

International experience in the use of AI in the legislative process as an example for Ukraine

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Abstract. The purpose of the study was to provide a comprehensive theoretical analysis of international practice in implementing neural-network technologies in law-making. The research process combined comparative-legal, formal-legal, structural-functional, and systems methods to compare regulatory frameworks, institutional constraints, and the architecture of digital platforms in three states: Ukraine, the Italian Republic, and the Federative Republic of Brazil. The study identified digitalisation as an objective necessity for reducing the bureaucratic burden, particularly during the adaptation of more than 2,700 acts of European law, when the drafting of only one regulatory document required 130 specialists and more than 22 thousand hours of work. The Italian and Brazilian parliaments successfully used natural language processing and machine-learning tools to categorise citizens' comments and cluster proposals. Official parliamentary reports showed that specialised algorithms could substantially accelerate the processing of large document sets, including sorting 82 million amendments within three days and publishing draft transcripts of sittings 40 minutes after a speech. Automation streamlined routine procedures, but neural networks could not independently produce legally flawless texts due to the high risk of algorithmic errors. The analysis supported the conclusion that human oversight cannot be replaced, and final verification of generated content must remain the exclusive responsibility of a person. The practical value of the results lies in the possibility for the Office of the Verkhovna Rada of Ukraine and the Ministry of Digital Transformation of Ukraine to use the proposed recommendations when developing internal regulations

Keywords: digital platforms; public administration; machine learning; natural language processing; large language models; personal data protection; digital transformation

● INTRODUCTION

The development of digital technologies has transformed traditional institutions of public administration. Law-making, as a basis for the functioning of any state governed by law, faces increasingly complex social relations and growing volumes of information. Governments have to process large bodies of text, including aligning new draft regulatory acts with laws already in force, assessing socio-economic consequences, and considering citizens' proposals. For countries adapting national legislation to international standards, this creates a bureaucratic burden on the staff of representative bodies. Artificial intelligence (AI) systems offer new possibilities for streamlining law-making. Large language models, natural language processing algorithms,

and machine learning can accelerate expert procedures, automate the detection of legal gaps, and increase parliamentary transparency. Delegating even part of the analytical work to neural networks, however, introduces risks. These concern mainly algorithmic bias and opacity in decision-making, extending to the possibility of systemic legal errors. Research on international experience in integrating intelligent systems into the work of supreme legislative bodies is therefore relevant, particularly for building a safe and effective digital environment for the state.

The legal regulation and introduction of new technologies in public institutions remain subjects of academic debate. A.V. Sterpetti *et al.* (2025) examined the legal and

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ethical consequences of using AI in medical decision-making through clinical practice in vascular surgery. The authors concluded that, despite the accuracy of algorithmic recommendations, the final decision must always be made by a specialist in order to avoid legal disputes. G. Mercan & Z.V. Selçuk (2024) examined the opportunities and challenges associated with integrating AI into legal practice. They argued that protection of individual rights required management strategies that ensured algorithmic transparency. M. Rönnblom *et al.* (2024) analysed the discourse around “ethical” and “responsible” AI and the political consequences of shaping such policies. They concluded that an exclusive focus on ethics depoliticised the problem by concealing real power imbalances in the introduction of technologies into the governance of society. N. Khmelevska (2025) assessed the prospects and obstacles associated with the use of AI systems in juvenile justice. She reported that working with algorithms reduced the time needed for procedures, but required a clear regulatory framework for the protection of personal data and the administration of justice. O. Bessonov (2025) considered international experience in the legal regulation and use of assistive AI systems in the judiciary of different states. He identified no single global model for the digitalisation of justice: some countries delegated certain powers to algorithms for predicting case outcomes, while others introduced legislative prohibitions on such practices.

V. Boiko (2024) described the development of international regulation aimed at using international standards in the formation of national legislation on public administration. The researcher argued for a flexible regulatory environment that took account of the European Artificial Intelligence Act and supported technological development without creating a risk of human-rights violations. V. Kozma (2023) assessed the extent to which intelligent systems had entered global politics. The author reported that, under conditions of armed conflict, AI had become a tool for analysis and intelligence gathering. This created new tasks for political science and democratic control. V. Franchuk (2025) characterised the governance potential and socio-economic risks of introducing AI into public administration. The analysis concluded that reducing these threats required the state to establish a coordinating body, develop legal safeguards for transparency, and introduce educational programmes for public servants. D. Lande *et al.* (2025) examined a set of social and legal conflicts arising in regulatory fields from the characteristics of AI systems. The researchers developed a system of parliamentary oversight using prompts and primitives for automated detection of conflict-generating provisions in draft laws. N. Rotar (2026) traced the institutional integration of AI technologies into the routine work of representative bodies of government. She argued that successful parliamentary digitalisation depended on the quality and reliability of data, while the innovations themselves should remain auxiliary tools and could not provide political accountability for legislators. Z. Lupak *et al.* (2025) systematised the evolution of intelligent systems through doctrinal legal challenges arising from the digitalisation of social relations. The authors concluded that existing regulation did not provide legal certainty on liability and the status of information systems, which

pointed to a need to harmonise national rules with European safety standards.

