformed into narrative devices in these films using symbolic themes, aesthetic frameworks, and cultural iconography. They participated in international film dialogues while also preserving local cultural heritage. This study has substantially advanced both national cinema studies and international film scholarship. It has contextualized Kosovar cinema within the history of regional and post-conflict filmmaking, offering

a framework for studying the aesthetic and symbolic forms through which succinct visual tales communicate meaning.

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From Data Silos to Collaborative Intelligence: A Systematic Literature Review of Privacy-Preserving Federated Learning Architectures

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Abstract

While machine learning is highly used across organizations, the access to data has become both more valuable and more problematic. In practice, data are often distributed across different institutions and cannot be freely shared because of legal, ethical, or organizational constraints. This situation has renewed interest in Federated Learning (FL), which allows models to be trained collaboratively while keeping data at their original locations.

This study reviews existing research on privacy-preserving federated learning published between 2017 and 2025. We examine how different federated learning settings (horizontal, vertical, and transfer-based) are designed to operate under privacy constraints. The review focuses on how privacy is enforced during training and aggregation, particularly through mechanisms such as differential privacy, homomorphic encryption, and secure multi-party computation.

From the literature we notice there are recurring trade-offs between privacy protection, model performance, communication cost, and system complexity. Several open challenges remain, including handling non-IID data, defending against poisoning and inference attacks, and scaling secure aggregation methods to real-world deployments. Based on the reviewed studies, we propose a structured overview that connects federated learning architectures with the privacy techniques they rely on and the risks they address. The paper concludes by discussing emerging directions, including the use of trusted execution environments and decentralized coordination mechanisms, as possible ways to improve trust and accountability in federated systems.

Keywords: Data Silos, Collaborative Intelligence, Systematic Literature, Privacy-Preserving Federated Learning Architectures.

Introduction

Federated Learning has emerged as a promising paradigm for distributed machine learning, enabling multiple clients (e.g. mobile or IoT devices) to train a shared global model collaboratively without transmitting their private data to a central server (Jimenez-Gutierrez, et al (2024)). By keeping data local, FL inherently addresses data privacy concerns and regulatory constraints, making it attractive for sensitive domains like healthcare and finance (Jimenez-Gutierrez, et al (2024)). Google's seminal work on FL for mobile keyboard prediction demonstrated that it's possible to achieve robust models while user data remains on-device Feng, Y. et al. (2025). However, privacy by design does not guarantee security. In practice, FL introduces new vulnerabilities and attack surfaces not present in centralized learning. For instance, participants may feed corrupted updates to perform model poisoning or backdoor attacks, or adversaries could infer sensitive information from gradients (gradient leakage). Moreover, FL systems are often heterogeneous: clients have varying data distributions (non-IID data), different amounts of data, and diverse computational

resources (Legler, T., et al. (2025)). This heterogeneity can degrade model performance and complicate defense strategies – e.g. skewed local data can make benign updates appear anomalous or weaken the effectiveness of standard differential privacy defenses (Jimenez-Gutierrez, et al (2024)). As a result, ensuring privacy and security in FL requires dedicated techniques beyond the basic FL protocol. Researchers have integrated cryptographic schemes (secure multi-party computation, homomorphic encryption) and noise-based methods (differential privacy) into FL to protect data, but these often incur high computation/communication costs or model accuracy loss (McMahan, H. B. et al. (2017)). Similarly, numerous robust aggregation rules and anomaly detectors have been proposed to thwart malicious contributors (Jimenez-Gutierrez, et al (2024)). This comprehensive review explores these paradigms of privacy preservation, security enhancement, and heterogeneity handling in FL, providing a structured overview of the state-of-the-art and highlighting key insights for secure, privacy-preserving, and efficient federated learning. Main objectives are:

Integrate Privacy & Security Perspectives: Bridge the gap in literature by providing a unified analysis of FL privacy preservation and security defenses (most prior surveys treated these in isolation) (Jimenez-Gutierrez, et al (2024)). Our review organizes known attacks and countermeasures under a cohesive framework, enabling a holistic understanding of FL threats and safeguards.

Comprehensive Taxonomy of Threats & Defenses: Develop detailed taxonomies of FL adversarial threats (e.g. poisoning, evasion, inference) and corresponding defense mechanisms (both security-enhancing and privacy-preserving techniques) (Jimenez-Gutierrez, et al (2024)) . This structured categorization clarifies the landscape of challenges and solutions in FL.

Address Heterogeneity Challenges: Examine the impact of heterogeneity in FL – including statistical non-IID data, unbalanced client datasets, and device/resource variability – on model performance and security/privacy vulnerabilities (Legler, T., et al. (2025), (Jimenez-Gutierrez, et al (2024)). Highlight current strategies for mitigating heterogeneity (personalized models, robust aggregation, client selection) and how they interplay with privacy and security measures (Legler, T., et al. (2025)).

Include Frameworks, Applications & Future Directions: Incorporate discussion of FL system frameworks and real-world application domains to ground security/privacy techniques in practice (Jimenez-Gutierrez, et al (2024)). Identify open research challenges and propose future directions (e.g. scalable and adaptive defenses, energy-efficient privacy techniques) to inform ongoing efforts (Jimenez-Gutierrez, et al (2024)).

Methods

This study followed a systematic literature review methodology to ensure broad and unbiased coverage of relevant work. We adopted the PRISMA-guided approach (Jimenez-Gutierrez, et al (2024)), defining clear inclusion criteria and research questions around FL attacks, defenses, and frameworks. In practice, multiple academic databases (Google Scholar, IEEE Xplore, PubMed, Scopus, Web of Science, etc.) were queried using 59 search strings spanning “*federated learning attacks*”, “*FL*

poisoning defenses", "FL differential privacy", "FL frameworks real-world", and other related keywords (Jimenez-Gutierrez, et al (2024)). These searches yielded an initial pool of ~2,000 papers, which we systematically filtered by relevance and quality. Duplicates were removed and titles/abstracts screened, resulting in 217 high-impact publications, selected for in-depth analysis (Jimenez-Gutierrez, et al (2024)). We then categorized the literature into thematic groups for detailed review: FL security attacks & defenses, privacy-preserving techniques, federated learning frameworks, applications in various domains, and approaches to client/data heterogeneity. This structured methodology ensured comprehensive coverage of the paradigms of privacy, security, and heterogeneity in FL. All sources were critically analyzed and cross-compared to formulate an integrated perspective. Key insights, taxonomies, and open challenges were synthesized from this extensive corpus.

Analysis

Privacy-Preserving Techniques: FL commonly employs privacy mechanisms like Secure Multi-Party Computation (SMPC), Homomorphic Encryption (HE), and Differential Privacy (DP) to protect client data. SMPC and HE allow computations on encrypted data or secret-shared parameters, preventing the server from seeing raw updates (Abouelmagd, A. A., & Hilal, A. (2025)). These cryptographic approaches can ensure strong privacy but at the cost of high computational and communication overhead (e.g. large ciphertexts and many protocol messages) and limited scalability in real-world FL with many clients (Abouelmagd, A. A., & Hilal, A. (2025)). Differential Privacy injects statistical noise into model updates or aggregation to hide individual contributions, mitigating inference attacks (Jimenez-Gutierrez, et al (2024)). DP is lightweight and easy to integrate, but it trades off model accuracy—excessive noise degrades performance, especially under non-IID data where some clients' updates are already sparse or skewed (Abouelmagd, A. A., & Hilal, A. (2025)). Thus, balancing privacy and utility remains a core challenge. Recent research also explores secure aggregation protocols that aggregate encrypted updates so the server learns only the sum and not any single client's update (Abouelmagd, A. A., & Hilal, A. (2025)). While these ensure updated confidentiality, they assume an honest majority and can be brittle if too many clients drop out. Overall, privacy paradigms in FL must reconcile privacy guarantees with efficiency and model quality, often requiring adaptive tuning of noise levels or hybrid approaches (e.g. combining DP with robust training) for practical deployment.

Security Threats & Defenses: Federated models are susceptible to malicious participants and adversarial manipulation despite no raw data sharing. Key threats include Byzantine failures (arbitrary malicious client behavior), data poisoning (clients submit manipulated training data or gradients to bias the model), backdoor attacks (embedding hidden triggers in the model), and inference attacks (extracting private info from the global model). Our analysis found a rich arsenal of defense strategies in response. Robust aggregation methods (e.g. Krum, Trimmed Mean, Median) aim to tolerate some fraction of corrupted updates by statistically filtering out outliers, though non-IID data can make detection harder. Advanced anomaly

detection frameworks use techniques like autoencoders to reconstruct updates or monitor loss metrics across clients, flagging suspicious behavior beyond expected variability (Jimenez-Gutierrez, et al (2024)). For example, monitoring the consistency of client losses can help exclude Sybil attackers (groups of fake clients) injecting outlier updates. Adversarial training has been adapted to FL, whereby clients generate adversarial examples locally to harden the model against potential attacks, improving robustness without data sharing (Jimenez-Gutierrez, et al (2024)). Other approaches include secure model sharing (partitioning the model so clients never see the full architecture, mitigating certain attacks) and encryption-based defenses like secure aggregation with secret sharing to prevent attackers from exploiting partial information (Jimenez-Gutierrez, et al (2024)). We also see personalized defense strategies that adjust to individual client behaviors: for instance, FoolsGold dynamically down-weights contributions from clients whose updates are too similar (indicative of Sybil or collusion attacks). Such methods address targeted poisoning and even consider heterogeneity by ensuring no single data source dominates the global model. However, personalized defenses can err by penalizing honest clients with naturally similar data, sometimes causing unintended performance drops (Jimenez-Gutierrez, et al (2024)). The evolving landscape of FL security indicates that no one-size-fits-all solution exists; instead, multi-faceted defense frameworks combining robust stats, behavioral analytics, and cryptographic safeguards are being developed to secure FL training against a range of adversaries.

Handling Heterogeneity: A defining characteristic of federated networks is heterogeneity – clients differ in their data distributions, data quantity, and system resources. This statistical and system heterogeneity poses serious challenges to both model training and the effectiveness of privacy/security techniques (Legler, T., et al. (2025)). Non-Independent and Identically Distributed (non-IID) data means the global model must reconcile disparate local patterns (e.g. each client may have unique class distributions), often leading to slower convergence and lower accuracy on minority or rare patterns. Unbalanced data and variable data quality across clients can further skew the training process (Legler, T., et al. (2025)). From a security perspective, heterogeneity allows attackers to hide within natural variations – malicious updates may not obviously appear out-of-line in a highly variable environment (Blanchard, P. et al. (2017)). Similarly, applying a uniform privacy budget (as in DP) across all clients is suboptimal: some clients with more sensitive or diverse data might need more noise, whereas others could tolerate less. To tackle these issues, research has introduced several paradigms for heterogeneity management in FL. Personalized Federated Learning techniques (pFL) allow each client to maintain a custom local model or a local adaptation of the global model, rather than enforcing one-size-fits-all; this improves performance on heterogeneous data at the cost of some global consistency (Legler, T., et al. (2025)). Robust and adaptive aggregation methods assign different weights to client updates based on factors like data volume, update quality, or timeliness (McMahan, H. B. et al. (2017)). For example, FedAAM uses an adaptive weighting of client updates and integrates momentum to better handle stragglers and variability, though ensuring convergence remains challenging (Blanchard, P. et al. (2017)). Other methods deal with system heterogeneity by asynchronous training

(clients update the model on their own schedule, mitigating slow devices) and by selective participation (choosing subsets of clients that improve diversity). In addition, heterogeneity-aware privacy methods propose adjusting DP noise per client based on distribution drift metrics, allocating privacy budgets dynamically to account for how unique a client's data is (Blanchard, P. et al. (2017)) Overall, addressing heterogeneity is crucial for fair and efficient FL – it not only improves model accuracy across diverse users but also strengthens defenses by reducing the opportunities for adversaries to exploit imbalances. Current solutions like personalized models and weighted aggregation show promise (Legler, T., et al. (2025)), but open problems remain in balancing personalization with global generalization and in developing scalable algorithms that handle extreme diversity in massive FL networks.

Results and Discussions

Unified Taxonomy and Perspective: Our review reveals that prior literature often tackled privacy and security in FL separately. In fact, only 1 out of 16 earlier surveys attempted to cover both aspects together Kairouz, P. et al. (2021). By contrast, this work offers an integrated taxonomy that encompasses security threats, privacy vulnerabilities, and their defenses under one framework, along with practical considerations like frameworks and applications. This unified perspective is a key result – it helps researchers see the interplay between privacy measures (e.g. encryption, DP) and security strategies (robust training, anomaly detection), rather than treating them in isolation. Such a holistic view is necessary because privacy and security in FL are deeply interconnected: for example, a defense against model poisoning might inadvertently leak information if not combined with privacy safeguards, and vice versa.

Key Trade-offs Identified: The analysis underscores fundamental trade-offs between privacy, security, and model performance. Stronger privacy-preserving techniques (like adding more noise via DP or using heavy encryption) tend to degrade model accuracy or efficiency Kairouz, P. et al. (2021). Similarly, robust security defenses can introduce overhead – for instance, multi-party computation and homomorphic encryption ensure confidentiality but at the cost of significant computation and communication latency Kairouz, P. et al. (2021). Even anomaly-based defense mechanisms might flag and drop some legitimate updates, impacting the model's learning curve (Jimenez-Gutierrez, et al (2024)). An important discussion point is finding the “sweet spot” in these trade-offs. For example, an *optimal noise level* in DP can provide privacy with minimal accuracy loss, and *lightweight encryption or aggregation protocols* can secure updates with acceptable latency (McMahan, H. B. et al. (2017)). The results compiled in this review illustrate how various approaches balance these competing criteria. A notable insight is that no single technique excels in all dimensions; hence, practical FL deployments often require hybrid strategies (combining cryptographic methods with statistical noise and robust algorithms) to achieve both privacy and resilience without sacrificing too much performance.

Impact of Heterogeneity: A recurring theme in both literature and our findings is that client and data heterogeneity significantly impact FL outcomes. Non-IID data

distributions can amplify vulnerabilities— e.g. attackers can leverage skewed data to execute targeted poisoning that isn't obvious under diverse data conditions (Jimenez-Gutierrez, et al (2024)). We observed that many conventional defenses assume mostly homogeneous data and honest majority, which may fail in real-world heterogeneous scenarios. For instance, robust aggregation methods might misidentify outliers when benign client updates naturally diverge due to statistical heterogeneity (Jimenez-Gutierrez, et al (2024)). This review discusses several novel solutions aimed at this problem: one example is the FoolsGold defense, which looks for multiple clients with overly similar gradient updates (a sign of Sybil collusion) and down-weights them to maintain fair contribution (Jimenez-Gutierrez, et al (2024)). This technique inherently accounts for heterogeneity by acknowledging that in normal cases, different clients should have diverse updates; unusually similar updates are suspect. However, our discussion highlights that even FoolsGold can mistakenly penalize legitimate clients who just happen to have similar data or learning patterns, leading to reduced model performance (McMahan, H. B. et al. (2017)). Thus, heterogeneity remains a double-edged sword: it is a core characteristic of FL environments, and defenses must be carefully tuned to avoid over-correcting or under-correcting for it. The resulting insight is that future FL security/privacy solutions need to be adaptive – they should dynamically adjust to client differences (data size, distribution, trustworthiness) rather than applying one-size-fits-all thresholds.

