Report on AI in Parliamentary Context[1]

(Final Draft-December 2024)

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HYPERMODELEX

Abstract. The report maps and analyses the current uses of AI in parliamentary contexts worldwide to address an undertheorized area in AI and law scholarship. Current use cases are examined in light of established principles of legal and constitutional theory. The integration of AI applications within parliamentary processes could undermine the concept of law underlying democracy and the rule of law, as well as infringe upon key constitutional principles. The analysis shows that, even though most current uses of AI are purely assistive, parliaments need to act promptly to address potential risks to constitutional principles. They should also take legal theory constraints seriously for future, more robust AI implementations by adopting technical frameworks capable of integrating foundational concepts from legal theory. Approaches like hybrid AI—rather than methodologies like Rule-as-Code (RaC) or Law-as-Code (LaC)—could offer a more nuanced and theoretically sound basis for digitizing legal systems.

[1] Funded by the European Union (ERC ADG HyperModeLex, DOI: 10.3030/101055185). Views and opinions expressed are however those of the authors only and do not necessarily reflect those of the European Union or the European Research Council Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.

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1. Introduction

Artificial intelligence is transforming our societies and everyday life, and its influence is rapidly extending to government institutions, including parliaments. Since most discussions have focused on AI's role in administrative and judicial decision-making, its use in parliaments remains largely undertheorized, despite its potentially more disruptive impact.[2] However, parliaments are taking steps towards using proofs of concept to test operational tools equipped with new AI solutions for three main purposes:

- **Administrative tasks**, minimizing the burden of the administrative tasks entrusted to civil servants, while optimizing efficiency and improving the quality of the administrative services delivered. AI can be used to automate many repetitive jobs (e.g., typing transcripts of an assembly meeting), delegate some very time-consuming activities (e.g., summarising amendments and arranging them in a proper order), and preprocessing some intellectual tasks (e.g., consolidating of a draft law).

- **Legislative tasks**, supporting the legislative initiatives of decision-makers and of members of parliament. AI helps bring out hidden legal knowledge that, owing to the complexity of the legal system, cannot be easily identified and managed. AI can be used to retrieve pertinent legal sources (e.g., through eDiscovery), simulate the application of a new bill and so evaluate all the potential effects of its application, check for compliance with existing norms, or assess how well any set of norms advances policy goals or how consistent these norms are with such goals (e.g., fighting climate change or ensuring gender equality).

- **Participation tasks**, helping citizens, businesses, and institutions easily access and understand the laws and regulations that apply to them. Using a chatbot or conversational interface portal, end-users can query the normative-system database depending on what their needs are. The query-answering system can support information retrieval, and some legal-reasoning portals can return useful information about a specific case.

In this context, this report aims to map the current applications of AI within parliamentary processes, contributing to the broader theoretical understanding of its use.
Our primary goal is to analyse these applications through the lens of general principles of law, with a particular emphasis on constitutional theory.

[2] See e.g. Fitsilis and Gomes Rêgo de Almeida (2024).

Given the fundamental role of parliaments in democratic systems, it is essential to analyse innovation and the state of the art in AI through the lens of general legal principles. Allowing technology to shape the legal domain without a solid foundation in theory of law risks weakening the values that underpin democracy and the rule of law. Ensuring the use of AI in parliamentary processes aligns with a constitutional framework, and understanding its role within that context, safeguards technological progress while preserving the foundations of legal systems.

A theory-based approach to the examination of practical uses is therefore essential to protect the basic principles of law as we know it.

For compiling this report, we have adopted a broad definition of AI, similar to the one in the AI Act approved by the European Union.[3] Namely, Art. 3 of the Act defines "AI system" as a machine-based system that is designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment, and that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments. Regardless of the technology used, we consider any application with these characteristics as an AI application.

The report is organized as follows: First, we examine the legal theory and constitutional principles that should guide the integration of AI into parliamentary functions. Sections 2 and 3 specifically emphasize the necessity of adopting a Hybrid AI technical framework that builds on three decades of digitization practices and AI and law scholarship. In Section 4, we analyze the general principles of constitutional law that should govern the use of AI. Next, in Section 5, we offer a detailed description of current AI use cases in parliaments. In Section 6 we then conduct a risk analysis, identifying possible threats to fundamental legal principles and measures to mitigate them. Finally, in Section 7, we conclude by offering recommendations for integrating AI into parliamentary contexts in a way that is consistent with current legal and constitutional principles.

2. Legal Theory Framework for AI Use in Parliamentary Contexts

[3] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence ("EU AI Act"), <http://data.europa.eu/eli/reg/2024/1689/oj>.

In recent years, international legal scholarship and soft law instruments have developed a set of general principles for ethically sustainable AI.[4] More recently, these ethical principles have been specifically applied to the use of AI in parliaments as well.[5]

However, the use of AI in parliamentary contexts calls for the development of more specific and thicker principles, particularly within the domains of legal theory and constitutional theory. In contemporary constitutional states, parliaments hold a unique status as representative bodies and lawmakers, and their role is crucial in safeguarding democracy and the rule of law.

In the report we highlight the general legal theory and constitutional principles that AI technologies used in the parliamentary context should respect.