Despite the existing research on the influence of AI on legal practice, several theoretical gaps require closer examination. Instrumental use of algorithms in a formalised legislative process remains underexplored. Most authors concentrated on judicial proceedings, ethics, or general administration and gave less attention to the praxeological dimension of parliamentary work, such as technologies for clustering parliamentary amendments, automated semantic analysis of draft laws for compliance with European standards, or neural-network processing of public-hearing materials. The study aimed to analyse international experience in implementing AI technologies in the legislative process from a theoretical perspective. The objectives were to examine the current stage, technological strategies, and regulatory challenges of implementing AI tools in the work of the parliament of Ukraine; analyse advanced practical experience; and develop recommendations for adapting effective international practices to the law-making process of Ukraine.

● MATERIALS AND METHODS

The theoretical part of the study covered the information and legal environments of three main states: Ukraine, the Italian Republic, and the Federative Republic of Brazil. Experience of the European Parliament and the parliamentary practice of Greece and Cyprus were also included as supplementary comparative material for assessing the legislative process of Ukraine. This selection of jurisdictions allowed comparison of different stages and scales of digitalisation in public administration. Ukraine was treated as a transitional model, Italy was included as an example of a European innovation ecosystem, while the experience of Brazil represented a model for managing very large document flows in the bicameral system of a federal state. The comparative-legal method was used to compare the fundamental principles for integrating automated systems into traditional law-making. The analysis covered core provisions of the national constitutions: Constitution of Italy (1948), Federal Constitution of Brazil (1988), Constitution of Ukraine (1996), and framework and specialised laws regulating law-making and the use of advanced technologies: Law of Ukraine No. 3354-IX (2023) and Law of Italian Republic No. 132 (2025). This methodological set made it possible to identify common regulatory trends in the standardisation of algorithmic decisions and to trace how different legal systems balanced the aim of streamlining legislators’ work against the need to preserve their exclusive discretionary powers.

The formal-legal approach was used for detailed examination of institutional and procedural restrictions, personal data protection rules, and strict procedural requirements for information processing in parliaments. Assessment of the legislation of Ukraine covered parliamentary rules of procedure and personal data protection provisions: Law of Ukraine No. 1861-VI (2010) and Law of Ukraine No. 2297-VI (2010). The provisions of Law of Ukraine No. 2807-IX (2023) were also examined. Procedural requirements and amendments to Chamber of Deputies of Italy (1971) were examined from official acts. Brazilian procedural rules and legislation on digital governance were analysed on the

basis of the relevant laws and resolutions: Resolution of the Rules of Procedure of the Chamber of Deputies of Brazil No. 17 (1989), Law of Brazil No. 95 (1998), and Law of Brazil No. 14.129 (2021). Separate attention was given to the requirements of Brazilian data-protection legislation, Law of Brazil No. 13.709 (2018) and Agency for Digital Italy (2019). These regulatory sources clarified the legal barriers limiting unrestricted use of commercial neural networks and the requirements for processing confidential information when preparing comparative tables or financial and economic justifications. Structural-functional analysis was used to examine the architecture of digital platforms and software systems. The analysis focused on technical descriptions, instructions, and reports on the operation of specific algorithms (Senate of the Italian Republic, 2025; Public Sector Tech Watch, 2026). These materials clarified the specific roles of large language models (LLMs), retrieval-augmented generation (RAG), optical character recognition (OCR), and blockchain architecture in daily workflows.

Systems analysis, together with an analytical and synthetic approach, was used to examine government concepts and road maps of Ukraine in the field of AI: Decree of the Cabinet of Ministers of Ukraine No. 1556-2020-r (2020) and documents of the Ministry of Digital Transformation of Ukraine (2023; 2024). Materials on interparliamentary cooperation with Greece and Cyprus, together with initiatives of the Research Service of the Verkhovna Rada of Ukraine (2024; 2025), were examined through official reports and webinars. European approaches were analysed using the European regulation, European Parliament reports, and the guidelines of the Inter-Parliamentary Union (2024; 2026). Analytical assessments of the Organisation for Economic Co-operation and Development (OECD) (2025; 2026), and the national strategies of Italy and Brazil, were examined through the relevant documents of Ministry of Science, Technology and Innovation (2024) and Agency for Digital Italy (2024). Examination of these materials was intended to combine individual technological practices and soft-law provisions into one set of recommendations for the legislature of Ukraine

● RESULTS

Theoretical-legal and praxeological foundations for implementing AI in the legislative process of Ukraine