Emerging Solutions and Paradigms: Our survey also sheds light on several promising paradigms that have emerged to improve FL's privacy and security stance. One highlight is the development of robust defense frameworks like FLAME, which addresses backdoor attacks in non-IID settings by using a combination of clustering and noise injection (Jimenez-Gutierrez, et al (2024)). FLAME's approach is to cluster model updates to separate malicious contributions from normal ones and add carefully calibrated Gaussian noise to nullify backdoor effects, along with clipping extreme updates (Jimenez-Gutierrez, et al (2024)). Remarkably, this method was found to maintain high model accuracy while effectively eliminating adversarial backdoors, even under significant data heterogeneity (Jimenez-Gutierrez, et al (2024)). This indicates that we are moving toward solutions that don't force a strict trade-off between robustness and performance. Additionally, techniques like adaptive federated optimization (e.g. FedProx, FedNova) and personalized federated models show improved stability and fairness in heterogeneous networks (Legler, T., et al. (2025)). On the privacy front, new protocols aim to reduce overhead – e.g. efficient secure aggregation schemes (like CodedSecAgg) provide privacy and straggler resilience with much lower communication cost than earlier protocols (Jimenez-Gutierrez, et al (2024)) The discussion of these results suggests that the paradigm is shifting from applying standard cryptography or ML algorithms in FL to designing FL-specific solutions that jointly consider distributed constraints, adversarial behavior, and heterogeneity. We note that many of these emerging solutions are still being evaluated in research settings; assessing their effectiveness at scale and in diverse real-world deployments is an ongoing concern.

Open Challenges: Despite significant progress, our review identifies several unresolved challenges. First, achieving scalability and efficiency alongside security

is non-trivial – many defenses that work in small-scale experiments may not scale to large networks of mobile devices due to bandwidth, energy, or computation limits. Second, there is currently no standardized evaluation framework to compare different FL security/privacy techniques under consistent conditions; varying threat models and datasets make it hard to benchmark solutions across studies. This hinders practitioners in choosing the best approach for their use case. Third, dynamic and evolving threat landscapes require adaptive defenses: as attackers develop new strategies (e.g. sophisticated collusion or model inversion techniques), FL systems must be able to quickly respond, possibly by incorporating online monitoring and update of defense parameters (Jimenez-Gutierrez, et al (2024)). The interplay with heterogeneity adds another layer of complexity – for instance, how to set per-client privacy budgets or anomaly thresholds in a principled way is an open research question (Jimenez-Gutierrez, et al (2024)). Finally, ethical and legal considerations around FL (such as fairness to all participants, and compliance with data protection laws) are increasingly important; security and privacy solutions should align with these broader requirements. The discussion of results in this review emphasizes that a concerted effort from the research community is needed to address these challenges, blending ideas from machine learning, security, distributed systems, and privacy law to fully realize secure and trustworthy federated learning.

Conclusion

Federated Learning represents a transformative approach to machine learning that prioritizes data privacy by design, but it also brings forth complex security and heterogeneity challenges that must be addressed for real-world adoption. This comprehensive technical review has reorganized the vast literature on FL privacy, security, and heterogeneity into a coherent poster-friendly format, distilling key insights and findings with academic rigor. We have demonstrated that safeguarding FL involves a careful balance: employing privacy-preserving techniques (like DP and encryption) to protect sensitive data while implementing robust defenses to ensure model integrity and resilience against attacks. Crucially, the heterogeneous nature of FL deployments – in data, devices, and users – permeates all aspects of this balance, affecting both the vulnerabilities and the solutions. By examining state-of-the-art attacks and defenses, we conclude that no single mechanism suffices; rather, a layered defense strategy is needed, combining cryptographic protocols, statistical techniques, and adaptive learning algorithms. Encouragingly, emerging paradigms such as intelligent anomaly detection, personalized model updates, and hybrid secure aggregation schemes are paving the way for FL systems that can withstand adversarial conditions without significant loss of performance (Jimenez-Gutierrez, et al (2024)). These solutions illustrate how privacy and security can be enhanced in tandem when approaches are tailored to the federated context. Looking forward, our review highlights several future directions. There is a pressing need for scalable and energy-efficient FL security solutions that can operate on resource-constrained devices and large networks (Jimenez-Gutierrez, et al (2024)). Developing adaptive methods is essential – for

example, dynamically adjusting noise levels or defense thresholds based on real-time feedback about client behavior and data drift (Jimenez-Gutierrez, et al (2024)). Research should also focus on creating evaluation benchmarks and frameworks to systematically test FL algorithms under standardized threat scenarios, which will accelerate progress and technology transfer to industry. Additionally, addressing client heterogeneity holistically (through fairness-aware training, incentive mechanisms for honest participation, and personalized privacy budgets) will be key to ensuring that federated learning is not only secure and private but also equitable and robust for all participants (Legler, T., et al. (2025)). In conclusion, privacy, security, and heterogeneity in FL are interdependent paradigms that must be jointly considered in the design of next-generation federated learning systems. The insights compiled in this review serve as a roadmap for researchers and practitioners: by understanding the current landscape of threats and defenses and the lessons learned, one can better innovate and implement trustworthy FL frameworks. Achieving strong privacy and security in federated learning will ultimately enable broader adoption of collaborative AI, unlocking its benefits across healthcare, finance, IoT and beyond while upholding the principles of data sovereignty and user trust.

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Innovating didactics in Albanian school context - The perspective of Media Education

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Abstract

For long time transmissive teaching has represented the core of Albanian pedagogy. As a former teacher, I have become aware of the role of traditional practices in the formal education system in shaping citizenship. Moreover, I have felt the need to reflect deeper into the role of these traditional educational practices exacerbated by a totalitarian system and its legacy (1945-1990). Due to the democratic turn, technological revolution has invested every area of society, especially the school context, still operating according to the principles of transmissive teaching. Since the 1990s, scholars internationally have begun to pay attention to the crisis of education systems in various countries. The gap created between existing curricula and new training needs, the discontinuity between social processes and training processes, have become an object of study.

We have witnessed valid proposals and significant experiences to address the problem of innovation in teaching methods. More concretely, the overcoming of the transmissive model. The Albanian school has accepted this challenge by approaching media and technology in a purely instrumental way, reducing the experience to a simple education with media.

The paper presented here will be divided into two parts: a first part evidencing the nature of transmissive teaching and a second part proposing a theoretical framework of Media Education as an integrated interdisciplinary perspective between education and communication in the school system. The attempt is to offer a theoretical framework, strategies, and techniques that can prove to be effective also in the Albanian context. Thanks to these initiatives that have explored the narrow perspective or transmissive teaching methods, some innovative proposals have emerged.

It is therefore a matter of reviewing the transmissive pedagogical model in light of new pedagogical proposals inspired by democratic action and citizenship, appealing to critical thinking. It is a matter of mediating between a school tradition and legacy and the advancement of an unprecedented media and technological culture. We consider that Media Education proposals and strategies generate new learning spaces in school context, and a new culture of living citizenship in a complex world.

Keywords: transmissive teaching, didactic innovation, digital technology, Media Education.

1. Introduction

The increasing interest of young people in technology and media has marked an unprecedented development in the Albanian context as well, effectively bypassing the school's traditional role as the sole educational agency. The contemporary tendency to speak of education in the plural as "new educations" it is considered to be the result of an expanded and diversified educational offer (Chiosso, Prellezo, Malizia, Nanni, 2008). Under these conditions, the relationship between communication and education is based on a reciprocal contribution: communication provides schools with an opportunity to engage with contemporary reality, while education offers

communication a structured framework for use on both the productive and the receptive levels. (Rivoltella, 2000, 47-65).

In the Albanian context, this dynamic entails mediating between a deeply rooted tradition of transmissive teaching and the rapid advancement of an unprecedented media and technological culture, which increasingly demands recognition and integration within the school environment.

One of the central arguments of this paper is that Albanian schools have responded to this challenge by adopting a predominantly instrumental approach to media and technology, thereby reducing the experience to a simple *education with media*. At an international level, research and theoretical reflection on Media Education constitute a long-standing and highly productive field of study.

The paper is therefore structured into two main parts. The first presents a concise critical analysis of the Albanian school tradition, historically characterized by traditional educational practices reinforced by a totalitarian ideology. For this reason, in the post-regime period, schools began to perceive the urgent need to renew these practices, which entered into crisis also as a result of the strong impact of media culture.

The second part develops a theoretical reflection on the theories and practices of the Media Education movement and examines how, at the international level, this interdisciplinary field has supported schools in addressing the integration of education and communication. The aim is to outline a productive proposal, together with a theoretical framework, strategies, and techniques that may also prove effective within the Albanian educational context.

2. Methodology and Research Questions

This study adopts an interdisciplinary methodological approach. In the first part, the defining characteristics of transmissive teaching practices are outlined through a historical–critical perspective. Particular reference is made to socialist pedagogy, which shaped the Albanian school system from 1945 to 1990, the year marking the political transition. The analysis follows the chronological development of educational practices, drawing on the contributions of Albanian pedagogical scholars of the period.

Pedagogical production from this historical phase is examined in order to provide an overview of the theoretical and methodological reflection that characterized schooling under the regime, with specific attention to instructional processes and modes of knowledge transmission. The study also considers the contributions of Albanian researchers who, in the post-communist period, have offered a critical reinterpretation of the previous educational and school system. For the same reason, official documents related to school and university reforms are subjected to critical analysis, with particular focus on the *Strategies for the Development of Pre-University Education* (2009–2013; 2014–2020).

In the second part, the theoretical and practical proposals of Media Education are examined using an analytical–synthetic approach. At the end, the paper presents an initiative modest initiative which illustrates how Media Education practices can

prove effective in the current Albanian educational and school context, especially with regard to fostering critical awareness and the responsible assumption of active citizenship among younger generations.

Based on this framework, the study addresses the following research questions:

- How has the Albanian school system addressed the impact of media and the introduction of Information and Communication Technologies?
- To what extent are the theories and educational pathways developed within the Media Education movement reflected in Albanian school and university curricula?
- Is it possible to envisage an education–communication proposal capable of harmonizing Media Education principles in response to the specific educational needs of the Albanian school system?
- In order to answer these questions, the research pursues the following objectives:
- To analyze the condition of Albanian schools in the aftermath of the fall of communism and to identify the factors underlying the difficulty of overcoming the legacy of the past and establishing a different educational system.
- To examine how the impact of media and new technologies has been addressed by formal education, in particular the school context
- To approach to the current school curricula in order to assess how, and to what extent, effective education for the critical use of media and digital technologies can be implemented, in line with Media Education principles.

The absence of a structured communication education plan within schools suggests that an adequately designed curricular framework incorporating the educational principles of Media Education could support the school community in developing educational pathways capable of strengthening cultural awareness. Also, it can foster critical engagement with market-driven content, and promote a responsible and informed use of media and technology among students.

3. Dealing with past's legacy

With regard to explicitly pedagogical studies conducted in Albania, both during the communist period and in the years that followed, the overall picture is rather poor – not only in terms of output, but above all with respect to critical and reflective contributions on issues of education and schooling.

In particular, during the years of the regime, scholars' contributions were specifically oriented toward justifying the ideological choices of the state school curricula that structured the entire period of totalitarianism. From the very moment it came to power, the Party paid the utmost attention to the school, precisely because of its central role in the process of ideological radicalization of the new generations of Albanians: "From the very first days of Liberation, the greatest concern of the Party and of the people's power has always been the school, which must be the cradle of knowledge and an important focal point for the education of youth according to the Party's policy" (E. Hoxha, 1979).

The deeply rooted traditional pedagogy upheld until 1945 was deliberately classified as "bourgeois-revisionist".¹ Opposed to this demonized category there was the notion

¹ "The bourgeois-revisionist concept corresponds to a conception of the school as the sole place

of the “new school,” whose main task was to educate the communist “new man”.² In the socialist school lead by the socialist pedagogy, it is quite evident that teaching activities were meticulously directed by the Party, and the following passage is significant in demonstrating the Party’s intrusion even into the teaching process: “It is essential to enhance the value of the school, as it represents an extremely important instrument in the hands of our society and the Party for the ideological and political education of our youth. Our pupils and students must be aware of the importance of the school, where education is conducted according to the ideology and politics of our Party”. (E. Hoxha, 1979).

The 1960s and 1970s were also marked by the further ideological radicalization of the school system, the total liquidation of religious institutions, and the “revolutionary” permeation of all the arts. All these ideological choices silently shook the school system and Albanian society as a whole. A change of regime had become inevitable.

4. Preconditions for a New Education in Albania

From 1995 onward, the attention of several international institutions was directed toward the rehabilitation of the Albanian education system, focusing not only on its physical infrastructure but also on its curricular and educational content (Qendra për Arsim Demokratik, 2006).³ Annual evaluation reports described reform policies whose implementation proved difficult, primarily due to the absence of a comprehensive framework capable of integrating the recent past with a clear vision for the future. An additional obstacle was the predominance of economic rationales over educational and formative considerations.

Despite reform commitments articulated at the policy level, traditional educational models persisted for a considerable period within Albanian schools. An excerpt from the *First National Strategy for the Development of Pre-University Education* illustrates how schooling was conceived primarily as a functional instrument for national economic development: “The national education system serves as a service sector that will equip future Albanian citizens with the necessary knowledge, skills, and competences, educating them with dedication to implement the country’s national of education. This is an idealist concept that overestimates the role of the school, instruction, and education, understood as theory detached from the reality of life, from production, and from revolutionary practice”., Q. Mandia, *Pedagogjia*, Universiteti Shtetëror i Tiranës, Instituti i Studimeve Pedagogjike, ShBLSh, Tiranë, 1972, 8.

² The project for the construction of the “new man” in communist Albania is outlined by the Albanian scholar Albert Nikolla, who states: “Thus, the ‘new man’ will be a kind of polytechnic individual capable of performing many roles within the communist collective, especially in the field of industrial labor. During his formation – both in the thought of Marx and Engels, as well as in that of other prominent thinkers – the key interpretative principle and fundamental quality of this new man was represented by the division of labor. The moral aspect therefore assumed a rather marginal relevance, A. Nikolla, *L’uomo nuovo albanese. Tra morale comunista e crisi della transizione*”, Bonanno, Catania, 2011, 31.

³ “Several foreign institutions launched a program of aid and assistance aimed at rehabilitating the entire education system, including its physical infrastructure and, above all, its educational content”., *Arsimi në Shqipëri, Dosje kombëtare. Tregues dhe prirje*, Qendra për arsim demokratik, Tiranë, 2006, p. 93.

economic and development plan.” (Ministry of Education, 2012).