We will not analyse the risks associated with AI technologies that are not specific to their use by parliaments and that are already fully covered by broader AI principles. For instance, concerns regarding privacy, bias, hallucinations, or environmental issues are general risks that apply to AI in all contexts. Parliaments, like other public authorities, should address these general risks using methods widely discussed in the soft law instruments and scientific literature.

The integration of AI into parliamentary processes, particularly in law-making, might impact the very concept of law.

It is necessary to go beyond the state of the art of the current theory of law in parliaments and take on the challenge of the "coding of the law"[6] by building a solid IT-based legal framework supported by the philosophy of law, the theory of law, ethics, constitutional law, parliamentary regulations[7], and a clear roadmap[8]. At present, there are in fact at least three competing methodologies: Rule as Code, Law as Code, and Digital-Ready Policymaking.

- **Rule as Code**: As described in the GovCMS platform of the Australian Government[9], the concept of Rules as Code has its roots in "turning legislation, regulation, standards, and policies into machine readable code which can be understood and interpreted by computers", in order not just to improve the drafting process and the implementation of the legislation, but also to help people to understand their obligations and responsibilities. This process involves close collaboration between legislators, drafters, and programmers, producing both human-readable legal text

[4] Cf. Floridi et al. (2018).

[5] 'Among the first examples of AI principles specifically designed for parliaments are the AI Guidelines for Parliaments, published by the Westminster Foundation for Democracy <https://www.wfd.org/ai-guidelines-parliaments> and the Guidelines for AI in Parliaments of the Inter-Parliamentary Union <https://www.ipu.org/resources/publications/reference/2024-12/guidelines-ai-in-parliaments>.

[6] Savelka et al. (2021).

[7] Micklitz et al. (2021).

[8] Von Lucke, Fitsilis, Etscheid (2023).

[9] 'What is Rules as Code?' <https://www.govcms.gov.au/rac>

and code that can be implemented or reused in larger systems. Rules as Code (RaC) aims to ensure that the rules work as expected, with the potential for open access to the code for further third-party implementations. The RaC approach differs from Lessig's "Code is Law" concept[10], which addresses how commercial software can override legal rules in online spaces, even if some of its ideas remain relevant to RaC. McBride and Diver[11] underline that once policies are developed and translated into "Rules as Code", attention shifts to enforcement, compliance, and legal advice. On one side, there are extensible platforms like DataLex that help create legal reasoning applications for advisory services, regulatory compliance, and decision support using Rules as Code. On the other side, "Low-code" and "no-code" platforms, such as Blawx and Neota, allow users to define rules through intuitive graphical interfaces, so the users don't need to care about logical rules underneath. This enables domain experts without programming experience to participate closely in the rule-defining process.

As highlighted in Palmirani (2022)[12], advanced IT, including AI, can significantly enhance the Commission's primary activities of drafting legislation and shaping policy. The report identifies several areas where IT and AI could provide advantages, such as legal reasoning, information retrieval, visualisation and interoperability. Mohun et al. (2020)[13], note that current methods for coding regulations are often fragmented and inefficient. The authors suggest that using RaC could help align intentions with outcomes, enhance modeling capabilities, accelerate processes, improve consistency, and reduce compliance costs for businesses. This approach would also help ensure better communication and understanding among those involved in drafting legislation, including awareness of the potential consequences of legislative decisions[14].

Recently, as part of the global RaC movement, the Legislative Drafting Office of Jersey launched the Computer-Readable Legislation Project (2023–2024). This project focuses on creating computer-readable versions of draft legislation, allowing automated systems to identify inconsistencies or unintended effects before the laws are finalized.[15] The project also explores how artificial intelligence can enhance

[10] Kennedy (2024)

[11] Pauline McBride and Laurence Diver, Research Study on Computational Law (Brussels 2024), funded by the ERC Advanced Grant 'Counting as a Human Being in the Era of Computational Law' (COHUBICOL) by the European Research Council (ERC) under the HORIZON2020 Excellence of Science program ERC- 2017-ADG No 788734 (2019-2024)

[12] Palmirani et al. (2022).

[13] Mohun and Roberts (2020).

[14] Kennedy (2024)

[15] Waddington (2023).

human ability to navigate legislation, highlighting AI's potential to drive progress in the RaC initiative.[16]

- **Law as Code**:[17] This approach aims at an even more ambitious transformation—digitizing entire laws or legal system in a way that goes far beyond automating individual rules. It envisions a legal landscape where laws are made, interpreted, and possibly even enforced through digital systems right from the outset.[18] Law-as-code approaches aim to bypass the problem of legal interpretation through processes of reverse engineering of legal reasoning.[19]
  In this regard, Mireille Hildebrandt (2018[20], 2020[21]) examines "code-driven law", i.e. the use of self-executing code to enforce legal norms, opposing it to "data-driven law," which is more predictive and analytical in nature. Her focus is on how code-driven law—found in applications like smart contracts and automated regulation—creating fixed, pre-determined triggers for legal actions. Unlike text-driven law, which allows for interpretation, code-driven law combines lawmaking, interpretation, and enforcement in a single automated action, assuming it can cover all possible future scenarios. Hildebrandt critiques this assumption, noting that computational constraints limit code-driven law's adaptability. Since code relies on formal logic, it struggles to capture the ambiguity of natural language or unforeseen events. Additionally, machine learning's reliance on historical data does not account for dynamic future changes, which can distort the behaviours it aims to predict. Human interactions, driven by natural language, inherently contain uncertainty, requiring the establishment of legal norms to stabilize social interactions. Text-driven law achieves this stability without rigidly "freezing" the future, whereas code-driven law risks constraining future possibilities by overly relying on the past.