The increasing complexity of social relations and intensifying European integration processes have created challenges for the legal system of Ukraine that require substantial revision of traditional approaches to law-making. Under Constitution of Ukraine (1996), the sole body of legislative power in the state is parliament – the Verkhovna Rada of Ukraine – whose exclusive competence includes adopting laws, determining the principles of domestic and foreign policy, and implementing the strategic course towards full EU membership. This course places a very high cognitive and administrative burden on parliamentary staff and the subjects of legislative initiative. According to official data from the relevant parliamentary committee, full EU membership requires the state to implement more than 2,700 acts of European law. If the current pace of traditional law-making is maintained, this work may extend over more than one and a half decades (Research Service of the Verkhovna Rada of Ukraine, 2024). The drafting of only one document required

for European integration, the draft law on electronic communications, illustrated the scale of the task: more than 130 specialists were involved, spent over 22 thousand person-hours, and prepared more than 30 thousand pages of supporting materials. These resource requirements make the search for new technological solutions necessary, including AI systems that can streamline structural and algorithmic analysis of large bodies of legal data. Assessment of the current introduction of intelligent systems into the work of the Verkhovna Rada of Ukraine showed that, as of 2026, the process remained mainly at the stage of active testing, conceptual development, and educational preparation of staff rather than official full-scale incorporation into procedural rules. One example was a specialised educational webinar held by the Research Service of the parliament in early 2025 on integrating AI tools into the work of members of parliament and their advisers (Research Service of the Verkhovna Rada of Ukraine, 2025). Expert input from the parliaments of Greece and Cyprus allowed legislators of Ukraine to examine practical examples of machine-learning algorithms used for automated text processing, analysis of legislative initiatives, and, more importantly, forecasting the socio-economic consequences of regulatory acts. This corresponded to the requirements of the legislation of Ukraine, which requires an impact assessment of a draft regulatory legal act on social relations, including forecasts of demographic, economic, regulatory, and corruption-related consequences. Generative models can accelerate preparation of financial and economic justifications and comparative tables, which are mandatory supporting documents when draft laws are submitted for a second reading.

The technological tools currently being tested and planned for the national legislative process combine neural-network solutions, cloud computing, and cryptographic databases. According to statements by the leadership of the Committee on Digital Transformation, the strategic vision of parliament is based on large language models (LLMs) for automated detection of conflicts between draft national laws and the EU *acquis* (Research Service of the Verkhovna Rada of Ukraine, 2024). Integration of blockchain technologies is also planned to provide transparency, immutability, and protection against unauthorised interference with draft laws during drafting, committee consideration, and final voting. Development of such systems rests on the state informatisation policy, which gives legislative priority to digital technologies for improving public administration and requires localisation of software products used by public authorities. A domestic, localised architecture is a national-security requirement, since processing the texts of laws before official publication may involve sensitive information of state importance, including state secrets and other protected information. The regulatory framework that legitimises and directs the use of AI in Ukraine has developed gradually and follows the so-called “bottom-up” approach (literally, “from the bottom upwards”).

The basic document setting the direction for this field was Decree of the Cabinet of Ministers of Ukraine No. 1556-2020-r (2020), which already in 2020 identified the need to use intelligent systems for analysing the texts of administrative decisions, streamlining public administration, and reducing excessive bureaucracy in the state apparatus. The Ministry of Digital Transformation

subsequently conceptualised development of the regulatory field in a dedicated Road Map (Ministry of Digital Transformation of Ukraine, 2023) and set out further detail in a White Paper (Ministry of Digital Transformation of Ukraine, 2024). The approach chosen by the state has two main stages. The first stage, planned for the period up to 2026, avoids mandatory regulation and relies on soft-law instruments. These include voluntary codes of conduct, methodological recommendations, a voluntary

labelling mechanism for synthetic content, and regulatory “sandboxes” for safe algorithm testing. The second stage provides for adoption of a comprehensive law as a national counterpart to Regulation (EU) 2024/1689 (2024) (AI Act), which will harmonise national legislation with EU requirements. Table 1 was prepared to systematise the phased introduction of intelligent systems into national parliamentary practice and to present the architecture of the planned changes.

Table 1. Strategic vectors for implementing AI in the legislative process of Ukraine

Implementation vector	Technological tools	Expected praxeological effect	Mandatory preventive measures
Adaptation to the EU acquis	Specialised large language models (LLMs), RAG technology	Automated semantic search, rapid detection of conflicts between national and European law	Deployment of algorithms only on closed local servers (open commercial models prohibited)
Optimisation of committee work	Natural language processing (NLP), spatial clustering algorithms	Rapid generation of comparative tables, bulk sorting of amendments to draft laws	Compliance with the “Human in Command” principle (absolute human verification of final texts)
Transparency and accountability	Blockchain architecture, OCR	Ensuring the immutability of texts during drafting, digitisation of historical archives	Mandatory machine-readable labelling of all generated synthetic content

Source: compiled by the author based on Ministry of Digital Transformation of Ukraine (2024), Research Service of the Verkhovna Rada of Ukraine (2024), Regulation (EU) 2024/1689 (2024)

The effects of intelligent algorithms in law-making need to be assessed against both their advantages and the risks identified. One positive area, where the technology already improves existing processes, is the speed of analytical processing of legal texts. Under the procedural rules, parliamentary committees must carry out a preliminary review of a draft law within thirty days and obtain conclusions on its budgetary impact and its compliance with Law of Ukraine No. 1861-VI (2010). AI gives them a tool for automating routine expert review. Its capacity to generate comparative tables and detect terminological inconsistencies reduces the routine workload of expert units of the Office of the Verkhovna Rada. Analytical systems can also make legal monitoring of legislation in force more efficient, a requirement that has been established at legislative level. At the same time, these technologies create several threats that may lower the quality of the legislative process when adequate safeguards are absent. The principal risks are algorithmic “hallucinations” and substantive model bias, which in law-making may lead to regulatory acts containing hidden legal gaps or discriminatory provisions. Under conditions of full-scale armed aggression, parliamentary infrastructure is also a continuing target for external cyberattacks and information operations.