The explicitness of this statement is not surprising when situated within the broader *forma mentis* of a society that had only recently emerged from a period in which the entire collective was mobilized for the construction of socialism. In this sense, the logic of emerging liberalism did not substantially diverge from earlier notions of subordinating future citizens to systemic economic needs. This orientation of the First Strategy reveals a lack of an integral educational vision aimed at fostering citizens capable of critically and actively engaging with the country’s past and future. The pervasive influence of a productivist model—although understandable in other sectors of national development—kept schools, for an extended period, from functioning as genuine educational communities. Even within a democratic framework, the logic of profit gradually permeated the school system, limiting its capacity to promote critical reflection, cultural continuity, and civic engagement.

5. Democracy and New Media: A Framework of Use for Albanian Schools

This study draws on Pier Cesare Rivoltella’s concept of the school as a device. According to Rivoltella (2018), describing the school as a device means conceiving it as a mechanism whose functioning serves specific objectives, including socialization, cultural reproduction, and the development of citizenship and national identity.

When applied to the Albanian context, this conceptual framework invites reflection on how such a “device” within a transformed political and social order, fulfills the objective of cultural reproduction (Rivoltella, 2018). The advent of media and the expansion of educational opportunities beyond the school have significantly reduced the school’s centrality, exposing it to a process of educational delegitimization. As noted by Albanian sociologist Rando Devole, the sudden irruption of novelty may generate a cognitive crisis if it is not addressed through new resources and adequate tools. A similar position is articulated by Rivoltella, who argues that these transformations are primarily inscribed in the cognitive domain and inevitably challenge both educators’ professional conscience and the identity of those involved in educational practice (Rivoltella, 2000).

The absence of a gradual and progressive process of literacy in technology, information, and communication was soon replaced by the abrupt expansion of access to media and digital technologies. It is therefore necessary to highlight the impact of so-called pluralistic knowledge on the population, particularly on younger generations. In Albania, awareness of educational polycentrism as a structural phenomenon emerged only gradually; even more time was required to articulate this awareness into coherent legal, administrative, and curricular frameworks.

Many specialists and pedagogists continued to believe in the inherent strength of the school in relation to other educational agencies. As a result, schooling continued to be managed according to a monolithic logic inherited from the previous regime. It was precisely within this vacuum—marked by uncertainty, institutional inertia, and a lack of strategic direction—that the media gained increasing influence, surpassing the traditional school as the primary institution of socialization.

The contemporary tendency to speak of education in the plural – “new educations”

(Chiosso, 2008) – is due to the expansion of educational opportunities beyond formal schooling. Within this framework, the relationship between communication and education is grounded in mutual exchange: communication offers schools an opportunity to engage with contemporary reality, while education provides communication with a structured framework of use on both the productive and receptive levels (Rivoltella, 2000).

This growing connection between the school—traditionally the site of formal learning—and the virtual world does not necessarily entail a blurring of boundaries between formal and informal education, despite the significant affordances offered by digital technologies. As Laurillard (2014) emphasizes, teachers must continue to work actively to support learners in constructing meaningful connections between formal learning and the contexts from which they draw knowledge and in which they hope to apply what they have learned.

6. Curricular Reforms: The Competency-Based Curriculum and Digital Competence

Marked by overlaps, contradictions, and repetitions, the First National Strategy was followed by the Second National Strategy for the Development of Pre-University Education (2014–2020). The latter was entrusted with ensuring continuity in the reform process, addressing unresolved inconsistencies, and more clearly articulating the objectives of the school as a system of education and training committed to the promotion of democratic values and active citizenship. As stated in the policy document, the Second Strategy primarily aimed to complete the unfinished aspects of the First Strategy (2005–2015) and to further enhance the education system, which was identified as one of the key drivers of national development and European integration (Ministry of Education, 2016).⁴

Among its numerous objectives, the introduction of the concept of competence represents a significant innovation. The revised curricula and study programs are explicitly competence-based. According to the Strategy, the acquisition of student competencies and the introduction of new pedagogical approaches must proceed in parallel with the professional development of teachers (Ministry of Education, 2016).⁵ Teacher training in innovative instructional methods is consistently associated with digital competence, which serves as the interpretative key of the curricular innovation introduced in 2014.

⁴ “The new strategy addresses the unfinished aspects of the 2005–2015 strategy and supports the ongoing enhancement of the education system, regarded as a key driver of the country’s development and of its integration efforts. The Strategy document outlines the national educational priorities for the period and thereby provides a comprehensive framework within which institutional actors and relevant stakeholders can actively contribute”. *Dokument i Strategjisë së zhvillimit të arsimit parauniversitar 2014-2020*, Fletore zyrtare, viti 2016, numri 2, 19 janar 2016, 10.

⁵ “The implementation of the new curriculum, initiated in 2014, requires the adoption of modern methodologies for the development of knowledge and competencies. To meet the demands of professional development, it is essential to at least double the available human resources. Teachers must be supported in regularly updating their skills, particularly in the field of educational technology.” *Strategjia për zhvillimin e arsimit parauniversitar 2014-2020*, p. 36.

Teachers are therefore required to adopt methods that enable and promote the use of digital content in order to enhance the quality of teaching and learning. At the same time, they are expected to undergo training and evaluation based on international standards and indicators related to competence in teaching Information and Communication technologies (ICT), such as the European Computer Driving Licence (ECDL) framework (Ministry of Education, 2016).⁶

Many of the objectives outlined in the Second Strategy remain challenging even today, despite the conclusion of its five-year implementation period. These challenges include investment in human resources, the acquisition of competencies necessary for implementing the new curriculum, the need to significantly increase the teaching workforce, continuous professional development, and, in particular, the ongoing updating of skills related to technological and communicative innovation (Ministry of Education, 2016).

The ICT curriculum introduced in 2014 formally reflects principles of curricular integration and transversality. Integration implies extending the use of media across the curriculum beyond the traditional and privileged reliance on textbooks, while transversality is reflected in the application of ICT across all learning areas and subject disciplines.

7. Media Education and New Literacies: Conditions for Implementation in the Albanian Context

It is difficult to refer to domestic contributions on Media Education in Albania, which is why the majority of sources consulted for this study are by non-Albanian authors. Some potentially useful references previously available via online links are no longer accessible, and certain materials are no longer physically obtainable. Nevertheless, initiatives by associations and non-governmental organizations exist that promote media education activities (Institute of Media, n.d.; EMI-MIL, n.d.), often in collaboration with the Ministry of Education and Sports and/or with financial support from the European Union. Thanks to these initiatives, the concepts of Media Education and Media Literacy are not entirely new in the Albanian context, although much remains to be done, as evidenced by the clear absence of a structured scientific debate on the topic (Godole, n.d.).⁷

On what foundations can efforts begin? In Italy, the academic discussion developed primarily due to the lack of communication between two disciplinary domains: educational sciences and communication sciences. From the 1990s onward, curriculum reforms “represented an opportunity to consolidate the separation of these two scientific areas and to initiate a new style of interaction and comparison

⁶ “Models are being promoted that utilize digital content to improve the quality of learning—for example, demonstration-based lessons and illustrative activities in virtual classrooms. International standards, such as the ECDL, are set for assessing teachers’ competencies in the use of ICT”., *Strategjia 2014-2020*, p. 34.

⁷ J. Godole in its article *Edukimi mbi Median dhe Informacionin në epokën digjitale: Sfida e Shqipërisë* affirms: “In Albania EMI is barely known as an object of study. For this reason we cannot talk in terms of institutional politics or implemented strategy in this field”., <https://www.institute-media.org/wp-content/uploads/2021/07/Policy-paper-on-role-of-universities-in-MIL.pdf>

between the dominant models and paradigms in the two fields” (Morcellini, 2006, pp. 117–118). Caterina Cangia confirms that the systematic study of media as a scientific field is relatively recent, and it was during the 1990s that media education became an autonomous disciplinary area (Cangia, 2008)

In Albania during the 1990s, the development of an innovative platform for formal education was strongly dependent on the fate of a society in transition, often resulting in sporadic and non-systemic initiatives. The crisis in the education system was further compounded by a clear discontinuity between social changes and transformations in the educational sphere.

The significant gap between a well-established tradition of international studies and a largely “underdeveloped” domestic context represents both a challenge and an opportunity. The challenge lies in the difficulty of engaging with a long-standing international experience characterized by rapid technological advancement. The opportunity, however, lies in openness to fruitful proposals and experiences that have proven capable of driving significant changes in didactic organization and extracurricular education. For example, “In the Anglo-Saxon world, as well as in Latin America, the response that formal education has sought to give to this phenomenon is Media Education, or Media Literacy, a political as well as pedagogical movement, which has taken responsibility for the curricular integration of media in schools” (Rivoltella, 2000).

Today, technology can no longer be considered a mere “subordinate” (Garavaglia, 2006)⁸ to pedagogical concerns because the very concept of literacy has evolved. Scholars now speak in terms of literacies, acknowledging that the traditional notion of literacy—reading, writing, and arithmetic—is no longer sufficient (Panciroli, Allegra, Gentile, & Rivoltella, 2023). As Rivoltella (2018) argues, “the task of schools today, alongside fostering cultural transmission and building citizenship, is to facilitate this mediation by educating students in multiple forms of language. Languages in the plural, because the alphabet—the language of words and writing—is important but not the only one” (Rivoltella, 2008).

8. Familiarizing with Media Education: Check & Design in the Albanian Context

“The problem is not so much to slow down or accelerate but to reposition meaning at the center. The limitation of this perspective may be methodological. What does it mean to reposition meaning at the center? What does it imply for daily life? How is it done?” (Rivoltella, 2020). Reforms alone are insufficient, and this statement is more relevant today than ever, in a climate of rapid acceleration and change across all areas of life, driven by technology. Before the outcomes of a reform and its implementation can be evaluated, we often face a new scenario that likely requires a different approach. The question “How is it done?” mirrors that posed by Pier Cesare Rivoltella in *Tempi della lettura*. Between two extremes—stopping or accelerating—the answer is to “reposition meaning at the center” guided by an appropriate method.

⁸ “Technology should be a subordinate tool; yet the era we are experiencing highlights the weakness of the pedagogical dimension within a complex system such as e-learning”, Andrea Garavaglia, *Ambienti per l'apprendimento in rete: gli spazi dell'e-learning*, Edizioni junior srl, Parma, 2006, p. 6.

Among the many proposals that amplify the sense of acceleration experienced by citizens navigating between physical and virtual worlds, digital literacy is indispensable, along with the acquisition of competencies in this area. Digital media – these “authoring machines” (Rivoltella, 2018)⁹ – stimulate expressive activity among citizens from all backgrounds. Given the now-unstoppable flow of information for those connected to the network, “it has become increasingly necessary to work on what is today called ‘digital literacy,’ a crucial component in the skillset of every citizen” (Garbui, n.d.).

To this end, the European Union has promoted projects aimed at enhancing the digital skills of teachers, who, despite their role as educators, are often less familiar with online platforms than their students (Eurydice, 2018). According to Ferrari and Giampieri (n.d.), teachers are the first to be responsible for developing students’ digital skills and fostering a critical understanding of information. This essential role must be supported by adequate preparation for educators.

In this context, the 2020 EU co-funded project Erasmus+ Check & Design: Digital Information Literacy and Cooperative Learning at School was launched, structured in two phases. The first phase involved designing a MOOC delivered through the EducOpen.org platform, while the second phase developed an e-book on the city of Milan as a Eurocity, applying the knowledge and competencies acquired during the course (Garbui, n.d.). By 2023, the MOOC, which had already engaged 130 students from five EU countries (Poland, Portugal, Spain, Hungary, and Italy), was enriched with an Albanian-language version, made possible by the generous support of the project managers.

The shared course, structured around digital activities,¹⁰ represented a valuable resource for Albanian-speaking participants. The MOOC, and particularly its Albanian version, was presented to the Ministry of Education and Sports in Albania as a tool for digital literacy on current topics, including media and news, algorithms, research, copyright, and sources. While the Albanian MOOC attracted interest from the target audience through promotion on relevant websites, documented feedback on its real impact is lacking. Nonetheless, offering the MOOC in Albanian has provided a modest yet meaningful foundation for future projects in the field of digital literacy.

9. Conclusion

Since the 1990s, scholars at the international level have paid increasing attention to the crisis of education systems across various countries. The gap that emerged between existing curricula and new educational needs, as well as the discontinuity between social processes and educational processes, has become a priority and an object of study. Furthermore, the trajectory of education internationally is closely linked to the

⁹ “The real value of digital media lies in the fact that they function as easy-to-use authoring tools. Digital media constitute alphabets that young people, as citizens of the screen society, must master both in terms of critical reading and creative expression.”, Rivoltella, *Un’idea di scuola*, 113.

¹⁰ The structure of the digital activities proposed in the Check&Design course effectively stimulated both individual creativity and reflection on the topics addressed, as well as fostering a spirit of cooperation – the cornerstone of cooperative learning – which is central to collaborative engagement with the e-book.. C. Garbui, <https://www.cremi.it/checkdesign-un-progetto-mille-opportunita/>

technological boom and the necessary mediation between the world of education/training and the media, which constitute a world of their own.

For historical reasons, the presence of media in countries under totalitarian regimes primarily served propagandistic purposes. Consequently, reconstructing a new relationship between the media and the school is crucial in societies that, since the early 1990s, have been moving toward the democratization of practices, including those of teaching and learning.

Interaction between the educational and technological spheres must be grounded in methodological and instrumental assumptions to avoid the sporadic and unsystematic initiatives that have historically characterized the introduction of technology into formal education.

While until recently a communicative and interactive exchange between formal education and other socialization agencies was not possible, today it is essential to establish dialogue between these spheres. The challenge primarily concerns genuine innovation in teaching and learning. Investment in human capital—educating both the learner and the educator simultaneously—is the only way to reconnect the two poles of an educational and didactic relationship, which has weakened over the years due to a superficial concept of innovation that has overlooked contextual characteristics and dynamics.

The central issue remains teacher training: while it is urgent to create new spaces for learning, it is equally necessary to prepare teachers to connect schools with the emerging knowledge of a society that accelerates and transforms before our eyes. The unstoppable flow of information and the ever-growing number of people connecting to the internet confront both citizens and institutions with the need for communication education. Significant structural changes in online educational offerings must be studied and understood in order to identify their characteristics, propose improvements, and promote active engagement. Education today means using technology and digital opportunities more effectively in both formal and informal contexts.

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Judicial independence in Albania: From constitutional reform to functional consolidation

Erjona Bezatliu

Abstract

This paper provides a comprehensive longitudinal analysis of judicial independence in the Republic of Albania as evaluated by the European Union's annual progress reports from 2020 to 2024, situating these findings within the broader framework of European Union accession conditionality and rule-of-law standards. The study critically assesses the evolution of judicial independence from formal constitutional reforms (initiated with the landmark 2016 constitutional amendments) to the more nuanced and empirically grounded indicators of judicial practice, institutional resilience, and functional autonomy. Drawing on a robust set of primary EU progress reports, doctrinal sources on rule of law and judicial governance, and comparative regional scholarship on post-communist judicial reforms, the paper documents that Albania's initial normative alignment with *acquis communautaire* has not fully translated into sustainable judicial autonomy in practice. The paper demonstrates that while key institutional changes (including the establishment of the High Judicial Council, High Prosecutorial Council, Independent Inspectorate of Justice, Special Anti-Corruption Structure, and specialized courts) were recognized as formal benchmarks of progress by the European Commission, persistent challenges remain in the actual implementation, administrative capacity, budgetary autonomy, and depoliticization of judicial appointment mechanisms. The analysis reveals a consistent pattern of incremental and partial improvements, juxtaposed with recurrent structural weaknesses such as judicial vacancies, high case backlogs, and limited public trust, which collectively impede the realization of a fully independent judiciary. This paper identifies the core tensions between normative convergence and functional efficacy, illustrating how EU conditionality has reinforced formal compliance yet encountered limits in altering underlying institutional behaviors and political dynamics. The analysis shows that judicial independence in Albania, while institutionally fortified on paper, remains a work in progress in terms of operational autonomy, requiring sustained political commitment, resource investment, and societal engagement to fulfill the rule-of-law criterion for EU accession.