- **Digital-Ready Policymaking:**[22] Digital-ready policymaking is a more managerial and service-oriented approach of designing policies and legislation with digital

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[16] 'Jersey Legislative Drafting Office – a Computer-Readable Legislation Project 2023 to 2024' <https://www.gov.je/Government/NonexecLegal/StatesGreffe/pages/legislativedraftingoffice.aspx>
[17] Kennedy (2024).
[18] See, e.g., the "Making Laws in a Post-Modern World: Are You Ready?" conference organised in September 2020 by the Canadian Institute for the Administration of Justice (CIAJ).
[19] Katz et al. (2023).
[20] Hildebrandt, M. (2018). Algorithmic regulation and the rule of law. Phil. Trans. R. Soc. A 376: 20170355. <http://dx.doi.org/10.1098/rsta.2017.0355>
[21] Hildebrandt, Mireille, Code Driven Law. Scaling the Past and Freezing the Future (January 19, 2020). Critical Perspectives on Law and Artificial Intelligence, eds. Markou, Deakin, Hart Publishers (2020 Forthcoming). <http://dx.doi.org/10.2139/ssrn.3522079>
[22] 'Interoperable EU – Digital-ready policymaking' <https://joinup.ec.europa.eu/topic/digital-government/digital-ready-policymaking>.

considerations integrated from the outset. This ensures that policies are adaptable to the digital age, future-proof, and interoperable. It also involves using innovative tools and methodologies, such as AI, to enhance policy design, analysis, and implementation.

Under this approach, lawmaking processes are fashioned in such a way as to make it possible to check whether the legislative enactment at issue is consistent with the policy goals it is meant to achieve, to which end it seeks to predict the effects the enactment is going to have on society. The approach relies on principles of human-computer interaction and calls for simplified legal language in designing the law.

Parliaments need to decide which approach is best suited to their needs in view of the type of law that needs to be modelled.

However, these approaches are often developed in practice by leveraging advancements in non-symbolic AI (machine learning, deep learning, large language models) without consideration of the principles established in legal theory.

However, legal theory is not merely descriptive; the way law is conceived is closely tied to the core foundational concepts of democracy and the rule of law, and thus to the legitimacy and practical functioning of legal systems.[23]

In particular, AI-driven automation in law-making and the application of law may interfere with foundational concepts in the following respects:

- **ML/DL/GenAI works without semantics**, and much of the contextual information contained in the legislative document is neglected, with a significantly reduced capacity to interpret similar concepts (e.g., palliative care, hospice care).

- **Legal citations are a consolidated best practice** in legal disciplines, which entrust some important meta-rules to external textual resources (e.g., definitions, derogations, modifications, integrations of prescriptiveness, penalties, and conditions). This means that ML/DL/LLM should also consider the cited text, especially considering that some algorithms (e.g., similitude, grouping) can find similarities in texts (e.g., “art. 3” and “art. 13”) when the content is completely different. For this reason, the network of norms through citations should be included in the baseline of the experiments.

- **Temporal parameters are fundamental** to creating a robust ML/DL dataset. The repealed acts should have less importance in the probabilistic model rather than the

[23] Palmirani (2022) and Palmirani, Sapienza and Ashley (2024).

updated codifications. Frequency, probabilistic calculus, and temporal series should therefore be mitigated on the basis of criteria of relevance and legal validity (e.g., entry into force, date of applicability).

- **Logic and semantic web annotation** needs to also be integrated with ML/DL in order to make it possible to understand the type and meaning of relationships that connect different sentences in the text (e.g., obligation and penalty, obligation, and derogation).

- In the legislative domain it is essential **to take account of context**: In legislative provisions we find frequent conditions (e.g., jurisdiction exclusion in the UK) or logic operators (e.g., the Boolean connectors "and," "or," and "xor" in legislative definitions) that are neglected by LLM.

- **Legal language is different from the ordinary language**, and the LLM/GENAI technique depends on a tokenization process that differs from language to language (e.g., the German word *Rindfleischetikettierungsüberwachungsaufgabe* is a compound of several words). The legislative language changes from one legislature to the next, and these differences include the political narrative tone. For this reason, LLMs cannot have the same accuracy across different bodies of law enacted by different legislatures.

- There are **implicit legal rules** embedded not in the legal language but in the institutional rules, in the powers granted under constitutional law or in an assembly regulation, in the hierarchy of legal sources as defined in the theory of law. These rules need to be added to the ML/DL/LLM using a rule-based approach.

As a consequence, approaches developed without considering legal theory may interfere with foundational concepts, such as the ontological nature of law, the role of legal language, and its necessarily open texture.

3. Developing Hybrid AI in compliance with Legal Theory Constraints

For these reasons, a hybrid architecture, one that includes symbolic AI too (semantic knowledge modelling, legal reasoning, and a symbolic rule-based approach)[24], is strongly advocated in integrating ML/DL legal knowledge with semantic Web annotation and legal

[24] Ashley et al. (2020), Pamirani et al. (2020), and Verheij (2020).

deontic logic modelling[25]. As a common interchange LegalXML standard, Akoma Ntoso could be a good bridge for creating a common annotated digital corpus for robust AI applications.