Specialised security centres report that hostile intelligence services actively use AI to generate fake documents, deepfakes of public officials, and disinformation intended to undermine trust in public institutions (Research Service of the Verkhovna Rada of Ukraine, 2025). These challenges were emphasised separately during educational activities for parliamentarians of Ukraine, where the need for robust cybersecurity policies and control over the use of generative models in public institutions was discussed. Another concern for the legal system is the risk of violating fundamental rights when unverified algorithms are used. The legal order in the state rests on the principle that no one may be compelled to do what is not required by law. Use of AI to model the social consequences of laws or support public consultations involves processing very large volumes of

personal data. Law of Ukraine No. 2297-VI (2010) prohibits the processing of sensitive data on ethnic origin and political or religious beliefs without the person’s consent, and it guarantees every citizen protection against an automated decision that has legal consequences for that person. Delegating functions related to social scoring or profiling of citizens to neural networks during regulatory impact assessment of draft laws is therefore categorically unacceptable.

The combined theoretical and empirical material was used to formulate a set of research-based recommendations for further application of international experience with AI in the legislative process of Ukraine. The need for such implementation is beyond doubt, since only technological automation can ensure timely and high-quality implementation of thousands of acts of European law into national legislation. This process, however, must retain an anthropocentric approach. The guidelines of the Inter-Parliamentary Union (2024) state that AI should be treated only as a tool for extending human capabilities, not as a substitute for democratic deliberation or direct political decision-making. Members of parliament must remain personally responsible for their votes, and no algorithm may replace the discretionary powers of a legislator. Ukraine needs to accelerate institutional development in digital oversight. International experts reported that effective implementation of European rules requires Ukraine to establish a single independent digital regulator – the National Commission for State Regulation of Digital Spheres (OECD, 2026). The relevant law is expected to be adopted by the end of 2026, allowing oversight of algorithmic systems, digital services, and data governance to be centralised. Such a body, provided with sufficient financial and human resources, would ensure professional review of intelligent systems planned for integration into the Office of the Verkhovna Rada.

In developing its own counterpart to European AI legislation, the parliament of Ukraine should clearly classify any algorithmic systems used in law-making or electoral procedures as “high-risk” systems. Under the logic of the

European regulation, public authorities must carry out an in-depth assessment of their effect on fundamental human rights before these systems are placed in service. This assessment includes potential threats to particular social groups, methods of human oversight, and routes for contesting algorithmic errors. Any synthetic content generated for parliamentary hearings or public consultations should also carry a clear machine-readable label identifying it as artificially created. The parliament of Ukraine should therefore adapt successful European practices for narrow, specialised uses of language models. One example is the European Parliament, where an EUBERT-based model is used for automatic classification of very large bodies of legal documents with the standardised EuroVoc thesaurus (Inter-Parliamentary Union, 2026). A comparable specialised model trained only on verified legislation of Ukraine and decisions of the Constitutional Court could reduce the problem of “hallucinations” associated with general-purpose commercial models, such as ChatGPT, Gemini, and Claude. Integrating such narrow-domain solutions, while also using chatbots to improve public access to parliamentary information, could increase the transparency of the legislature and strengthen public trust in law-making during digital transformation.

International experience in the use of AI in the legislative process

The review of international experience in implementing AI technologies in law-making confirmed that digitalisation of parliamentary procedures is a necessary part of the global transformation of public administration. Reports by leading international organisations treat AI not only as an object of state regulation, but also as a tool used by governments and legislatures to improve productivity, timeliness, and accountability in public policy (OECD, 2025). The experience most relevant to Ukraine, which is adapting national legislation to European standards, is that of the Italian Republic and the Federative Republic of Brazil. Both states face excessive bureaucratic burdens on their parliaments, which has encouraged a move from traditional methods towards LLMs, ML, and NLP.

The Italian Republic is one of the recognised European leaders in parliamentary innovation. Under Constitution of Italy (1948), the legislative function is exercised jointly by both chambers of parliament, which involves a complex procedure for considering drafts, introducing amendments, and approving them. Chamber of Deputies of Italy (1971) required detailed committee examination of every draft law, assessment of its financial implications, and review of constitutionality, producing a very large body of documentation. The Senate of Italy introduced several AI-based tools to streamline these processes, and they are already used officially in daily work. The central technology is *Ge-store EMendamenti* (GEM) – an integrated amendment manager that uses natural language processing algorithms and generative AI for clustering, analysing, and determining the voting order of amendments (Senate of the Italian Republic, 2025). The *Similis* algorithm operates alongside GEM and can identify identical or similar amendments among thousands of submitted documents within seconds, avoiding duplicated committee work. *TeSeo* is another officially deployed tool: a system for classifying parliamentary

acts, based on an open machine-learning engine trained on tens of thousands of historical Senate documents. *Lincoln* software, based on NLP, is also used actively. It automatically recognises legal references in texts and creates hyperlinks, making it easier to check new acts for consistency with legislation in force.