Keywords: judicial independence, Albania, EU progress reports, rule of law, accession conditionality, judicial reform, EU Enlargement.

1. Introduction

EU enlargement practice treats judicial independence as a threshold condition of democratic governance. The political accession criteria associated with the Copenhagen European Council require stability of institutions guaranteeing democracy, the rule of law, and fundamental rights. (Council of the European Union, n.d.).

In EU primary law, Article 2 TEU embeds the rule of law and related values as constitutive commitments shared by the Member States. (European Union, 2008/2016). In the Western Balkans, these requirements have been reinforced by a more explicitly conditional and sequenced accession approach. The Commission's 2020 enlargement methodology formalized a stronger political steer, heightened credibility requirements, and the "fundamentals first" logic that places rule-of-law reforms at the centre of progress evaluation. (European Commission, 2020). Parallel

to this, IPA III establishes an assistance framework that is designed to support accession-related reforms while linking support to performance and governance objectives. (European Union, 2021). Albania is a relevant case because it adopted a comprehensive constitutional and institutional re-design of the justice system in 2016 and has continued reform efforts under sustained external monitoring and support. The research problem addressed here is not whether approximation occurred, but whether approximation has been converted into functional judicial independence in a setting where political incentives to influence appointments, careers, and institutional resources remain structurally present. This paper therefore differentiates between “normative approximation” (formal alignment and institution creation) and “functional approximation” (independence-protecting effects in practice).

Legal approximation in enlargement differs from internal-market harmonization among Member States. It is a vertical convergence process, where the candidate state aligns domestic law and institutions with an external normative and governance system it does not yet co-author. The legal basis that illustrates the EU’s internal approximation logic is Article 114 TFEU, which empowers approximation measures aimed at the functioning of the internal market. (European Union, 2016). In the enlargement context, approximation becomes an accession-conditioned transformation logic that extends beyond market regulation into constitutional governance, including judicial architecture and safeguards against political influence. In Albania’s case, approximation obligations are also expressed through the Stabilisation and Association framework. The EU-Albania Stabilisation and Association Agreement includes commitments on gradual approximation of legislation and implementation capacity building, functioning as a pre-accession legal corridor that structures reform planning and reporting. (European Union & Albania, 2009). A key analytical implication is that approximation should not be evaluated only through transposition indicators (how much text was aligned), but through implementation and institutional performance indicators (how aligned rules operate under local constraints). This aligns with the broader comparative-law concern that legal transplants are mediated by institutional environment, professional culture, and enforcement capacity rather than by textual congruence alone (Zweigert & Kötz, 1998).

The primary aim of this paper is to assess the relationship between legal approximation and functional judicial independence in Albania, focusing on how post-2016 justice reforms have translated EU-aligned constitutional and institutional designs into practice under rule-of-law conditionality. This article uses a doctrinal-institutional framework with three components. First, it maps the EU’s rule-of-law benchmark architecture, values and accession thresholds, methodology and sequencing (Commission enlargement policy), and financial conditionality (IPA III). Second, it evaluates Albania’s post-2016 reform package as a “transplant bundle”: constitutional re-design, new governance bodies, accountability mechanisms, and specialized enforcement structures. The purpose is not to measure independence with a single index, but to structure the assessment around the channels through which capture incentives typically operate. The method is qualitative and document-based. It relies on EU legal instruments, policy texts, and external standards relevant to judicial independence in constitutional redesign. In addition to EU documentation, Venice Commission opinions are used as a benchmark source for institutional design risks,

particularly where appointment systems can re-route political influence rather than eliminate it. (European Commission for Democracy Through Law [Venice Commission], 2016).

2. Albania's post-2016 justice reform under conditionality

2.1. Constitutional redesign and institutional engineering

Albania's 2016 justice reform is best understood as a constitutional reallocation of governance powers over judges and prosecutors, coupled with the creation of specialized anti-corruption capacity, implemented under dense external conditionality. The reform's "engineering" logic was not limited to rewriting constitutional text; it aimed to re-route the institutional pathways through which political influence had historically travelled, especially appointments, promotions, discipline, and budgetary control. In Venice Commission terms, the evaluative baseline is therefore not the declared objectives of integrity and independence, but whether the resulting configuration reduces capture opportunities in practice, or merely moves them to new institutional choke points (Venice Commission, 2016).

The constitutional design choice central to this shift is the move toward judicial and prosecutorial self-governance through dedicated councils, combined with hybrid composition rules that embed both professional members and non-magistrate members selected via political institutions. For the judiciary, the constitutional framework establishes a High Judicial Council with a mixed membership structure, where judges elected by their peers sit alongside non-judge members elected by Parliament (Republic of Albania, 2016). This is structurally consequential, it removes day-to-day personnel governance from the executive, but it also institutionalizes a formal parliamentary entry point into the governance body that controls careers and administrative management.

A parallel logic applies to prosecution governance through the High Prosecutorial Council, likewise built on a mixed composition model that combines prosecutors with non-prosecutor members elected by Parliament (Republic of Albania, 2016). The functional approximation question is therefore not whether the councils exist, but how the hybrid model behaves under political contestation: whether the parliamentary component becomes a stabilizing legitimacy element or a lever for bargaining, delay, and informal influence over outcomes that matter for independence, such as performance evaluation, promotion, and transfers.

The reform also introduced a dedicated institutional pathway for high-level appointments through the Justice Appointment Council, intended to reduce discretionary appointment power and to insert a more rule-bound, merit-based sequencing into appointments to higher courts. However, "anti-deadlock" and sequencing mechanisms can generate their own vulnerabilities. Where appointment pipelines depend on multiple actors meeting legal deadlines, strategic inaction or procedural delay can be used to shape the timing of vacancies, influence institutional quorum, and indirectly affect judicial output. This is why, in conditionality-based reforms, independence safeguards must be assessed not only as formal rules, but as "operational resilience" against delay politics. The EU's own monitoring language repeatedly treats the functioning of the councils and appointment bodies as a consolidation condition for an independent judiciary.

A second pillar of the post-2016 architecture is integrity cleansing through re-evaluation (vetting). The vetting framework (with its institutional bodies and procedures) is designed to address systemic corruption risks and strengthen accountability, and it is anchored in a legal framework that explicitly structures the re-evaluation process for all judges and prosecutors (Republic of Albania, 2016). From a functional perspective, vetting is a high-impact instrument because it can simultaneously increase integrity and reduce system capacity. If removals and resignations are not matched by sufficiently rapid and merit-based replenishment, the system can enter a cycle where backlogs rise, managerial discretion grows, and pressure mounts for “pragmatic” staffing solutions, conditions that can, paradoxically, create new opportunities for influence over recruitment, temporary assignments, and fast-tracked promotions.

To manage credibility and reduce risks of domestic capture of the vetting process itself, the framework has also relied on international monitoring arrangements. This reinforces a broader point about EU-driven judicial reforms in candidate countries, external support is not only financial and technical, but also institutional, aimed at sustaining credibility where domestic trust is weak and political incentives to interfere remain present. In design terms, this internationalized monitoring responds to a classic “commitment problem” in accession politics, formal approximation can be achieved relatively quickly, but functional independence requires stable behavioral constraints on political actors over time.

A third component is specialized anti-corruption and organized crime capacity, constitutionally and legally separated from ordinary structures through special prosecution and adjudication pathways. The institutional rationale is straightforward, where ordinary structures are perceived as vulnerable to corruption or intimidation, a specialized jurisdiction with tailored recruitment, security, and investigative capacity can raise effectiveness. The constitutional and legislative materials governing the organization and functioning of anti-corruption institutions reflect this differentiation logic (Republic of Albania, 2016). Functionally, however, specialization also introduces a system-level trade-off. It can improve high-profile enforcement while leaving ordinary courts burdened by vacancies and backlog, producing a “dual performance” pattern in public perception (strong action at the top, weak service delivery in routine justice). That dualism matters for judicial independence because broad legitimacy and service capacity are themselves protective factors against politicized pressure, a system viewed as slow or inaccessible is more vulnerable to political narratives that justify exceptional interventions.

Recent EU monitoring language is consistent with this functional reading: it acknowledges continued implementation and strengthening steps, while pointing to persistent governance and operational weaknesses that directly condition independence in practice. The Commission’s 2025 Rule of Law country chapter on Albania identifies continuing challenges linked to appointments of non-magistrate members to governance councils, the operational constraints of the High Justice Inspector due to vacancies, and concerns about attempts of undue influence by public officials or politicians (European Commission, 2025a). These are not peripheral issues; they map precisely onto the reform’s intended “firewalls” (appointments, discipline, and governance integrity). Where these firewalls are porous, the reform

risks becoming a reallocation of leverage rather than a durable reduction of political influence.

The same Commission assessment also highlights a performance governance bottleneck: backlogs in magistrate evaluations and insufficient internal operating rules in the councils, including for conflicts of interest (European Commission, 2025a). These details matter because independence is not only about insulating judges from direct interference; it is also about ensuring that career progression and disciplinary exposure are governed by predictable, transparent, and integrity-protecting rules. When evaluation backlogs delay merit-based promotion and transfer decisions, discretion and informality tend to increase, creating a governance environment in which influence can be exercised without overtly breaching formal independence guarantees.

Under EU conditionality, Albania's reform is therefore best evaluated through a "pathway" lens: which institutional routes remain available for political influence, and how costly it is to use them. The 2020 enlargement methodology's "fundamentals first" logic formalizes precisely this sequencing emphasis by placing rule-of-law institutions at the centre of credibility and progress assessment (European Commission, 2020). In parallel, IPA III frames assistance in a way that is explicitly tied to reforms and performance objectives rather than legal drafting alone (European Union, 2021). Together, these instruments push the system toward not only normative alignment but also measurable governance outcomes; however, they cannot, by themselves, remove domestic political incentives to delay appointments, contest mandates, shape council composition, or politicise disciplinary narratives. The practical question is whether Albania's post-2016 configuration has built enough internal procedural robustness (clear internal rules, credible evaluation pipelines, stable staffing, and transparent appointment sequencing) to resist these incentives over time.

2.2. *Vetting and the implementation dilemma*

Albania's post-2016 vetting process, operationalized through Law No. 84/2016 "On the Transitional Re-evaluation of Judges and Prosecutors," represents an unprecedented constitutional mechanism for integrity screening. While the legal design formally aims at filtering out corrupt or professionally unqualified magistrates, the political and institutional implications of such a high-magnitude personnel intervention are complex and multidimensional.

Theoretically, the vetting intersects two potentially conflicting objectives: cleansing the judiciary of political infiltration and corruption, and ensuring continuity of institutional functionality. In practice, these goals are difficult to balance. A highly effective cleansing process may inadvertently produce institutional fragility, where large-scale vacancies disrupt service delivery and institutional memory. This creates a paradox: reforms meant to enhance independence may, if not carefully managed, open indirect avenues for political influence, such as temporary appointments, delayed confirmations, or the informal repurposing of transitional governance mechanisms for partisan benefit.

The European Court of Auditors (ECA) has critically assessed rule-of-law assistance

in the Western Balkans, noting that reforms in Albania (including vetting) are constrained by deeper institutional pathologies such as politicized staffing, low administrative absorption capacity, and systemic inefficiencies (ECA, 2022). These structural deficiencies, even under conditions of formal legal approximation, limit the functional independence of the judiciary.

From a functional approximation perspective, judicial independence cannot be reduced to the removal of compromised individuals; it must also include the system's operational resilience. A judiciary that is under-staffed, under-resourced, or reliant on transitional governance is inherently more vulnerable to informal influence. Vulnerabilities include selective prioritization of politically sensitive cases, strategic procedural delays, or the use of budgetary levers to constrain institutional autonomy. In this way, vetting becomes not merely a tool of integrity screening, but also a stress test of institutional durability under post-reform conditions.

Moreover, recent reports by the Euralius V mission and international stakeholders underscore that while vetting has resulted in the dismissal of a significant number of judges and prosecutors, the system remains under pressure due to delays in judicial school graduation cycles, backlogs in appointments by the High Judicial Council (HJC), and the limited functional capacity of appeals courts. These cumulative challenges threaten to transform temporary transitional weaknesses into long-term structural limitations unless remedied by sustained capacity-building and politically insulated institutional support.

2.3. Digitalisation and transparency as independence instruments

The digital transformation of the justice sector is commonly framed within the broader EU narrative of public sector modernisation and service efficiency. However, in contexts such as Albania, digitalisation has independence-protecting implications that extend beyond efficiency. Specifically, digital case management systems, e-filing, automated allocation algorithms, and the publication of judicial decisions contribute to transparency, reduce discretion, and increase auditability, all of which indirectly protect judicial autonomy.

Within Albania's reform trajectory, projects such as the Integrated Case Management System (ICMS) and the e-Albania platform have been funded or supported by EU instruments, including IPA II and IPA III, and implemented under the supervision of the Ministry of Justice in partnership with the HJC and High Prosecutorial Council (HPC). These efforts aim to establish a traceable chain of judicial activity and to mitigate informal interference in case distribution and resolution.

Nonetheless, functional approximation analysis reveals that digitalization alone is insufficient if not implemented equitably and securely. If access to digital tools is territorially uneven, as in rural or peripheral courts, or if cyber-security vulnerabilities compromise system integrity, the presumed benefits are diluted. For instance, reports have shown inconsistent use of ICMS between first-instance courts and appellate courts, with some judges continuing to operate semi-manually due to training deficits or infrastructure constraints (European Commission, 2023).

Moreover, transparency reforms must be evaluated not only in terms of technological deployment, but in terms of their institutional integration. Digital access to decisions

is beneficial only if those decisions are timely uploaded, indexed, and searchable in meaningful ways. Public confidence in judicial independence also requires the perception that digitalization is not merely cosmetic, but genuinely limits backroom discretion.

Digitalization should not be treated as a substitute for institutional reforms in judicial appointments, budget autonomy, or disciplinary safeguards. Technology may constrain discretion, but it does not displace the need for accountable and transparent governance mechanisms. In Albania's case, the synergy between digitalisation and institutional autonomy is still fragile, and reforms must be jointly evaluated to ensure that independence is consolidated both procedurally and structurally.