Parliaments need not to start from scratch. Instead, they should build on the qualified and annotated legal datasets derived from previous research and technologies that have been applied over the past decades to digitize parliamentary tasks. These datasets can now serve as the foundation for enhancing parliamentary processes through the integration of assistive AI tools. Bypassing this groundwork and jumping directly to generative AI tools risks overlooking the vast legal knowledge embedded within these digital documents.

From the 1990s, official journals began publishing legislation online to enhance accessibility, while parliaments followed suit to increase transparency. This effort expanded with the goal of ensuring open access to legal sources through the Web of Data approach,[26] also creating open data collections and legal ontologies[27]. This digital transformation soon extended to the lawmaking process, optimizing workflows between institutions. The next phase involved leveraging legal big data and open standards to enable legal data analytics, AI applications, and the transformation of procedural rules into smart contracts[28]. Technologies such as XML, RDF-metadata, and logic formulas have been used by various official bodies to manage legal corpora and provide up-to-date legal versions (point-in-time mechanism). Since 1999, Eur-Lex has consolidated EU legislation and is now transitioning to the Akoma Ntoso standard (AKN4EU). Internationally, the United Nations approved Akoma Ntoso as the official standard for its documentation (AKN4UN) in 2017, with the EU and WHO adopting similar standards to enhance interoperability and uncover hidden knowledge. LegalXML modelling has thus provided a robust digital framework, applying legal theory to annotate legal knowledge.

Also, the work carried out by the AI and law community over the last thirty years is crucial in laying the groundwork for the proper deployment of AI in parliamentary settings.

Over the past thirty years, the AI and law community has developed widely accepted theories and models to manage legal norms, values, interpretation, and argumentation[29]. Other scholars have focused on using machine learning, natural language processing, and AI techniques to extract and analyze legal knowledge directly from text[30]. Significant advancements have been made in logic-based methods for modeling legal norms and

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[25] Deakin and Markou (2020).

[26] Filtz et. al. (2020), Filtz et. al. (2021), Livermore (2019).

[27] See e.g. the Open Data portal of the European Parliament in Linked Open Data modality (https://data.europarl.europa.eu/en/home).

[28] See e.g. RDF format and AKN standards, as seen on https://dati.senato.it/sito/home.

[29] See the large literature of Artificial Intelligence and Law Journal <https://link.springer.com/journal/10506>.

[30] Ashley (2017).

supporting legal reasoning[31] and to extract data from legal texts and information retrieval based on legal ontologies[32]. Projects like Lynx[33] and ManyLaws[34] also aim to enhance legal information retrieval through knowledge graphs and metadata. Recent efforts, such as OpenFisca[35] and Marcell[36], strive to codify legal systems using programming languages, bypassing traditional legal language.

A final key challenge in legal informatics is improving the transparency and explicability of AI to mitigate the "black box" effect.[37] Legal design methodologies, utilizing visualization and human-computer interaction, provide a promising approach to better communicate AI-driven legal insights while ensuring human oversight and decision-making autonomy.[38]

However, these projects remain fragmented, lacking integration with broader legal theory, constitutional analysis, or a dynamic legal framework that accounts for multilingual perspectives and the interpretive flexibility of legal systems. A Hybrid AI approach should bridge this gap by combining symbolic and non-symbolic AI methods to ensure that AI uses comply with legal theory constraints.

4. Constitutional Principles Governing the Use of AI in Parliaments

The perspectives of legal theory and constitutional theory are closely intertwined. However, constitutional theory also operates at a lower level of abstraction, where general principles of constitutional law impose constraints that are distinct from those highlighted in broader legal theory.

From a constitutional perspective, the use of AI in parliaments might in fact pose risks to the following fundamental principles, which are widely accepted across most constitutional jurisdictions:[39]

- **State Sovereignty, Parliamentary Autonomy,[40] and Separation of Power:** The use of AI in parliamentary processes, both legislative and non-legislative, may lead to undue influence. The principles of state sovereignty and parliamentary autonomy dictate that parliaments must retain full control over the AI technologies they employ.

[31] Governatori et al. (2020).
[32] Palmirani et al. (2018), Palmirani et al. (2018a), Palimirani and Liga (2019), Palmirani and Liga (2019a), Palmirani et al. (2020), Palmirani (2022).
[33] 'LYNX Legal Knowledge Graph for Multilingual Compliance Services' <https://lynx-project.eu/>
[34] 'MANY LAWS' <https://www.manylaws.eu/>
[35] 'OPENFISCA' <https://openfisca.org/en/>
[36] 'MARCELL Multilingual Resources for CEF.AT in the legal domain' <https://marcell-project.eu/>
[37] Pasquale (2015) and Sovrano (2024).
[38] Hagan (2020).
[39] Cf. Bresciani and Palmirani (2024).
[40] Albanesi (2022).