The GENAI4LEX-B project, developed by the University of Bologna, is at the pilot-testing stage in the Chamber of Deputies of Italy. The tool combines symbolic AI (Law as Code) and generative AI to automate searches for relevant legal documents and generate summaries of amendments (Public Sector Tech Watch, 2026). It uses the EuroVoc legal ontology for thematic classification, complies with the international Akoma Ntoso (LegalDocML) standard for machine-readable legal documents, and applies the Houdini deductive-logic engine for automated checking of draft laws against current strategies and constitutional principles. The regulatory framework of Italy that permits such use evolved from general acts towards specialised legislation. Agency for Digital Italy (2019), which encourage public authorities to share source code for their solutions, and compliance with Legislative Decree No. 196 (2003) were important elements. Italian strategy for artificial intelligence 2024-2026 published by Agency for Digital Italy (2024) became a strategic reference and provided for large-scale investment in AI for public administration. Law of Italian Republic No. 132 (2025) was the fundamental act establishing official use of AI. Article 14 of this Law directly permits public authorities to use AI to improve efficiency, reduce procedural time, and improve services, but it also imposes requirements. AI may serve only an auxiliary function, and full responsibility for a decision always remains with a person. In the Senate of Italy, this approach is termed “Human in Command”, the main safeguard against algorithmic errors and neural-network “hallucinations” (Senate of the Italian Republic, 2025). Alongside the conceptual advantages, pilot testing of GENAI4LEX-B identified several fundamental challenges affecting the technological and financial sustainability of innovation. The system developers reported that training AI on specialised legal terminology required continual improvement of the models, while deployment of generative solutions required substantial investment in scalable computing infrastructure. High hardware costs and the risk of systemic failures during processing of large data sets required technical specialists to monitor computing performance continuously. Transparency and explainability of algorithmic actions for non-technical users, particularly parliamentarians and staff, formed an additional barrier. Italian practice addresses these obstacles by requiring exclusive use of reliable parliamentary sources and strict observance of the hierarchy of legal acts. The digitalisation process is also regulated closely by the guidelines of the Agency for Digital Italy (AgID). These rules require public authorities, when carrying out comparative assessments, to give absolute priority to open-source software and to implement personal data protection mechanisms from the architectural design stage, in accordance with the European regulation and Legislative Decree No. 196 (2003).

The experience of the Federative Republic of Brazil is also representative. Federal Constitution of Brazil (1988) establishes a bicameral National Congress in which

legislative initiative, consideration of vetoes, and delegated legislation require detailed examination. Procedural rules require congressional committees to examine the legal, economic, and social aspects of each act in detail, and they set strict rules for consolidating and amending legislation in force: Resolution of the Rules of Procedure of the Chamber of Deputies of Brazil No. 17 (1989) and Law of Brazil No. 95 (1998). In response to these requirements, the Chamber of Deputies of Brazil has officially used the Ulysses AI Suite platform since 2018. The system applies machine learning and natural language processing to classify very large sets of laws, speeches, and research documents, and it also helps parliamentarians draft texts and locate similar bills considered previously (OECD, 2025). One of the main Ulysses functions is automatic classification and analysis of citizens' comments during public consultations, which allows key areas of public interest to be identified and addressed more quickly. A generative AI tool for automatic transcription and summarisation of public hearings is also being tested.

Implementation of these innovations in Brazil rests on Law of Brazil No. 14.129 (2021), which establishes principles of debureaucratisation, system interoperability, and the use of open data in governance, and on Law of Brazil No. 13.709 (2018), which regulates the processing of personal information by public authorities. Ministry of Science, Technology and Innovation (2024), adopted in 2024, provides for infrastructure development, national Portuguese-language models, and the use of AI to improve public services. Law of Brazil No. 2338 (2023) on AI regulation is also under consideration. It establishes rights for persons affected by AI and classifies the use of algorithms in the administration of justice and political processes as "high-risk systems" requiring enhanced oversight. The draft specifies that "high-risk" systems include technologies used in the administration of justice, assessment of the reliability of evidence, and support for

decisions by public authorities that affect citizens' rights and freedoms. Developers and operators of such systems would be required to introduce governance measures, including documentation of every stage of an algorithm's life cycle, automatic logging of operations, regular testing for accuracy and reliability, and inclusive development teams to reduce cognitive and social bias. In practical terms, the Chamber of Deputies of Brazil coordinated the development of clear institutional guidelines for the use of intelligent systems in parliaments in 2024. These criteria cover the principle of complementarity, under which human oversight cannot be replaced; requirements for accuracy and reliability, including continuous calibration of algorithms to avoid reproducing bias; and full transparency towards the public. Parliamentary rules also emphasise the security of confidential data during automatic transcription and document analysis. They require any experiment with AI to begin only as a small pilot project with controlled risks and accountability protocols. Comparison of the constitutional principles of Italy and Brazil confirmed that neither legal system allows the discretionary powers of a legislator to be delegated to AI. Structural-functional analysis of the technical architecture of GEM in Italy and Ulysses in Brazil showed that the software design of both platforms follows these constitutional requirements. Both systems have a modular architecture. The first level aggregates incoming document sets, the second carries out semantic processing with NLP and the EuroVoc legal ontology, and the third produces analytical extracts without intervening in decision-making (Senate of the Italian Republic, 2025). This division follows constitutional principles of accountability and transparency while leaving members of parliament in control of the content of legal acts. Table 2 provides a detailed classification of the functions and technological basis of the intelligent platforms that have already proved viable in the parliaments of Italy and Brazil.