3. Discussion

The Albanian case illustrates a common enlargement pattern: high reform "visibility" at the level of constitutional text and institution creation, paired with slower stabilization of day-to-day independence conditions. This aligns with broader comparative-law critiques of transplant strategies that assume formal adoption is equivalent to functional transformation (Watson, 1993; Legrand, 1997). In enlargement practice, the Commission's methodology changes after 2020 reflect recognition of this gap: credibility and reversibility concerns are addressed by prioritizing rule-of-law fundamentals and by strengthening political steering and monitoring logic. (European Commission, 2020). From this paper's perspective, "functional approximation" can be operationalized through three evaluation questions. The first concerns appointment resilience: do the revised appointment pipelines reduce the probability that political actors can obtain decisive influence over high-level judicial and prosecutorial appointments, including through delay strategies or control of "gatekeeper" bodies? The second concerns accountability integrity: do disciplinary and oversight mechanisms produce accountability without creating a credible threat of selective enforcement against judges or prosecutors who decide politically sensitive cases? The third concerns operational autonomy: are the courts and prosecutorial bodies able to function without recurrent vulnerability to budgetary manipulation, staffing fragility, or administratively induced bottlenecks? These questions are compatible with the EU's own evolution toward performance-sensitive conditionality via IPA III and methodology reform, but they provide a clearer independence-centred logic for assessing whether approximation is achieving its governance purpose rather than its formal alignment objective alone. (European Union, 2021; European Court of Auditors, 2022).

4. Conclusion

Albania's post-2016 justice reform exemplifies the depth of formal transformation that EU-oriented conditionality can induce in candidate states. However, the experience also demonstrates that constitutional and legislative realignment—though a necessary entry point—is insufficient for ensuring functional judicial independence. Independence emerges not from text alone but from the durability of institutional

constraints on political influence, the resilience of personnel governance systems under stress, and the operational capacity of justice institutions to deliver services consistently and transparently. This paper has proposed a functional approximation lens through which to assess Albania's reform path. It highlights the importance of evaluating institutional behaviour under pressure, the real-world integrity of appointments and disciplinary structures, and the autonomy of courts to resist external manipulation. EU mechanisms like IPA III and the revised enlargement methodology embed these performance-sensitive expectations into the accession process, but their success depends on sustained internal implementation and insulation from politicization. Albania's justice reform is not merely a compliance exercise; it is a credibility test—of whether the foundational promises of independence can hold against the enduring gravitational pull of political control.

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Sharpening the appropriate use of ambiguous professional vocabulary in context by SLL in ESP

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Abstract

The appropriate understanding of the ambiguous vocabulary is a fundamental challenge for SLL of English and especially when they use the professional vocabulary. The inappropriate use or understanding of professional vocabulary in certain fields such as medicine, law, economy politics etc. might bring irreversible consequences and detrimental outcomes. So the purpose of this article is to point out some relevant strategies that lead to the appropriate understanding and use of the ambiguous words and resolution of semantic ambiguity in ESP by the SLL of English. The main mission of language is the linguistic interaction of thoughts, feelings and ideas. In order that language accomplish this crucial function it must be appropriate to the field or realm used and unequivocal as well. English acquisition, being a language used in business, High-tech, tourism, diplomacy as well as other domains must be mastered appropriately even regarding its professional vocabulary. This has played a significant role in the increscent use of English for special purposes worldwide. (Agustiana, 2017; Oktoma et al., 2023; Sumarni et al., 2022). As a matter of fact, learners of ESP face difficulties as a result of the ambiguous polisemantic vocabulary of the target field they encounter. This might hamper the accurate and effective use of the intended meaning which might result in misunderstanding or misinterpretations of the discourse. Considering the significance that the use of the accurate and appropriate vocabulary has in medicine, law, business, we will assume that it is obvious the role of its adequate acquisition in order to master ESP appropriately. The paper is conceived using descriptive and analytical elements. The descriptive part consists of displaying some of the previous studies on this topic and the analytical part will evidence the findings from analyzing the questionnaires and semi-structured interviews conducted during the study.

Keywords: ambiguous, ESP vocabulary, barrier, misunderstanding.

Introduction

Vocabulary acquisition plays a vital role in mastering any language and English is not an exception. In any kind of communication, the appropriate choice and use of vocabulary is fundamental as Wilkins (1972) asserts “Without vocabulary, nothing can be conveyed.” The use of the relevant vocabulary is very important element in communication, but in the professional field the application of the appropriate vocabulary is not only a necessity but a prerequisite. Therefore, vocabulary acquisition is crucial element in learning English by second language learners especially while learning professional vocabulary or what is known as ESP. Taking into consideration that a great percentage of English vocabulary bares more than one meaning, its appropriate understanding and mastering becomes even more challenging (Zukswert et al., 2019),

Living in a virtually borderless world that develops with a very fast pace, in which

English has become the language of economy, technology, politics, education, medicine, marketing, its mastering by SLL must keep up with the same pace that means appropriate acquisition of general as well as technical English. It absolutely takes considerable significance the proficiency in accurate understanding and use of English vocabulary for Specific Purposes (ESP), particularly for SLL of English. In ESP, the appropriate professional vocabulary is essential because it enables the user of language to intercommunicate effectively within their target domain of work. Despite the fact that the previous approaches to ESP have not completely resolve the inconsistency between general and specialized vocabulary when it is needed to be used in a specific field, or disciplines (Brun-Mercer, N., 2022.).

One of the greatest challenges of SLL while learning ESP is its polysemous vocabulary that causes ambiguity in understanding and using. Semantic ambiguity brings about serious challenges to technical communication in any profession because of the specific meanings that words bare according to the domains. (Liu, Y., Medlar, A., Głowacka, D., 2022) The problem of resolving ambiguity does not only concern only the specialists of the given field but anyone who deals at a certain point with them or even colleagues from other domains, fields or cultures. So, the appropriate understanding and use of ambiguous words of ESP is already a crucial element to avoid misconceptions of professional terms, misunderstandings of technical words or misinterpretation of the conversation. (Rodd et al., 2004). On the other hand, the misuse of the unclarified term or ambiguous professional words or inappropriate decode of its meaning can contribute to miscommunication between specialists. (Boland, J.E., 2018). There are cases of words which when used in everyday conversation bare a certain meaning but they acquire totally different meanings in professional discourse for example: charge in everyday life means “the price or responsibility” and in law it means “formal accusations”; or “sentence- group of words that give an idea” and in law means “punishment given by the court”. In order to get an accurate understanding of words which have different meanings, the cases of lexical ambiguity must be disambiguated referring to the context in which they are used (Boland, J.E., 2018). According to some studies in this area, the ESP vocabulary is considered to be more complex and more difficult to be acquired than the general one and students need to dedicate more time learning it. (Lewis, 1993). There are several strategies which help SLL understand and acquire appropriately the meaning of the ambiguous ESP words as well as avoid misuse and misinterpretations.

Different studies in this field suggest several strategies that can be used to avoid ambiguity as effectively as possible. (Akbari 2015). Let’s consider the following examples and see the application of the appropriate strategies to decode the accurate and intended meaning of the polysemous word. When a SLL encounter the sentence: “Don’t charge him” the first meaning that comes to our mind for the ambiguous word “charge” is the most frequent meaning “fee, payment” “Don’t give him the fee or receipt”, thus we retrieve the most frequent meaning of it and here, it is applied “*Frequent Meaning-referring Strategy*” according to which when we encounter polysemous or ambiguous words the most frequent meaning is the one we retrieve for it. While in the sentence: “Don’t charge him because he is innocent” the context provides us with the right meaning “charge-accusations” so the strategy used in this case is *Context–Source*

Strategy according to which context is the source of information and gives us the appropriate clues for the right meaning of the ambiguous word. As for the sentence: “Don’t charge him with anything”, at the very beginning all the meanings are retrieved and then, it is selected the appropriate one the ones that fits the context – “don’t give him any task”, so charge=task. (Duffy, S. A., Kambe, G., & Rayner, K. 2001)

Based even on the previous examples we can say that it is substantial that all the meanings conveyed by the ambiguous word in ESP must be clarified. Then, building contextual relationships is absolutely significant to the retrieval of the appropriate meaning for ESP. (Elman, 2009; Li and Joanisse, 2021). Several studies suggest that ESP vocabulary items are better acquired when found and used in authentic and informative contexts (Huckin and Coady, 1999; Restrepo Ramos, 2015; Godwin-Jones, 2018).

Methodology

The study, as was previously mentioned, was conceived to be explored from both descriptive and analytical point of view. In the descriptive treatment of the topic, there were presented the studies of different scholars regarding the correct understanding and use of ambiguous vocabulary in ESP, while in the analytical treatment, there were analyzed data collected by surveying the experience of students and teachers that study and teach ESP. The aim of this paper is to study the role of context in the accurate interpretation and application of the polysemous ambiguous words in ESP by SLL. It raises the hypothesis: The appropriate technical context provides the accurate meaning and use of polysemous words in ESP. This hypothesis is supported by the research questions, such as: “Does the given technical context present the students with the correct meaning of the ambiguous words while studying ESP?” “Does the communication that consists of polysemous words becomes more understandable if it is supported by the relevant technical contextual elements?” In order to conduct this study, it is thought to use an integrated approach between quantitative and qualitative methods. Tomas (2003) suggests that the combination of quantitative and qualitative methods results in an integrated approach, which is more trustworthy because it provides the scholar with a deeper analysis of the survey (Matthews & Ross, 2010).

The quantitative data is collected by compiling and delivering a questionnaire as a suitable measuring instrument for gaining a wider view of the study. The questionnaires provided us with individual data collected from the students of a public university “F.S. Noli University”, in Korçë Albania. As for the qualitative data, there were organized discussions with 15 teachers of ESP in focus groups by means of some semi-structured interviews. Semi-structured interviews investigated teachers’ experiences in teaching and guiding students how to interpret correctly the meaning of ambiguous vocabulary in ESP through the use of the right technical context. It was thought to engage a sample of as many as 150 students from the above university to participate in the research. To determine the sample of this research was used the method of random selection of students. It was thought to include in the survey 30 students from each field of study such as economy, education, natural sciences,

agriculture and nursing in order to make possible an inclusive representation at different levels: both in terms of the ability and mastery of the English language, as well as variety of academic fields of study. As far as the age group is concerned, the students that participated in the study ranged in age from 19 to 23 years old while teachers ranged from 35 to 50 years old. Both the questionnaires and focus group discussions aimed evidencing the influence of the appropriate context on the accurate interpretation and use of the polysemous ambiguous words when learning and using ESP.

The structured questionnaire was conceived to get students' experiences and their point of view about the role of context in the right understanding and application of the polysemous words in ESP. The questionnaire consisted of 13 questions, including 10 multiple-choice Likert-scale questions, focusing on how students understand, interpret and use ambiguous words in and out of context as well as 3 open questions. Responding to the open questions, they expressed their opinion on how they solve the confusion caused by polysemous vocabulary in ESP when they encounter words that bare more than one meaning.

Focus group discussions provide us with qualitative data about teachers' experiences in guiding students in retrieving the correct meaning or understanding correctly a discussion which consists of polysemous professional words and use the right one in ESP. The interviews were held in 3 focus groups with teachers from the given fields. Each focus group consisted of 5 teachers who discussed and answered semi structured interview questions. They provided deeper insights into how students try to avoid ambiguity and the effectiveness of using contextual elements in clarifying the meaning of ambiguous words. Furthermore, they explored teachers' experiences and strategies in resolving ambiguities they encounter while learning ESP as a result of the use of ambiguous words.

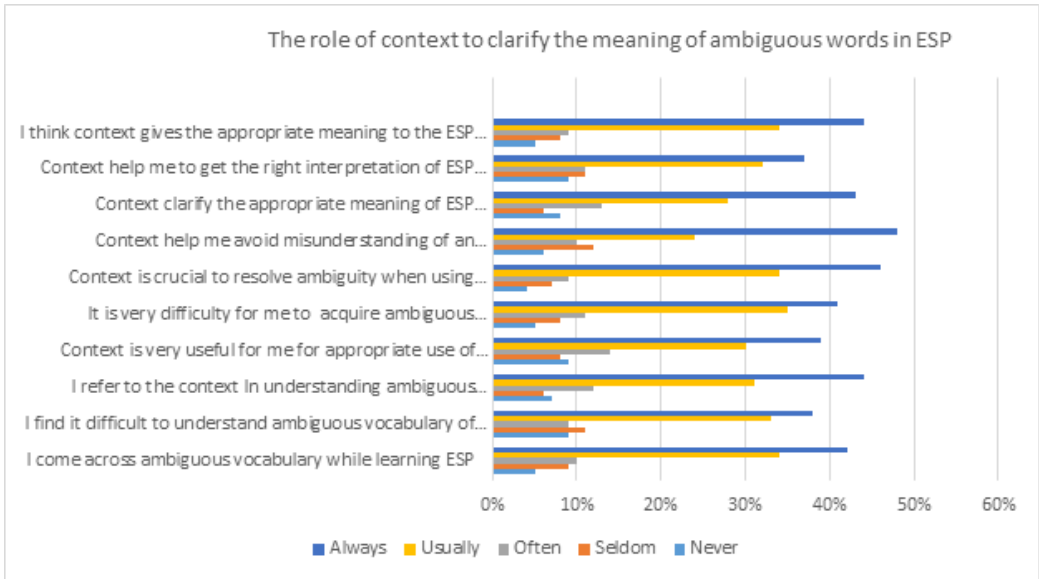
Each participant completed the structured questionnaire independently and individually. Responses from the questionnaires were analyzed using descriptive statistics to summarize student point of view and attitudes. In the same way, the qualitative data obtained from the focus group discussions regarding the teachers' experiences regarding ambiguous words ESP and the contextual elements that provide learners with the accurate meaning were also analyzed. Analysis of focus group discussions included analyzing responses, gathering data from teachers' responses on the best teaching and learning strategies on the appropriate acquisition and understanding of the ambiguous words, as well as the effectiveness of contextual elements.