For example, parliamentary autonomy could be undermined if AI tools are developed by external entities in ways that might affect parliamentary proceedings, or if AI systems inherited from previous parliaments cannot be adapted to meet the needs of the current parliament.
Moreover, when AI technologies are used for oversight functions, such as monitoring government activities, the principle of separation of powers demands strict safeguards to ensure these tools do not compromise the independence or effectiveness of parliamentary oversight.
Furthermore, parliamentary autonomy may be at risk if the AI technologies used are vulnerable to cyber-attacks or manipulation.

- **Continuity of Power:** Technological malfunctions in AI systems used within parliamentary processes could disrupt the functioning of parliaments.
  This risk is heightened if parliamentary operations become overly dependent on AI, as any malfunction or disruption could severely impede the timely restoration of normal workflow. Such a situation challenges the constitutional principle of continuity of power, which requires the uninterrupted functioning of governmental authorities. From this standpoint, constitutional law principles can thus be seen as imposing limits on the complete automation of processes and the total replacement of administrative staff.

- **Free Mandate:**[41] AI could affect the ability of parliamentary groups or members of parliament to participate in parliamentary processes.
  At the group level, there is a risk of technological disparity between different parliamentary groups, extending not only to the availability of AI technologies but also to the availability of datasets. This could allow groups that invest more significantly in algorithms to have a greater influence in the parliamentary process, irrespective of their electoral results. In other words, the unregulated use of AI within parliaments can disrupt fair political competition between groups, thereby violating the principles of *par condicio* and equal participation.
  At the individual level, the use of AI raises constitutional concerns if it hinders a member of parliament's ability to participate in parliamentary processes. This can occur, for example, due to a lack of digital skills or physical disabilities.

[41] Jackiewicz and Olechno (2017).

- **Integrity of democratic processes:** If AI technologies are used to enhance public participation in parliamentary works[42], it is paramount that adequate measures are in place to ensure the integrity of democratic processes.
  Transparency of parliamentary works is the cornerstone of representative democracies, as it allows the public to hold their representatives accountable. Therefore, it is essential to avoid manipulation and misrepresentation of the information on parliamentary activities provided by AI technologies to the public. This requires implementing particularly robust safeguards to ensure that AI systems are transparent, accountable, and free from bias.
  Also, it is crucial that feedback from the public received through AI technologies is not distorted so that member of parliaments can effectively understand and take into consideration public opinion.

5. Current Use Cases in Parliamentary Contexts

In this section, AI technologies currently used within the parliamentary context are analytically described.
The section is divided into two parts: the first part focuses on the EU context, while the second part addresses non-EU countries.
Use cases are organized geographically and described in terms of their functions and technological basis according to openly available information.

- **EU context**

European Union
The European Parliament has adopted different tools that use AI to enhance efficiency and effectiveness in daily tasks, including chatbots that automate processes in various sectors, helping to provide quick and efficient responses to questions.
A crucial task in many areas is document analysis and understanding. In addition to the processing of textual and visual data, content retrieval (information retrieval), decision support, it's important to being able to generate texts for summarisations and responses to specific questions. The European Parliament employs an automated system that can summarise texts and an editor to provide concise overviews, making it easier to understand complex documents.
The European Parliament's Archives Unit in Luxembourg holds a vast collection of historical documents, which leads to the need of improving accessibility of the archives. Recently, the

[42] Christensen et al. (2015) and Rangone (2023).

European Parliament introduced "Archibot"[43], an AI tool that provides global, multilingual access to documents, including EU resolutions and policies, and supports report generation and data analysis. Key features include document summarization, precise information retrieval, and language support for all EU member states. Archibot has greatly improved efficiency, handling thousands of monthly requests, compared to the hundreds previously managed by staff alone. This AI-human collaboration has enhanced user experience, dramatically reducing search time and boosting user satisfaction. Researchers and users worldwide can now easily access the archives, and feedback loops between users and the Archives Unit have further improved the system's functionality. Archibot has strengthened the connection between the European Parliament and its global users, facilitating broader engagement with EU governance history. Through Retrieval Augmented Generation (RAG), the system extracts and combine information from different documents pertaining the question asked. As Marco Amabilino, head of the Digitalisation department at the Archives Unit specifies: "We use a standard AI, but we provide it with specific knowledge: the context. In our case, this is an index with more than 100,000 documents from our Archives. This solution, called Retrieval Augmented Generation (RAG), was invented in 2020 and allows improved accuracy and reliability of generative AI models with facts fetched from external sources".[44]
The Publications Office of the European Union is implementing the usage of AI (in particular of Generative LLMs) in order to automate the generation of the XML files based on texts the Official Journal.

Austria

The Austrian Parliament uses the EULE Media Monitor / 360° Topic-Monitoring, an AI-driven tool designed to keep the members of the parliament informed and updated.[45] By leveraging a web platform, EULE provides members of parliament with precise and dependable information, enabling them to perform their duties efficiently, optimising time and other resources, and ensuring that they receive consistent data and news when they need them. After its release in 2017, the system has been adapted to implement AI-based techniques as, for example, auto-abstracting and content-matching. This approach aims to broaden and deepen the available information while delivering a fully optimized and customer-focused presentation of diverse data.

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[43] https://www.anthropic.com/customers/european-parliament

[44] European Parliament, 'Historical Archives' <https://historicalarchives.europarl.europa.eu/en/sites/historicalarchive/home/cultural-heritage-collections/news/ai-dashboard.html>.