Table 2. Comparative characteristics of AI tools in the legislative practice of Italy and Brazil

State	Platform/project name	Core technology	Area of parliamentary application
Italy	GEM	NLP, specialised machine-learning algorithms	Structuring amendments, immediate detection of textual duplicates, optimisation of the voting order in the Senate
Italy	GENAI4LEX-B (pilot stage)	Symbolic AI (Law as Code), EuroVoc legal ontology	In-depth search for relevant legal acts, automated checking for compliance with constitutional norms
Italy	TeSeo and Linkoln	Open ML engines, parsers	Cataloguing archival documents, automatic generation of active legal hyperlinks in legislative texts
Brazil	Ulysses AI Suite	Machine learning, NLP	Categorisation and content analysis of citizens' comments during public consultations, navigation through bodies of legislation
Brazil	Automatic transcription systems	Generative AI, speech recognition	Preparation of detailed transcripts and concise summaries following public parliamentary hearings

Source: compiled by the author based on Senate of the Italian Republic (2025), OECD (2025), Public Sector Tech Watch (2026)

Assessment of AI use in the legislative processes of Italy and Brazil identified substantial improvements. In Italy, GEM and Similis allowed processes to be dematerialised and saved a very large amount of time. One example was the processing of more than 82 million algorithm-generated amendments to a constitutional law in 2015; with the new software, Senate staff sorted and classified them in only three days. Automatic transcription technology allowed the Senate to publish draft transcripts of sittings 40 minutes after a speech (Senate of the Italian Republic, 2025). In Brazil, Ulysses improved parliamentary

transparency and public engagement through rapid analysis of public requests. International experience also identified several risks accompanying digitalisation. AI requires considerable financial resources for model training and computing capacity, regardless of the state in which it is used. Generative AI is also prone to "hallucinations" and legally incorrect constructions. For this reason, both Italy and Brazil recognise that AI does not improve the process when used autonomously. Improvement occurs only when the principles of complementarity, meaning that human involvement cannot be replaced, algorithmic transparency,

data security, and continuous risk control are maintained. Experts from the OECD (2025) also noted that, without auditing, confidentiality safeguards, and explainability of decisions, excessive reliance on machine outputs could lead to systemic errors and loss of trust in public institutions.

Additional recommendations for introducing AI into the legislative process of Ukraine were formulated from the international experience examined. Such implementation is unequivocally appropriate in view of the volume of European-integration legislation that the Verkhovna Rada must process. Ukraine should also adopt the Italian “Human in Command” concept and establish in legislation that neural networks may not generate final legally binding texts without human review and authorisation. Based on the trust framework proposed by the OECD (2025), implementation in Ukraine should begin not with AI-generated laws, but with semantic-search systems, amendment clustering modelled on the Italian GEM system, and analysis of public consultations modelled on the Brazilian Ulysses platform. This requires integration of NLP technologies with existing parliamentary databases. Under the analytical methodology of the OECD, the most promising approach for a legislature is to combine NLP with RAG technologies. This approach will produce neural-network responses solely from a verified internal database of national legislation and European-law directives, fully excluding unverified external sources. OCR technologies are also suitable for large-scale digitisation of archival parliamentary materials, while “rules as code” algorithms can support automated checking of new draft laws for structural conflicts with public-administration rules in force.

Any AI tools used in the parliament of Ukraine should therefore comply with personal data protection and cybersecurity standards, operate on open machine-readable formats such as LegalDocML, and include audit mechanisms to prevent algorithmic bias and maintain a high quality of national legislation. The analysis of digitalisation outcomes in the parliamentary procedures of Ukraine, Italy, and Brazil confirmed that automated systems had become a means of streamlining work with large bodies of legal texts. The greatest practical effect in law-making came from specialised solutions based on natural language processing, machine learning, and RAG, particularly when they were embedded in the internal databases of legislative bodies. Comparison of the Italian GEM platform, the Brazilian Ulysses platform, and initiatives in Ukraine showed that compliance with cybersecurity requirements, personal data protection, and the “Human in Command” principle was necessary for preventing errors. The data obtained provide a basis for further academic discussion of the changing role of intelligent technologies in state governance.