Results

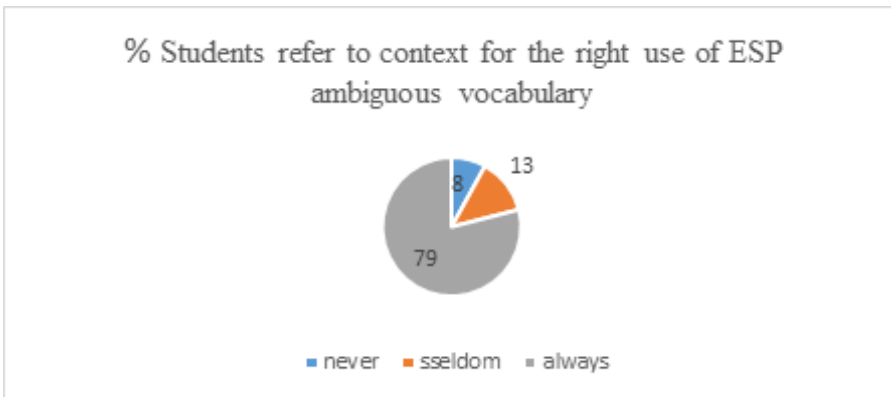
The data obtained from the questionnaires and the responses of the teacher's interviews in focus group discussions were analyzed and proved the fact that Albanian students, who study ESP face difficulties when learning the vocabulary of ESP especially the polysemous vocabulary. It was confirmed the fact that a considerable number of ESP words have more than one meaning and, as a result, they experience confusion in perceiving the appropriate meaning intended by the speaker and it is precisely the

relevant context that clarify their appropriate meaning. The bar chart below presents the evidence and figures drawn from the questionnaires that were delivered to students. The data displayed on the chart, clearly shows the percentage of students for each Likert scale response to the questions of the questionnaires, according to which it results that the context considerably influences on the appropriate understanding and use of the ESP ambiguous words and in the accurate interpretation of their intended meaning. Most of the students (69-80 %) who participated on the survey admit that context is crucial for accurate acquisition of the meaning of the ESP ambiguous words. The percentage of students who were neutral to the role of context in the proper use of the ambiguous words varied according to the questions, from 9%-14% of the total number of students in the study. While the percentage of students that never or seldom use the context for understanding the ambiguous words was very low compared to those who consider it fundamental and varied from 4-12%. The analyze of the open questions of the questionnaire emphasized the importance of the context in clarifying the meaning of the polysemous words while learning ESP. Most of them considered it indispensable for the right use and interpretation of them. The answers received from the interviews conducted in focus groups highlighted once again the confusion that students reflect when they deal with the presence of ambiguous vocabulary in ESP. By the teacher's response in the focus group interview, it resulted that the ESP semantic ambiguity can be clarified if these words are always associated with the relevant context. It was emphasized the fact that, without the right context, professional polysemous words lead to misunderstandings and misuse of them. Appropriate or relevant context gives to ESP ambiguous vocabulary the accurate meaning intended by the speaker. They expressed that there were not a few cases when students claimed to be confused and unclear to decipher the intended meaning of ESP ambiguous vocabulary when the speaker didn't include the relevant context in the discourse, which not seldom bring about misunderstanding or misapplication of them. About 85% of the interviewed teachers gave their own arguments on the importance of the context to clarify the meaning of ambiguous words, or confusion as a result of polysemous vocabulary of ESP. The figures displayed in the charts below clearly highlight the results gathered and analyzed from the questionnaire of the survey conducted.

The analysis of questionnaires displayed on the chart and focus group interviews give evidence and confirm the hypothesis raised in this study that the relevant context solves the ambiguity that appears as a result of polysemous words in ESP. In the same way, the findings attained from this survey give answer to the research question that the context clarifies the meaning of polysemous or ambiguous words and the contextual elements assist students in the right acquisition and use of the technical ambiguous vocabulary that result from the polysemous words in ESP. The figures displayed in the Pie-chart 2 present the % of students that in open questions admitted referring "always", "seldom" or "never" to the appropriate context to acquire and use correctly the ambiguous words that bare more than one meaning, while studying ESP.



Bar chart 1: Data from the Students' questionnaire



Pie-chart 2: Data from opened questions questionnaires about context use

Conclusion

The aim of this research is to highlight the problem of appropriate understanding and use of the polysemous technical vocabulary while learning ESP, as well as to point out the most effective strategies that lead to the accurate acquisition and application of the technical vocabulary by students of ESP who speak English as a second language. Based on previous studies of different authors in this field, it was found out that ambiguous vocabulary in ESP caused students difficulty in acquisition and use because of the polysemy that they bare. This confusion and difficulty might be solved by the proper use of the context (Elman, 2009; Li and Joannis, 2021). Different research in this field have stressed the importance of the context in the proper understanding and use of the ambiguous words (Duffy, S. A., Kambe, G., & Rayner, K. 2001). The survey conducted among Albanian students evidenced that contextual elements help

in understanding as well as correct acquisition of the polysemous vocabulary but also makes the communicators perceive correctly the intended meaning and avoid misunderstandings that might result from the ambiguous words in ESP.

To sum up, the study looks into the ambiguity created as a result of polysemous technical words among students of ESP who study English as Second language. Both the descriptive and the analytical study evidenced the essential role of context for providing the students with the right understanding and use of the ambiguous technical vocabulary in ESP. The analyses of the questionnaire and the semi structured interviews in focus group discussions attested the hypothesis gave the due response to the research questions raised in this paper making it clear that the role of context in the accurate understanding and use of the ambiguous technical vocabulary in ESP is indispensable.

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Observed Damage and Analytical Seismic Assessment of Four URM Dwellings in Krujë after the 2019 Albania Earthquake

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Abstract

This paper presents a comparative overview of four unreinforced masonry (URM) dwellings in Kruja, Albania, all of which suffered heavy structural damage during the Mw6.4 earthquake of 26 November 2019. Although the buildings were constructed independently, they belong to the same masonry typology that is widespread in the region, and their seismic response reflects a set of recurring weaknesses. The study combines field documentation of damage with simplified nonlinear static (pushover) analysis performed on each building. The analytical results, including base shear capacity, stiffness degradation, and displacement demands, are compared with the damage observed on site. The comparison shows a strong correspondence between predicted failure mechanisms (diagonal cracking, corner separation, out-of-plane instability) and the real damage patterns documented after the event. The findings underline the vulnerability of this building type and support the use of pushover analysis as a practical tool for seismic assessment of older URM dwellings in Albania.

Keywords: earthquake damage, unreinforced masonry, pushover analysis, Albania 2019, structural assessment.

1. Introduction

URM houses make up a very large portion of the residential building stock in Kruja and in many other areas of Albania. Most of them were built several decades ago, without seismic detailing and often with limited quality control. For this reason, the 26 November 2019 earthquake exposed a number of structural weaknesses that are typical for this type of construction. This paper looks at four such URM dwellings, all of which reached Damage State 4 (DS-4). Even though the buildings were constructed in different periods and by different families, their response during the earthquake was remarkably similar. The main goal of this work is to document the observed damage patterns and compare them with the results of simplified nonlinear static (pushover) analyses. By analysing the four houses as a single typological group, the paper highlights the main structural issues that characterize older masonry dwellings in Kruja and shows how analytical assessment aligns with real earthquake performance.

2. Study case and field investigation

The four dwellings included in the study share the following characteristics:

- Two-storey residential buildings

- Load-bearing brick masonry walls (25–38 cm)
- Low to moderate-quality mortar
- No confinement elements or ring beams
- Weak diaphragms, many with timber or partially deteriorated slabs
- Shallow strip foundations
- No seismic detailing of any kind



Figure 1. Building façade photos A(up right), B(up left), C(down right), D(down left)

Each building suffered DS-4 damage. For the purposes of the summary analysis, they are referred to as:

- **Building A** (URM, typical layout with moderate openings)
- **Building B** (URM with wider openings, more vulnerable)
- **Building C** (URM with long unconfined walls)
- **Building D** (URM with irregular wall configuration)

3. Observed damage patterns

The four URM dwellings examined in this study developed a set of recurring damage patterns during the 2019 Albania earthquake. Even though each building has its own floor plan and construction year, the observed failures were strikingly similar. This is mainly due to their shared typology: weak masonry units, poor wall interlocking, absence of confinement, and floor systems that do not function as proper diaphragms. The following subsections describe the most representative forms of damage

documented on site.

3.1 Diagonal Shear Cracks in Primary Walls

All four buildings exhibited diagonal cracking across their main load-bearing walls, especially on the ground floor. These cracks typically started near wall corners and spread diagonally toward the opposite end, forming X-shaped patterns. In several cases, the cracks followed the mortar joints, which confirms the low quality of the mortar and its limited ability to transfer shear forces.

Walls with wider openings, such as those in Building B, suffered more severe cracking. Some sections also showed slight sliding at the base, suggesting a combination of shear and rocking mechanisms.



Figure 2. Building A diagonal shear cracks on perimeter wall

3.2 Corner Separation and Wall Junction Cracking

Another widespread form of damage was the separation at wall junctions. Vertical cracks formed at the intersections of orthogonal walls, indicating that the corners were not sufficiently tied together. In a few cases, the crack widths reached several millimetres, and slight outward rotation of wall edges could be observed.

This type of damage is critical because it disrupts the box-like behaviour of the structure and reduces its lateral-load resistance drastically. All buildings showed some degree of corner separation, with Buildings C and D displaying the most severe cases.

3.3 Out-of-Plane Wall Movements

Because the houses lack strong diaphragms, the façade walls behaved independently during shaking. This resulted in out-of-plane bulging and partial detachment of upper wall segments, especially near the roof level. Signs of local instability were visible in Buildings A and B, where gable or parapet walls showed cracking patterns consistent with outward movement.

Although no full collapses were reported in these particular houses, the deformation

patterns clearly indicate that the façades were at risk of out-of-plane failure.

3.4 Wall–Slab Separation

Weak or deteriorated floor systems contributed to horizontal cracking along the wall–slab interface. Timber floors, in particular, were not properly anchored to the walls, allowing small gaps to form during shaking. These cracks were documented consistently in all four objects, and in several rooms the slab appeared slightly displaced relative to the supporting walls.

This behaviour confirms that the floor levels did not act as rigid diaphragms and could not distribute seismic forces effectively to the vertical elements.



Figure 3. Building B slab degradation and separation from walls

3.5 Damage Concentration Around Openings

Door and window openings acted as natural weak points. Cracks often initiated at the corners of openings and propagated diagonally through the surrounding masonry. In some cases, crushing was observed above lintels, particularly where openings were unusually wide.

Building B had the most noticeable damage of this type, reflecting its reduced effective wall area and greater geometric irregularity. Partial detachment of small masonry units around openings was also documented in several locations.

3.6 Material Degradation

In addition to structural deficiencies, the overall condition of the masonry contributed significantly to the observed damage. Mortar in many of the buildings was visibly degraded, powdery, or missing in places. Moisture exposure over time had weakened the masonry units, making them more vulnerable to shaking.

This degradation amplified the failure mechanisms described above, especially diagonal shear cracking and sliding at bed joints.

3.7 Summary of Damage Behaviour Across All Four Buildings

When viewed collectively, the four dwellings demonstrate a consistent set of

vulnerabilities:

- brittle shear behaviour of masonry piers;
- weak or missing diaphragm action;
- poor wall interlocking leading to corner separation;
- high risk of out-of-plane instability;
- stress concentration around openings;
- strong correlation between material condition and damage severity;

These observations form the basis for the analytical comparison presented in the next section, where the predicted mechanisms from pushover analysis are examined against the real damage documented in the field.

4. Analytical modelling and pushover analysis

To complement the field survey and better understand why the four URM dwellings in Kruja performed so poorly during the 2019 earthquake, a simplified nonlinear static (pushover) analysis was carried out for each building. Although the exact geometry and distribution of walls differ slightly from one case to another, the numerical results display a very similar trend. This is expected, given that all four structures share the same typology, similar materials, and nearly identical weaknesses in their lateral-load resisting systems. The aim of this analytical assessment is not to provide a detailed design-level evaluation, but rather to extract the main behavioural tendencies of these buildings and compare them with what was actually observed on site.

4.1 Modelling Assumptions and Approach

All analyses were carried out using the equivalent-frame modelling approach, where masonry piers and spandrels are idealised as nonlinear macro-elements. This method captures the principal failure mechanisms—shear cracking, sliding, and flexural deformation—without requiring complex finite-element modelling, making it well-suited for older masonry buildings.

Across the four case studies, the following assumptions were applied consistently:

- Masonry compressive strength: approximately 2–3 MPa
- Elastic–plastic behaviour with explicit cracking thresholds
- Vertical loads applied according to the expected gravity load combinations
- Lateral loads applied in both principal directions (X and Y)
- Diaphragm behaviour modelled as flexible or semi-rigid depending on the floor system condition
- Pushover curves extended until the formation of global or significant local mechanisms

By keeping the modelling parameters similar across all four dwellings, the differences in response arise primarily from the buildings' geometry and wall configuration rather than from modelling choices.

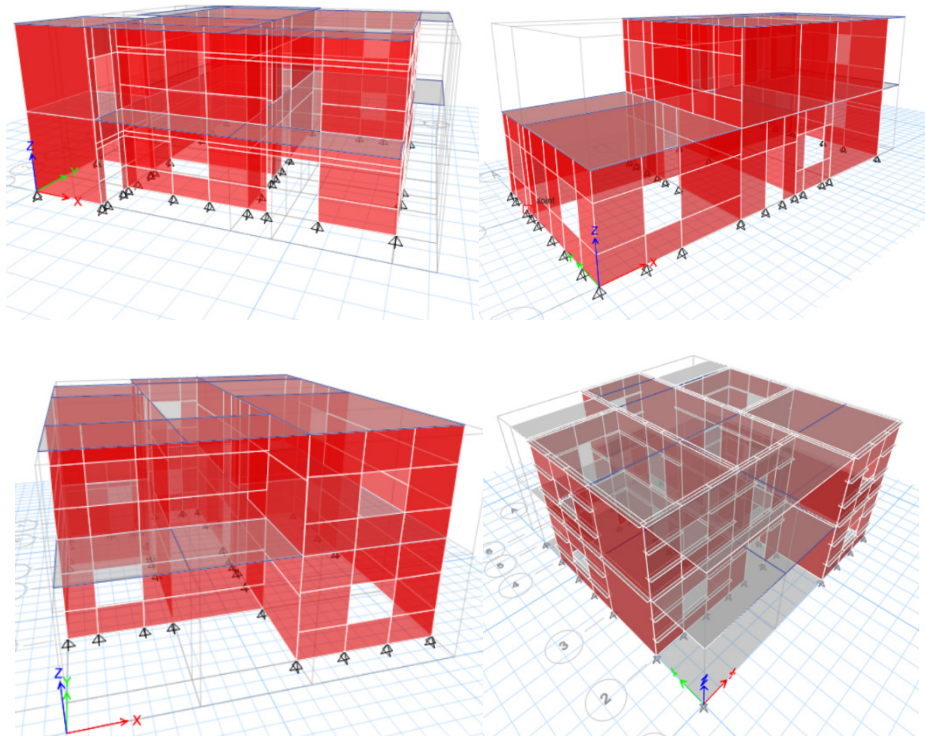


Figure. Three-dimensional models of the four buildings

4.2 General Trends in Seismic Capacity

The capacity curves for the four buildings have a comparable overall shape. All dwellings show a relatively stiff initial response, followed by a rapid strength drop once diagonal cracking develops. In most cases, shear failures dominate the behaviour, particularly in walls oriented along the Y direction.

Across the group, three consistent tendencies were observed:

1. Low strength relative to building weight (V/W ratio).
Values typically fall between 0.15 and 0.30, far below what would be expected for life-safety performance.
2. Limited displacement capacity.
Ductility values usually remain in the range of 2–3, which is insufficient for strong seismic shaking.
3. Early stiffness degradation.
The first cracking point is reached quickly, and the post-cracking branch descends sharply.

These patterns align closely with the brittle failure mechanisms documented during the damage survey.

4.3 Behaviour in the X Direction

In the longitudinal direction (X), the buildings show a somewhat better performance than in Y, although still below acceptable seismic limits. This direction generally

benefits from a slightly higher density of continuous walls, which increases initial stiffness.