[45] 'EULE Media Monitor' (IPU Innovation Tracker, Issue 1, 31 March 2019) <https://www.ipu.org/innovation-tracker/story/austria-uses-ai-keep-mps-informed>.

Estonia

The Estonian Parliament uses HANS an AI-based system designed to optimise the efficiency and accuracy of parliamentary session transcriptions through the use of speech recognition.[46] The system is custom-designed to integrate with all existing tools, allowing for information exchange with the document management system, data reception from the electronic plenary voting system, and data transmission to online platforms.

Finland

In 2021, the Committee for the Future of Finland's Parliament (*Eduskunta*) held an unprecedented hearing involving artificial intelligence (AI).[47] Before the actual hearing took place, a comprehensive preparation process was undertaken. The Committee consulted with several AI scholars and private sector experts, and a few experts from both academia and the private sector were involved to assist with the preparation, facilitation, and reporting of the hearing. The structure of GPT-3 was examined in detail, leading to the creation of two distinct "personalities" to interact with: the first one focusing on technological innovation and business opportunities, and the other on environmental policy. The experiment consisted in submitting some test questions and observe how these profiles would answer. At first, to ensure smooth interaction with GPT-3, initial questions were directed to the facilitators, who then input them into the AI system via an internet prompt. On a second hand, the hearing proceeded similarly to a typical one, with Parliamentarians posing questions to the two simulated personalities, who provided written responses. After each question-and-answer segment, Committee members held brief discussions with the facilitators to reflect on and analyse the responses given by the AI.

The Finland Parliament also utilizes AI to align old parliamentary affairs and documents with the logical structure of newer data for improved findability, accessibility, interoperability, and reusability in searches and APIs.[48] Furthermore, AI is employed to generate summaries of XML or PDF documents to be published on the parliamentary website, create audio files,[49] and enhance cybersecurity through automated static application security testing (SAST) to ensure code quality and detect potential security vulnerabilities.[50]

France

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[46] 'Introducing HANS, the new AI support tool for Estonian lawmakers' <https://e-estonia.com/hans-ai-support-tool-for-estonian-parliament/>.

[47] Fitsilis (2021).

[48] <https://www.ipu.org/ai-use-cases/data-normalization-historical-parliamentary-affairs-and-documents>

[49] <https://www.ipu.org/ai-use-cases/summarizing-parliamentary-documents-and-conversion-podcasts >

[50] <https://www.ipu.org/ai-use-cases/narrowing-attack-threshold-parliamentary-applications>

LLaMandement is an advanced Large Language Model, refined by the French government to improve the efficiency of it participation in parliamentary session processing.[51] This includes creating bench memoranda and documents for interministerial meetings by generating impartial summaries of legislative proposals. By tackling the administrative difficulties of manually handling an increasing number of legislative amendments, LLaMandement marks a major technological advancement in the legal field. It offers a scalable solution that surpasses traditional human efforts while maintaining the robustness of a specialized legal drafter.

The creation of LLaMandement was centered around being able to achieve a high level of performance in processing and comprehending legislative texts. The adaptability of LLaMa 70B was tested and evaluated, exposing the performance limitations of general LLMs to deal with complex texts in French.

Italy

Automatic and large-scale classification of parliamentary acts, focusing specifically on inspection and guidance documents. A model was trained for this purpose, with its outcomes being reviewed by humans to validate the classification criteria. Gradually, this process was improved and fully automated, contributing to the specialized databases accessible on the website of the Chamber of Deputies.[52]

The Italian Chamber of Deputies has made a pioneering choice that has reshaped the document production process through Automatic Speech Recognition (ASR) systems for the production of parliamentary transcripts. The ASR technology, which has been acquired from third parties, has been trained, customized (and is still subject to periodic fine-tuning), and integrated into a process that starts from transcription and culminates in the creation of the master copy of the traditional parliamentary print, which can be accessed in various formats directly from the parliamentary website. Moreover, the internal process includes enriching the transcript with classification elements and metadata, turning the transcripts into a valuable data mine.

Moreover, the Chamber of Deputies started a collaboration with European Institutions in the field of machine translation, in order to publish sections of its site in English. For this purpose, the eTranslation system is exploited.[53]

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[51] Gesnouin at al. (2024).

[52] 'Chamber of Deputies' Supervisory Committee on Documentation Activities, 'Using Artificial Intelligence to support parliamentary work', February 2024 <https://comunicazione.camera.it/archivio-prima-pagina/19-37666>.

[53] 'Need a quick translations? Use eTranslation,' <https://commission.europa.eu/document/download/bf4a8495-73dc-474d-958e-dff2414dcb62_en?filename=eTranslation-Flyer-en.pdf>.

In order to ensure greater accessibility to the proceedings of the Assembly, the Chamber of the Deputies implemented automatic transcription for real-time subtitling of parliamentary sessions broadcast on both the Chamber of Deputies' webtv and YouTube. Since 2015, Cedat 85 has been providing the Chamber of Deputies with real-time transcription and simultaneous digital archiving of parliamentary sessions based on automatic speech recognition technology.