● DISCUSSION

The results of this theoretical study on implementing AI technologies in the legislative processes of Ukraine, Italy, and Brazil provided a new conceptual view of the limits and possibilities of digital transformation of the state. The analysis indicated that large language models, NLP, and ML could increase the productivity of law-making in parliaments by turning a bureaucratised process into a more flexible, data-oriented mechanism. The study did more than record technological progress; it identified an institutional

shift. AI is moving from an auxiliary information-search tool towards an active role in analytical support for law-making, as illustrated by amendment clustering through GEM in Italy and analysis of public input through Ulysses in Brazil. At the same time, the analysis made clear that the principal barrier for Ukraine was not a lack of technology, but the absence of clear regulatory safeguards capable of preventing algorithmic bias and protecting the process from AI “hallucinations”. Parliamentary digitalisation therefore needs to begin with audit institutions and implementation of the “Human in Command” concept rather than delegation of powers to neural networks. The patterns identified in the study are consistent with international academic debate and extend the conclusions of several researchers. The conclusion that uncontrolled use of AI in legislation may lead to systemic errors and violations of basic legal principles corresponds closely to the concerns of S.G. Peschke & L. Peschke (2022). They analysed ethical and legal conflicts associated with the integration of machine learning into EU practice and argued that new initiatives, including the Data Act and AI Act, created considerable legal uncertainty regarding privacy protection where access to large data sets was easy. M. Jarota (2023) likewise stressed the need for a clear allocation of responsibility when algorithms are introduced. In examining occupational safety in the EU, he argued that European regulation remained insufficient and that AI should be treated solely as a work tool, with human control supported by sanctioning mechanisms of the relevant authorities. A. Drahmann & A. Meuwese (2022) also examined the potential of AI to improve legislative texts and process monitoring. Using the Dutch Digitaal Stelsel Omgevingswet project, they reported that parallel design of data and legislation increased the transparency of legal rules, although it also created risks at early stages.

N. Rangone (2023) also supported the proposition that AI could reduce the routine workload of parliamentary staff, as illustrated by the Italian experience. She examined the effect of AI on the life cycle of public decisions and reported that neural networks substantially expanded access to knowledge bases and helped simplify the regulatory environment, although the process required a phased experimental approach to avoid discrimination. The Brazilian part of the present study, particularly the use of Ulysses for public participation, corresponded directly to the conclusions of D.J. Wardana & D. Setiawan (2025). They analysed the integration of AI into the legislation of Indonesia and concluded that automation and NLP could make law-making more participatory, democratic, and responsive to public needs when personal data protection safeguards were maintained. The prioritisation of parliamentary technologies also corresponded to the empirical study by J. von Lucke *et al.* (2022). The authors systematised more than 210 proposals for introducing AI into parliamentary work and argued that automation of legislative procedures was the most realistic and most in-demand area for public authorities. The scepticism of the present study towards full automation of legal work was supported by N. Khatniuk *et al.* (2023), who examined the use of AI in legal services and stressed the need for strict legislative measures to ensure ethical implementation of such tools. M. Araszkievicz & M. Florczak-Wątor (2025) considered applied aspects of legal-text optimisation identified through the analysis of

Linkoln. They analysed the capacity of NLP models to detect structural defects, ambiguities, and conflicts in laws and concluded that AI was an effective means of maintaining consistency, but its use required awareness of related ethical risks. O. Shevchuk *et al.* (2023) and P. Parycek *et al.* (2024) examined the role of AI in administrative procedures and its limitations. The researchers from Ukraine argued that algorithms could be introduced into administrative proceedings only under judicial control in order to avoid violation of the rule of law. The European researchers stressed that integrating AI into governance required systematic monitoring of transparency and the quality of representative data to prevent bias.

T. Wahl (2024) described the importance of systematic digitalisation through the example of Norway, which corresponded with the evidence on strategy development in Ukraine. He analysed the StorSak project in the Norwegian Storting, where AI is used to categorise documents from metadata, supporting the global trend towards automated parliamentary document management. A. Goldmann & S. Plümer (2026), together with A. Chiappetta (2023), examined the political dimension of narratives around AI. They analysed how members of the European Parliament perceived the AI Act and reported that legislators viewed AI both as a source of innovation and as a serious threat due to algorithmic bias, prompting demands for strict regulatory intervention. P.F. Bresciani & M. Palmirani (2025) raised the question of whether national parliaments themselves fall within the scope of the AI Act. They concluded that, although the European regulation extends to parliaments, their obligations are minimal, placing responsibility for protecting democracy in the digital era on the representative bodies themselves. H. Farrell (2025) conceptualised the fundamental influence of AI on bureaucracy and governance as “AI as Governance”. He proposed that political scientists should consider AI not simply as a technology, but as a new form of governance with its own coordination mechanisms capable of substantially changing markets and democracy.

C.M. Cordeiro *et al.* (2025) and A. Batool *et al.* (2025) also examined this corporate and social influence. Through semantic analysis and a systematic review, they argued that acts such as the AI Act were moving corporate governance from formal reporting towards accountability to stakeholders at multiple levels. The threat of AI to representative democracy also forms part of this debate. The present conclusion about the risk of distorting public opinion is consistent with the work of S. Kreps & D. Kriner (2023). Their experiment showed that language models such as GPT-3 could improve legislators’ efficiency when drafting replies to constituents, but low-quality generation or concealment of AI use undermined citizens’ trust in public authorities. A. Jungherr (2023) supported this position by proposing a move away from concern about artificial general intelligence (AGI) towards monitoring the concrete effects of existing narrow AI on electoral institutions and equality in democratic society. The use of AI in the legislative process can therefore be treated as an irreversible development that requires reconsideration of the nature of law-making. The analysis of international experience and previous research indicated that successful transformation depended not on algorithmic power, but on the quality of

representative data and the capacity of the state to integrate ethical safeguards. Ukraine has an opportunity to avoid the errors of “first movers” by building parliamentary digital architecture around the “Human in Command” principle, maintaining algorithmic transparency, and preserving an anthropocentric approach in which AI remains an analytical tool and responsibility for the fate of a law remains with a person.