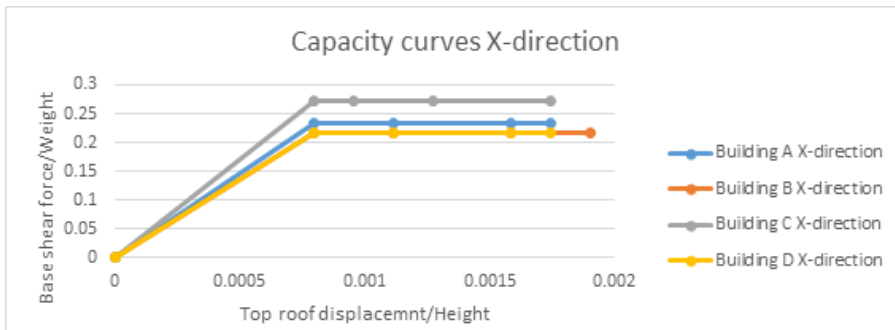


Figure. Normalised capacity curves X-direction for all buildings

After cracking, however, all four buildings lose strength rapidly. The ultimate displacements achieved before collapse mechanisms appear remain modest. As a result, the X-direction curves consistently fail to meet the displacement requirements of Eurocode 8 for both the 95-year and 475-year return periods.

4.4 Behaviour in the Y Direction

The transverse direction (Y) is clearly the governing weakness for every building in the study. Walls in this direction tend to be:

- thinner,
- more discontinuous,
- more heavily perforated by openings, and
- less effectively connected at corners.

As a consequence:

- shear cracking appears at very low displacement levels,
- strength capacity is significantly lower than in X,
- ductility is minimal, and
- the Near Collapse (NC) threshold is reached quickly.

This analytical result corresponds almost perfectly with the field damage, where the most severe cracking and wall separations were observed in transverse walls.

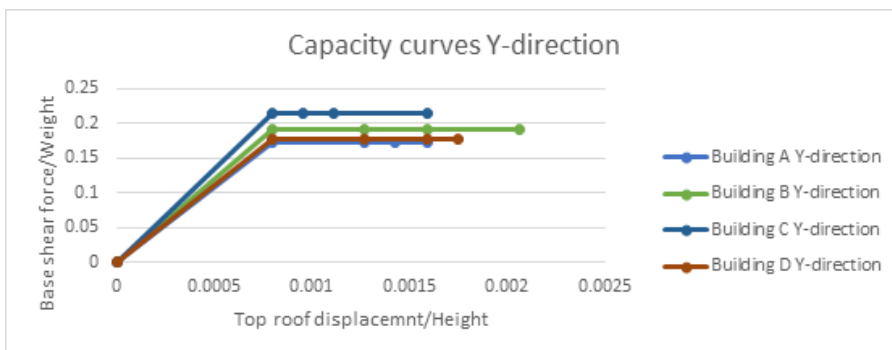


Figure. Normalised capacity curves Y-direction for all buildings

4.5 Eurocode 8 Performance Levels

The pushover curves were evaluated against the EC8 spectra for two main hazard levels:

- 95-year return period (DL – Damage Limitation)
- 475-year return period (SD/NC – Significant Damage / Near Collapse)
- Across all four buildings, results converge:
- DL is not satisfied in either direction. Even moderate shaking levels exceed allowable displacements.
- SD is exceeded, meaning significant structural damage is expected under design-level earthquakes.
- NC is reached or exceeded, especially in the Y direction, confirming high collapse vulnerability.

These results mirror the DS-4 condition observed after the 2019 earthquake.

4.6 Summary Interpretation

When all four pushover analyses are viewed together, several conclusions become very clear:

- The buildings have insufficient lateral resistance in both directions.
- Shear failure governs the global behaviour.
- Ductility levels are low across all case studies.
- Diaphragm weakness leads to increased displacements and higher torsional effects.
- Analytical predictions match closely with the failure mechanisms documented on site.

This alignment between numerical behaviour and real earthquake performance provides a strong basis for the comparative discussion in the next chapter.

5. Comparison between observed damage and analytical predictions

A key objective of this study was to understand whether the failure mechanisms identified through nonlinear static analysis are consistent with the actual damage observed in the four URM buildings. Such a comparison is valuable because it helps assess how well simplified analytical tools reflect the real behaviour of older masonry dwellings, and whether they can be reliably used to evaluate large stocks of similar buildings.

Despite the individuality of each dwelling, the comparison revealed a strong alignment between predicted and observed behaviour. The main points of correspondence are discussed below.

5.1 Shear Cracking: Predicted and Observed

All analytical models indicated that the first significant nonlinearity in the structures would be diagonal shear cracking in the masonry piers. This matches closely with the field observations, where diagonal X-cracks were the most widespread form of damage across all four houses.

- In the pushover curves, the initial drop in stiffness corresponds to the shear

cracking limit.

- In reality, these cracks appeared early during the earthquake and extended across full wall panels.

Building B, which had large openings and reduced effective shear area, showed both the strongest predicted shear weakness and the most severe shear cracking on site.

5.2 Corner Separation and Loss of Box Action

The pushover results indicated that torsional effects and weak corner connectivity would lead to concentration of deformations near wall junctions, especially in the Y direction. This behaviour was clearly observed in the real buildings:

- Cracks were often vertical and located exactly at wall intersections.
- Small rotations of wall edges were documented, consistent with the analytical indication of loss of box action.

The strong similarity between prediction and observation reinforces the idea that URM corner joints in these dwellings do not act monolithically under lateral loading.

5.3 Out-of-Plane Wall Instability

In the analytical models, several wall sections—particularly in upper storeys—were flagged as vulnerable to **out-of-plane deformation** due to low diaphragm stiffness and insufficient anchorage.

The actual earthquake damage confirmed this tendency:

- Bulging and outward rotation were seen in façade walls, especially near roof level.
- In some cases, parapet and gable wall segments showed local detachment.

Although the pushover analysis is primarily an in-plane tool, the displacement patterns under monotonic loading suggested weak wall-diaphragm interaction—precisely the condition that later manifested in out-of-plane behaviour on site.

5.4 Wall–Slab Separation

The analytical models consistently showed high interstorey rotations due to diaphragm flexibility.

In practice, this translated into:

- horizontal cracking along the slab–wall interface,
- visible gaps in several rooms, and
- partial separation of timber floors from load-bearing walls.

Each building displayed some version of this phenomenon, confirming that diaphragm weakness was both a predicted and an observed vulnerability.

5.5 Exceedance of EC8 Performance Limits and Real DS-4 Damage

For all four buildings, the pushover curves indicated that:

- DL (Damage Limitation) would be exceeded even under moderate shaking,
- SD (Significant Damage) would be reached for the 475-year event, and
- NC (Near Collapse) was likely in the weakest direction.

This analytical failure to meet EC8 performance targets aligns strongly with the actual DS-4 damage state documented on site, which included:

- extensive cracking,

- loss of stiffness,
- partial wall detachment, and
- irreversible deformations.

In other words, the analytical models correctly predicted that these buildings would not maintain structural stability under strong ground motion.

5.6 Overall Interpretation

When all results are viewed together, the correspondence between analytical findings and earthquake damage is remarkably close. The same weaknesses highlighted by the pushover analysis—low shear strength, weak corners, diaphragm flexibility, and poor out-of-plane stability—were the dominant features of the observed damage.

This confirms that, despite being a simplified method, pushover analysis is a reliable tool for evaluating older URM dwellings of this typology, particularly when the goal is to identify failure tendencies rather than exact envelope capacities. It also suggests that large groups of similar buildings in Albania and the region can be screened effectively using this approach.

6. Conclusion

This paper examined four unreinforced masonry (URM) dwellings in Kruja that were heavily damaged during the 2019 Albania earthquake, combining field observations with simplified nonlinear static (pushover) analysis. Although the four buildings differ slightly in geometry and age, they share a common construction typology and, as a result, exhibited very similar structural weaknesses and damage mechanisms.

The field survey revealed several recurring patterns: diagonal shear cracking in load-bearing walls, separation at wall corners, out-of-plane movements of façades, and widespread cracking along the wall–slab interface. These forms of damage are typical for older URM construction, especially where masonry quality is poor and diaphragm action is weak or inconsistent.

The analytical results obtained from the pushover assessment align closely with these observations. For all four buildings, both the X and Y directions showed limited capacity and low ductility, with the transverse direction consistently emerging as the most vulnerable. The models predicted shear-driven failure, early stiffness degradation, and exceedance of Eurocode 8 performance limits even under moderate seismic demand — all of which were reflected in the actual DS-4 damage documented on site.

By comparing analytical predictions with observed behaviour, the study shows that pushover analysis, despite its simplifications, can provide meaningful insight into the seismic performance of older URM dwellings in Albania. The method correctly identified the main failure tendencies seen in reality and therefore represents a practical tool for future evaluation of similar buildings.

Given that a large portion of the residential stock in Kruja and surrounding areas belongs to this typology, such analytical approaches can assist engineers and local authorities in prioritizing seismic rehabilitation efforts.

In broader terms, the findings highlight the urgent need for systematic strengthening

programs for older URM dwellings and support the development of typology-based assessment strategies that balance accuracy and practicality.

Conflict of interests

The author would like to confirm that there is no conflict of interests associated with this publication and there is no financial fund for this work that can affect the research outcomes.

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Finding minimum distances and shortest paths using graph theory

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Abstract

Efficient transportation and distribution are essential for the supply chains of businesses with multiple outlets in busy urban areas. In Albania, the changing logistics infrastructure makes optimization of delivery routes increasingly important in academic, managerial, and policy discussions. Although existing studies recognize the need to reduce transportation time and costs, there is a practical gap in using graph-theoretical algorithms for small and medium-sized enterprises (SMEs) that manage frequent stock replenishment. This study aims to fill that gap by examining the distribution network of Neranxi, a leading food company in Albania. The research focuses on improving the movement of goods from its central warehouse to six retail outlets in Tirana, aiming to reduce the higher operational costs and delivery times caused by inefficient routing. This paper seeks to identify the shortest and most cost-effective delivery routes within this network by applying established algorithms in graph theory. Specifically, the study contributes to the literature on operational improvement by showing how algorithmic decision-support tools can enhance logistics performance in urban retail systems. The methodology uses a case study approach combined with algorithmic analysis, utilizing distance data from Google Maps to create a weighted directed graph of Neranxi's distribution network. The Roy-Floyd (Floyd-Warshall) algorithm calculates the minimum distances between every pair of nodes, generating a complete matrix of shortest paths. Dijkstra's algorithm determines the shortest routes from a fixed node—Neranxi's central warehouse—to all other outlets, finding the best sequence for outbound logistics. The analysis reveals not only the shortest theoretical distances but also the actual paths that reduce total transportation costs. The main findings indicate that the algorithms provide significant efficiency gains by uncovering routes that are much shorter than those typically used. For instance, the optimal route from the warehouse to the "Brryli" outlet goes through the "Muhamet Gjollës" location, decreasing the total distance compared to direct options. These findings highlight the potential of algorithm-based route planning to cut fuel use, shorten delivery times, and boost customer satisfaction. Although the study is limited by its use of static distance data and does not factor in real-time traffic conditions, it still shows the benefits of incorporating optimization models into the logistics strategies of retail companies. Future research could broaden the analysis by including dynamic routing algorithms, cost functions, or time windows, leading to better logistical decision-making. The results provide practical insights for managers looking for evidence-based strategies to enhance supply-chain performance and lay the groundwork for further academic research on algorithmic optimization in logistics within emerging markets.

Keywords: graph theory, algorithms, shortest path, transportation, logistics.

JEL classification: C02, C61, L81, L91, R42

Introduction

The business studied is the company “Neranxi”. This company has been developing its activity in the import, production and processing of raw materials for the food industry for 30 years. It aims, through its activity, to promote a healthy life and educate a nutritional culture that ensures a long and quality life, firmly believing that the quality of life begins and ends at the table. The company ensures HACCP and IFS standards, which represent the criteria recognized by the main European and international food distribution chains. The meticulous control and overall management of raw materials, suppliers, processes and finished products are the basis of the company’s evolution and the expectations of the most attentive customers. Thanks to an internal team of professionals, with multidisciplinary knowledge, the criteria of the standards are met and raised to increasingly competitive levels. Also, continuous investments in improving logistics bring about improved supply chain and increased operational efficiency. These developments position “Neranxi” as one of the most sustainable and innovative companies in the Albanian food market.

Problematic situation

Today, the Neranxi company has a headquarters and 6 markets in different areas of Tirana. The distribution of products is done from the headquarters to other points based on the needs and requests for missing products. Below are the points and their locations:

Points	Location
1	Neranxi Company , Rruga Dardania, Tirana, Albania
2	Neranxi, Rruga Muhamet Gjollësia 1001, Tirana, Albania
3	Neranxi Astir, Rruga Teodor Keko, Tirana, Albania
4	Neranxi, 21 Dhjetori, Tirana, Albania
5	Neranxi Rruga Sami Frashëri, Sheshi Willson Tirana, Albania
6	Neranxi, Rruga Shenasi Dishnica, Tirana, Albania
7	Neranxi Organic Market tek Brryli Rruga Arkitekt Kasemi, Tirana 1006, Albania

Table 1. Neranxi points in the Tirana area and their locations

Situation on the ground

A visual representation of the Orange Markets in the city of Tirana is given in the figure below. The image was taken via Google Maps. The red dots indicate the Orange Markets and the directional arrows connect each two of these points, meaning that they have their beginnings and ends in this set of points.

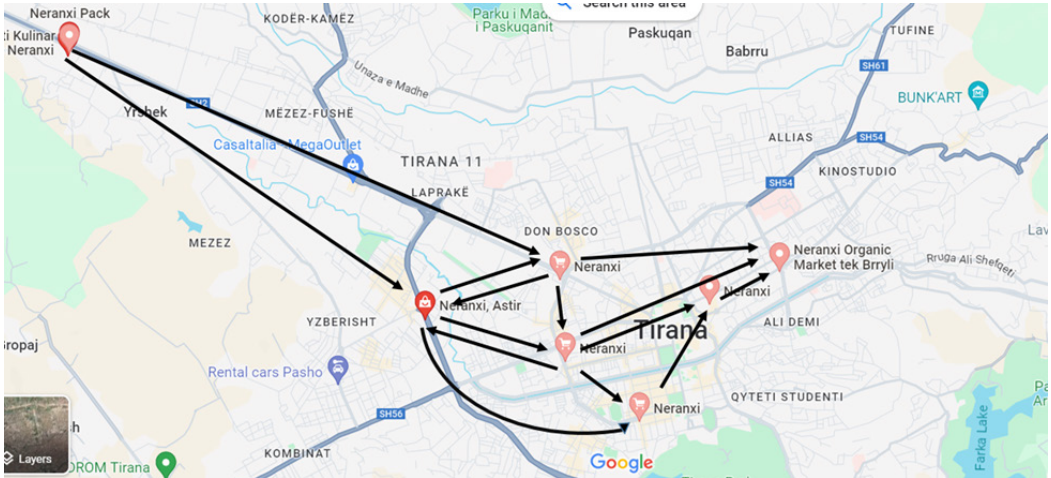


Figure 1. Display of points on Google Maps

The importance of using the Algorithm

In practice, various problems are often encountered that are well reflected by graphs. We can mention the transportation scheme between several centers, the scheme of the water supply network, the electricity network, the telegraph network in an area, the scheme of work operations in the production process, construction or repair of a factory, plant, etc. Although these schemes are completely different from each other in content, they also have common characteristics. The general thing about them is that they reflect several objects (states) that are in one way or another in connection relations between them. In the specific case, in the transportation scheme, we consider the production and sales points of Neranxi products as objects, while the connections are the highways that directly connect these points. Through these algorithms, we can ease the burden of monetary and time costs of the company by finding optimal routes for transporting goods.