Another application of artificial intelligence focuses on the amendment proposals related to bills under examination by parliamentary committees and the Assembly. As part of the complete digitalization of the parliamentary bill examination process, the creation and organization of amendment files are made extremely fast and efficient through technology. This technology has been applied to streamline and enhance human activities, enhancing the contribution of specialized operators who are freed from basic preparatory tasks. Through Asimov AI[54], a project developed by LUISS University of Rome, it is also possible to identify parts of legal texts modified by the amendments and to create a consolidated text. On a further step, it is then possible to interact with a chatbot over the modified amendments. Advantages of this technology are the possibility to identify a higher number of normative references in a given text than REGEX-based parsers, and the capability of grouping legislative texts with the same legal effect.

A system developed in collaboration with the National Consortium for Informatics (CINI) and the Artificial Intelligence Laboratory at the University of Udine (and currently in the prototype phase), can automatically assign sectors and the main classes of semantic identification to the documents, making it easier to identify related content. This system exploits the multilingual and multidisciplinary EuroVoc thesaurus for automatic text classification.

Moreover, some artificial intelligence solutions for correlating security events have been implemented within the Security Operations Centre of the Chamber of Deputies i.e. anomaly detection, user behavioural analysis, correlation of security events, passive analysis of network traffic, detection of differences from the usual behaviour of users and analysis of the dangerous behaviours, vulnerability verification of software systems, with an AI that simulates the behaviour of a potential attacker to test defense systems.

Netherlands

From 2017 onwards, Dutch Parliamentary Reporting Office (PRO) has been seeking methods to integrate ASR into their operations, collaborating on a pilot project with Radboud

[54] 'The Asimov AI Luiss business idea' <https://www.luiss.edu/news/La-Business-Idea-Asimov-AI-Luiss?category=&date=>

University in Nijmegen.[55] This project involves automated speech-to-text conversion and subsequent manual refinement of grammar and style. ASR technology provided assistance, but it resulted more effective under particular conditions. Therefore, even after the integration of ASR into the transcriptions process, manual interventions were necessary to correct errors.

- **Non-European countries**

Argentina

The Argentinian Chamber of Deputies has developed a system that allows for intelligent searching to retrieve relevant reports from parliamentary sessions. The algorithm indexes legislative information, enabling effective searching and analysis of public policy trends and legislative changes.[56]

The initiative is based on the digitalisation of the shorthand versions of the transcripts of plenary sessions from 2005 to 2020. The shorthand versions of the parliamentary record were analysed using a Latent Dirichlet Allocation algorithm, which groups words and terms into common topics. Forty topics were identified. Two web services were then created, allowing anyone to consult the composition of the topics (which words make up each topic and to what extent, thereby revealing which has the greatest influence), and their evolution over time.

The AI implementation was led by the Innovation Directorate. The editable database was developed with the National Council for Scientific and Technical Research (CONICET). It is based on the use of public information (the shorthand records and other information used do not contain private data). Multidisciplinary teams of experts worked on it. Measures to foster the ethical use of AI have been implemented.

Bahrein

Various AI-based technologies have been implemented in the Bahrain Parliament and Shura Council.[57] They include automatic speech recognition for session recordings, automatic speech recognition for subtitling parliamentary sessions on streaming, a chatbot for document retrieval, and AI-powered MP attendance monitoring and real-time quorum calculation.

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[55] 'Dutch Parliamentary Reporting Office' (IPU Innovation Tracker, Issue 10, 21 October 2021) <https://www.ipu.org/innovation-tracker/story/dutch-house-representatives-shares-its-experience-automatic-speech-recognition-asr>.

[56] 'First steps towards an AI driven Chamber of Deputies' (IPU Innovation Tracker, Issue 16, 21 October 2023) <https://www.ipu.org/innovation-tracker/story/argentina-first-steps-towards-ai-driven-chamber-deputies>.

[57] 'Bahrein News: Parliament and Shura Council start using AI', 13 September 2023 <https://www.gdnonline.com/Details/1290889/Parliament-and-Shura-Council-start-using-AI#>.

These AI systems were developed during the Covid-19 pandemic and have evolved since then.

Brazil

The Brazilian Chamber of Deputies has launched Ulysses, a set of AI tools to improve the legislative process and interact with citizens.[58] The tool leverages machine learning to examine considerable volumes of documents and data. Specifically, the system can classify new documents and label them more efficiently within the Brazilian Chamber's public web portal, thereby enabling better consultation for citizens.

Since 2018, citizens have had the opportunity to vote on and comment (anonymously) on specific bills. The data collected is then examined and used by Ulysses, applying a machine learning algorithm to the comments, based on natural language processing. The system analyses all comments, focusing on the positive and negative aspects of a legislative proposal.

Ulysses is also used to index live broadcasts and recorded videos to identify speakers, transcribing the interventions of parliamentary sessions in real time.

Chile

The Chamber of Deputies of Chile implemented the CAMINAR project[59], which is divided in modules that integrate LLMs from OpenAI ChatGPT, and Claude with a RAG (Retrieval-Augmented Generation) in order to produce more accurate responses, and increasing the overall accuracy of the platform. Caminar modules cover a variety of tasks including transcription, semantic search, argumentation, legislative tracking, regulatory impact assessment, constitutional support, and management of budget.

India

Starting from 2023, in India the Digital Sansad system has been developed.[60] The app, leveraging AI, can transcribe real-time discussions on the Parliament's agenda using an automatic speech recognition tool. The AI-based transcription technique simplifies documentation and facilitates information retrieval, contributing to greater efficiency in parliamentary operations.