● CONCLUSIONS

The theoretical study included a comparative-legal analysis of the introduction of intelligent information systems. The analysis confirmed that automation of parliamentary procedures was necessary for public administration to reduce the administrative burden. For Ukraine, this process had practical importance due to the need to harmonise national legislation with EU law, which requires processing more than 2,700 acts required for European integration. Examination of the current digitalisation of the Verkhovna Rada of Ukraine showed that the country was at the stage of testing NLP and LLM tools. Regulation of this field followed a “bottom-up” approach based on the Concept for the Development of Artificial Intelligence, the government Road Map, and the White Paper, with a later transition towards implementation of the European Artificial Intelligence Act.

Analysis of the international practice of the Italian Republic and the Federative Republic of Brazil confirmed the effectiveness of specialised digital platforms in the daily work of parliaments. The Senate of Italy successfully used GEM to cluster parliamentary amendments, Similis to detect textual duplication, and Linkoln to create legal hyperlinks. The GENAI4LEX-B platform was being tested in the Chamber of Deputies of Italy, combining the EuroVoc legal ontology with AI and the LegalDocML standard. The legislative basis of the Italian model was the Law of 23 September 2025, which defined the auxiliary status of algorithms and established the “Human in Command” rule. Examination of the Chamber of Deputies of Brazil confirmed the effectiveness of the Ulysses AI Suite platform for classifying citizens’ submissions during public consultations and providing semantic navigation through bodies of legislation. Brazilian practice rested on the General Data Protection Law, the Brazilian artificial intelligence plan published by Ministry of Science, Technology and Innovation (2024), and Law of Brazil No. 2338 (2023), which classified algorithms used in law-making as high-risk systems. Comparison of the technical architecture of these platforms with the provisions of the Constitution of Italy and the Constitution of Brazil showed that constitutional rules prohibited transfer of parliamentarians’ discretionary powers to automated systems.

Theoretical synthesis of international experience indicated that neural networks accelerated processing of legal texts, cataloguing of archival documents, and preparation of comparative tables. Algorithms, however, could not independently produce legally complete legislative texts due to the risk of substantive bias. The results confirmed the need to adapt the Italian and Brazilian approaches to the legislative process of Ukraine. The legislator was advised to establish the principle of human oversight in law, under which final verification of generated texts remained the duty of a specialist. Technical integration of algorithms into the Office of the Verkhovna Rada of Ukraine should

be based on specialised language models and RAG. Such models should operate on state servers and be trained on a verified body of national legislation and decisions of the Constitutional Court of Ukraine. This would meet the requirements of the Law of Ukraine “On the Protection of Personal Data” and the Law of Ukraine “On Law-Making Activities”. The state should also introduce mandatory machine-readable labelling of synthetic content and establish an independent supervisory body for digital spheres as part of legal-act quality control. Future research should include practical modelling and testing of Ukrainian-language

neural networks during large-scale semantic processing of real national draft laws.

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Міжнародний досвід застосування ШІ в законодавчому процесі як приклад для України

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Анотація. Метою дослідження було проведення всебічного теоретичного аналізу міжнародної практики впровадження технологій нейронних мереж у законотворчість. У процесі дослідження поєднувалися порівняльно-правовий, формально-правовий, структурно-функціональний та системний методи для порівняння нормативно-правових баз, інституційних обмежень та архітектури цифрових платформ у трьох державах: Україні, Італійській Республіці та Федеративній Республіці Бразилії. У ході дослідження було встановлено, що цифровізація є об'єктивною необхідністю для зменшення бюрократичного навантаження, зокрема під час адаптації понад 2 700 актів європейського права, коли для розробки лише одного нормативно-правового документа було залучено 130 фахівців та витрачено понад 22 тисячі годин роботи. Парламенти Італії та Бразилії успішно використовували інструменти обробки природної мови та машинного навчання для класифікації коментарів громадян та групування пропозицій. Офіційні парламентські звіти показали, що спеціалізовані алгоритми можуть суттєво прискорити обробку великих масивів документів, зокрема сортування 82 мільйонів поправок протягом трьох днів та оприлюднення проектів стенограм засідань через 40 хвилин після виступу. Автоматизація спростила рутинні процедури, однак нейронні мережі не змогли самостійно створювати юридично бездоганні тексти через високий ризик алгоритмічних помилок. Аналіз підтвердив висновок про те, що людський контроль неможливо замінити, а остаточна перевірка згенерованого контенту має залишатися виключною відповідальністю людини. Практична цінність отриманих результатів полягає в тому, що Апарату Верховної Ради України та Міністерству цифрової трансформації України можна використовувати запропоновані рекомендації під час розробки внутрішніх нормативних актів.

Ключові слова: цифрові платформи; державне управління; машинне навчання; обробка природної мови; великі мовні моделі; захист персональних даних; цифрова трансформація