Literature Review

Dijkstra's algorithm was invented by Dutch computer scientist Edsger W. Dijkstra in 1956 and published in 1959 (Misa, Thomas J. 2010). This algorithm solves the shortest path problem for a graph with a single source channel of non-negative weights. This algorithm is often used in routing and as a subroutine in other graph algorithms. Dijkstra's labeling method is the main procedure in the algorithm (Faramroze, 2005). The output of the labeling method is a series of nodes from the source to a set of other nodes. The output flow is the shortest distance from the source node that can be found by the algorithm.

The Floyd-Warshall algorithm is also known as the Floyd algorithm, Roy-Warshall algorithm, Roy-Floyd algorithm, or WFI algorithms. This algorithm was published by Robert Floyd in 1962. The modern formulation of Warshall's algorithm as three overlapping for loops was first described by Peter Ingerman, also in 1962 (Weisstein

2009). The Floyd–Warshall algorithm performs the shortest path search by computing all pairs of vertices in a weighted graph (Ariffin et al. 2011). This algorithm starts by finding all the minimum distances between pairs of nodes without passing through intermediate nodes. These values are recorded in a minimum distance table. The minimum distance between pairs of nodes is determined by comparing it to the previous value. Each change will update the value in the minimum distance table. This is done from the first node to the last node, the process will be repeated using the previous results for comparison.

Methodology

In this scientific paper, graph theory was used to find optimal transportation and distribution routes, minimizing transportation costs and delivery time for the Neranxi company, from its headquarters to its markets. To achieve the goal, the Roy Floyd Algorithm was used to find the minimum distances between any two vertices of the graph and the Dijkstra Algorithm to find the shortest paths from a fixed vertex of the graph to its other vertices. The distances from each point were found using Google Maps.

The Roy Floyd algorithm for finding the minimum distance matrix between any two vertices of a graph can be expressed as follows:

We start from the direct distance matrix, denoted by the letter A .

In the first step, we fix the first row and column of the matrix A and replace each element that is not in the first row or column with the smaller of the element itself or the sum of its projections onto the first row or column.

So,

We leave the elements of the first row and column unchanged. After these operations, we obtain a matrix A_1 . In the second step in the matrix A_1 , we fix the second row and column. Each element of the matrix that is not in the second row or column is replaced again with the smaller of the element itself or the sum of its projections in the second row and column. We do not change the elements of the second column. In this way, we obtain a matrix A_2 . With the matrix A_2 , we continue the same operations again, fixing the third row and column. After n steps of applying this algorithm, we find a matrix A_n , which is the required matrix.

Dijkstra's algorithm

It is used to find the shortest paths from a fixed vertex of the graph to its other vertices. Dijkstra's algorithm can be expressed more simply as follows:

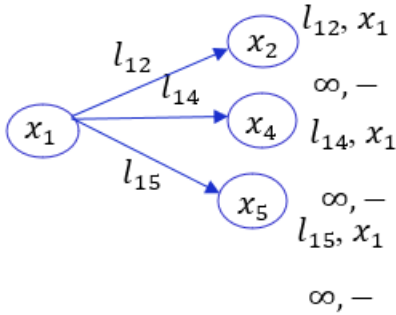
Let us have a graph with n vertices. Let us assume that we are looking for the shortest paths and their lengths from the vertex v_1 , to the other vertices of the graph. First, we associate each vertex of the graph with a two-part notation as follows:

The label of the vertex v_1 is permanent, while the labels of other vertices are temporary. During the implementation of the algorithm at each step of it, the temporary labels may change. Also, at each step of the algorithm, a vertex of the graph receives a

permanent label. Let's see how the temporary labels change and how the vertex that receives a permanent label is determined at each step of the algorithm.

Step one

We consider all the arcs that originate from the vertex . For simplicity, we assume that these are the arcs shown in the figure.



The lengths of these arcs are , respectively. The initial labels are marked below each vertex. The temporary labels of vertices and change as follows:

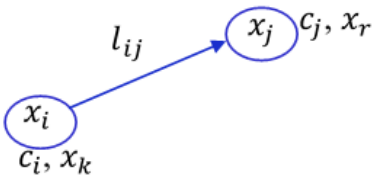
Vertex gets the label , . Vertex gets the label , . Vertex gets the label , .

These new labels for vertices and are placed next to the vertices. For the other vertices of the graph where no arcs reach from the vertex , the labels do not change. After this operation, for all vertices with temporary labels (i.e., except vertex) we compare the numbers of the first part of the labels and find the smallest of them. We assume that the smallest of them is . Then the notation , of vertex becomes permanent.

General step

Let us assume that in the previous step a vertex has been given a permanent notation which is . We emphasize that is a number 0 , while is a vertex of the graph from which vertex has received the permanent notation.

Let us consider all the arcs that start at vertex and end at the vertices that are currently given a temporary notation. Let be one of these arcs with length .



Let us assume that the temporary notation of the vertex is

If then the notation of the vertex changes and becomes .

If then the notation of the vertex does not change.

Thus, the temporary notations of other vertices that are the ends of the arcs that come from also change or not in this step. After these actions, we examine all the vertices of the graph that currently have a temporary notation. We compare the first parts of

the notations and choose the smallest of them. If there are several such, we choose any one of them. We make the notation of the vertex that corresponds to this smallest number permanent. Then the process continues in the same way.

Findings and interpretations

Roy-Floyd algorithm

The distances expressed in kilometers from the headquarters to its various points have been calculated using Google Maps. The distances found are presented in the graph below:

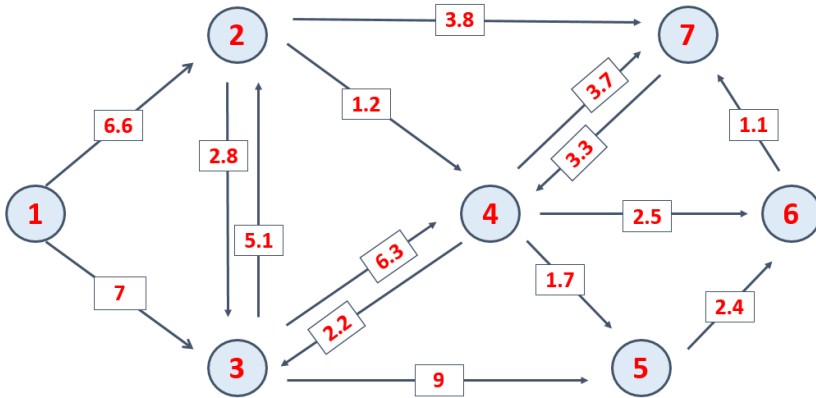


Figure 2. Graph formation (points and distances in km)

From the Headquarters (1) to the point on Muhamet Gjollësja Street (2) => 6.6 km
 From Headquarters (1) to the point in Astir (3) => 7 km
 From the point on Muhamet Gjollësja Street (2) to the point in Astir (3) => 2.8 km
 From the point in Astir (3) to the point on Muhamet Gjollësja Street (2) => 5.1 km
 From the point on Muhamet Gjollësja Street (2) to the point of 21 December (4) => 1.2 km
 From the point of Astir (3) to the point of 21 December (4) => 6.3 km
 From the point of 21 December (4) to the point of Astir (3) => 2.2 km
 From the point of Astir (3) to the point of Sami Frashëri St. (5) => 9 km
 From the point of 21 December (4) to the point of Sami Frashëri St. (5) => 1.7 km
 From the point of Sami Frashëri St. (5) to the point of Shenasi Dishnica St. (6) => 2.4 km
 From the point on Muhamet Gjollësja St. (2) to the point of Brrylit (7) => 3.8 km
 From the point of 21 December (4) to the point of Shenasi Dishnica St. (6) => 2.5 km
 From the point of Dishnica sign (6) to Brryl point (7) => 1.1 km
 From 21 December point (4) to Brryl point (7) => 3.7 km
 From Brryl point (7) to 21 December point (4) => 3.3 km
 From the constructed graph we create the direct distance matrix, as follows:
 We start from the direct distance matrix. In the first step, we fix the first row and column of the matrix A and any element that is not in the first row or column is replaced by the smaller of the element itself or the sum of its projections in the first row and column.

So,

We leave the elements of the first row and column unchanged. The main diagonal will be 0. Specifically:

From the obtained values, we form the matrix as follows:

In the second step, in the matrix, we fix the second row and column. Each element of the matrix that is not in the second row or column is replaced again with the smaller of the element itself or the sum of its projections in the second row and column. We do not change the elements of the second column. In this way, we obtain a matrix. With the matrix, we continue the same operations again, fixing the third row and column. Finally, after 7 steps, we find a matrix, which is the required matrix.

The matrix is the matrix of minimum distances between any two vertices of the graph. For example, the value 6.6 indicates the minimum kilometers to go from point 1 to point 2, the value 5.1 indicates the minimum kilometers to go from point 3 to point 2, and so on, as expressed below.

Dijkstra's Algorithm

So far, we have found the minimum distances but not the shortest paths themselves. Let us now show how to find the minimum distances and the shortest paths from a fixed vertex of the graph to its other vertices. And for this we will use the Dijkstra algorithm.

Suppose that we are looking for the shortest paths and their lengths from the vertex, which represents the Central Cell of Neranx, to the other vertices of the graph. Initially, we associate each vertex of the graph with a two-part notation as follows:

The label of vertex is permanent, while the labels of other vertices are temporary. During the implementation of the algorithm at each step of its temporary labels may change. Also at each step of the algorithm one vertex of the graph receives a permanent label.

Step One: We examine all the arches that emerge from the roof of the Headquarters :

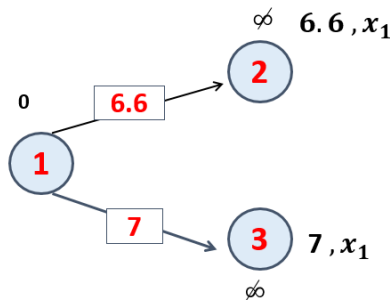


Figure 3. Arches emerging from vertex 1

We set the initial value for each vertex and move on to the first step. In the first step we see that from the vertex with permanent notation, the arcs and with respective lengths 6.6 and 7. The notation of the vertices and changes and becomes: 6.6, for vertex and 7, for vertex. We compare the numbers 6,6,7,∞,∞,∞, where the smallest

is 6.6. The vertex gets permanent notation .

								Roofs with permanent markings
Initial notes								
Step I								
Step II								
Step III								
Step IV								
Step V								
Step VI								

Table 2. Table of steps of Dijkstra's algorithm

In the second step we see the arcs that come out of the vertex and end at the vertices with temporary notation. These are the vertices and . Vertex we see that $6.6 + 7 > 7$, so the notation for vertex does not change. For vertex we see that $6.6 + 1.2 < \infty$ so the notation for vertex changes and becomes: 7.8, . For vertex we see that $6.6 + 3.8 < \infty$ so the notation for vertex changes and becomes: 10.4, . We notice that the smallest of the first parts of the temporary notations is the number 7 which corresponds to vertex . Therefore the notation for vertex becomes permanent. Next we see the arcs that start at and end at the vertices with temporary notation and make the corresponding changes that are shown in the table.

From the table we can find the minimum distances and shortest paths from vertex to any other vertex of the graph. The shortest path from to is found in this way:

The last vertex of this path is . From the permanent notation at , we find the previous vertex and finally from the permanent notation at , we find the first vertex of this path .

So the shortest path from vertex to vertex is: .

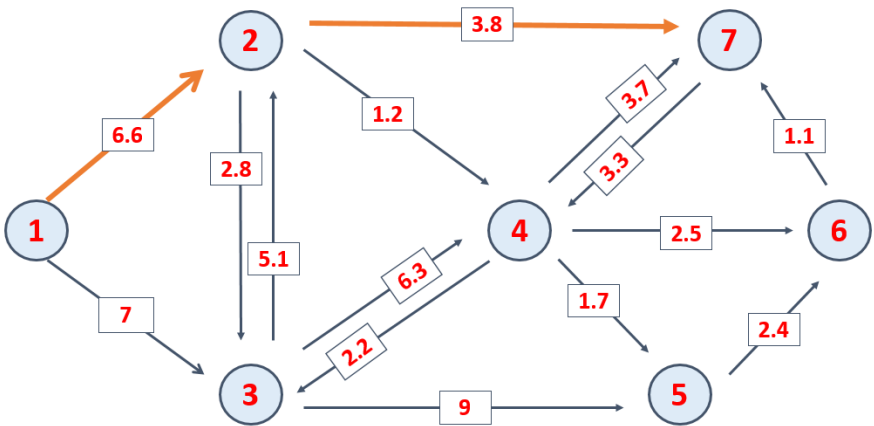


Figure 4. Shortest path from vertex 1 to 7 with Dijkstra's algorithm

Conclusions and Recommendations

- From the algorithms used, we have found the minimum distances and shortest paths of the Neranxi company points.
- Both algorithms (Roy–Floyd and Dijkstra) confirm that the company can significantly reduce total travel distances, thereby improving the efficiency of its distribution operations. The shortest routes from the Central Headquarters (Point 1) to all other outlets were identified as:

1→2

1→3

1→2→4

1→2→4→5

1→2→4→6

1→2→7

These results emphasize the importance of Points 2 and 4 as intermediate hubs.

- Optimizing the delivery routes would result in fuel savings, lessened delivery times, and an improvement in the supply reliability for all outlets, contributing to low operational costs.
- The study shows the practical use of mathematical models for logistics management, which can be within the reach of even small and medium-sized enterprises that do not require highly complex software systems.
- One limitation of the study is that it uses static distance data and cannot represent traffic flow conditions in real-time. The model developed here nevertheless, can provide some useful and valid insights for managerial decision-making.
- Establish a formal route-planning system based either on graph algorithms or route-optimization software, such as OR-Tools, Routific, or OptaPlanner.
- Apply the shortest routes identified by Dijkstra’s algorithm to the company’s daily delivery route standards.
- The establishment of a micro-distribution hub near “Muhamet Gjollështa” or “21 Dhjetori” should be considered, since these points minimize total distances traveled and can also facilitate the flow of goods.
- Perform field measurements to record the actual travel time to enable the company to switch from distance-based optimization to time-based optimization.
- Integrate dynamic data such as traffic levels, peak hours, and temporary road restrictions to enhance future optimization models.
- Logistics and supply-chain staff must receive proper training on how to interpret distance matrices and subsequently apply route-optimization techniques in practice.

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