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[58] Brazil: A digitally mature parliament (IPU, 1 June 2022) <https://www.ipu.org/news/case-studies/2022-06/brazil-digitally-mature-parliament>.

[59] 'LegisTech: AI in Parliaments - 2nd Edition' <https://news.bussola-tech.co/legistech-ai-in-parliaments>.

[60] 'Revolutionizing Indian Parliament with the Digital Sansad App: AI-Powered Transcription and More' (IndianAI.in, 29 September 2023) <https://www.indianai.in/revolutionizing-indian-parliament-with-the-digital-sansad-app-ai-powered-transcription-and-more/>.

AI is also utilised for biometric scanning and facial recognition to securely identify people entering the building or to manage selective access to sensitive areas (such as the Prime Minister's wing) without the need for badges or cards.

Israel

In Israel, AI is utilized to transcribe audio recordings into text, aiding various parliamentary activities such as maintaining official records of speeches and transcribing public hearings.[61]

Japan

In Japan,[62] the House of Representatives uses an Automatic Speech Recognition (ASR) system that directly transcribes parliamentary speeches given in both plenary sessions and committee meetings (with an accuracy rate of 90%).

A special interface also enables the automatic selection of the highlights of parliamentary debates.

Singapore

Singapore has released Pair, a digital platform to support the work of Singapore government public officers, including legislators. Pair is a chatbot powered by the same Large Language Models underlying ChatGPT.[63] The Pair chatbot adds value over ChatGPT by ensuring that the underlying large language model technology can work better thanks to the availability of official documentation.

The platform operates on government-issued laptops, allowing officers to harness the capabilities of LLMs without compromising confidential data.

Taiwan

Taiwan uses its online platform vTaiwan for public consultation and participatory legislation.[64] It has integrated the platform with Polis, an AI-driven tool for gathering, analysing, and understanding what large groups of people think in their own words, enabled by advanced statistics and machine learning. The system has been adopted to catalogue citizens' opinions on specific issues. The AI system then visualises these opinions, highlighting areas of consensus and disagreement. This visualisation helps legislators and

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[61] <https://www.ipu.org/ai-use-cases/audio-text-parliamentary-transcription-system>

[62] 'Chamber of Deputies' Supervisory Committee on Documentation Activities, 'Using Artificial Intelligence to support parliamentary work', February 2024, 84 <https://comunicazione.camera.it/archivio-prima-pagina/19-37666>.

[63] 'Pair - A Helpful Assistant Powered by Large Language Models (LLMs) (Singapore Government Development Portal)' <https://www.developer.tech.gov.sg/products/categories/productivity-tools/pair/overview>.

[64] 'vTaiwan: rethinking democracy' <https://info.vtaiwan.tw/>.

policymakers to understand public sentiment on various issues in a nuanced and detailed manner. This innovative approach to lawmaking has been applied to various topics, including the regulation of online alcohol sales, telemedicine, and fintech regulations.

USA

Since 2017, the US House of Representatives has invested substantial resources in an NLP-based tool named the Comparative Print Suite (CPS).[65] Officially launched in October 2022, the tool is designed to display legislative changes in context by generating reports that illustrate changes in versions of a bill or how a bill would change current law. These changes are shown both through distinct colours and text formatting such as underlines and strikethroughs. In particular, there are essentially three types of comparison: 1) two versions of a bill, resolution, or amendment; 2) current law and current law as proposed to be changed by amendments contained in a bill, resolution, or amendment to current law; 3) a bill or resolution and the bill or resolution as proposed to be modified by amendments. If an amendment cannot be carried out and shown automatically due to an error, the system displays an alert to inform the user. Types of errors that can affect the generation of a comparative print include: an error in drafting; an error in the current law dataset; an error in the system; the amendment already being executed into current law. The comparative print results are shown both in an interactive online version and a PDF that can be downloaded and shared by the user. Bills to be compared can be searched for among codified law or uploaded in PDF or XML formats. The tool currently operates with an accuracy level of 90%, with human feedback expected to improve this progressively.

Since 2018, the Library of Congress (LC) has been actively researching and implementing ML technologies, including the creation of machine-readable text from digitised documents using Optical Character Recognition (OCR), generating standardised catalogue records, extracting data from historical copyright records, and parsing legislative data.

In the legislative realm, predictive modelling is used to assess the potential impact of proposed bills on federal finances — sometimes referred to as the 'fiscal note.' In the US federal context, notable instances include the models utilised by the Congressional Budget Office (CBO) and the Joint Committee on Taxation (JCT). The CBO provides budget and economic information to Congress, including, for significant legislative proposals, a cost-benefit 'score' demonstrating how the proposed policy would impact the federal deficit. To accomplish this, CBO employs a suite of automated technology or AI models, one of which

[65] 'The Comparative Print Suite' (Popvox Foundation) <https://www.popvox.org/legitech/comparative-print-suite>.

is the Policy Growth Model (PGM), which analyses the interplay between economic growth and the federal budget.[66]
Additional NLP projects in the US Congress include LC Labs' experiments with legislative bill data to create bill summaries through natural language processing, which could augment the work of the Congressional Research Service and reduce the wait time.

6. Constitutional Classification of Use Cases and Risk Analysis

From a legal perspective, the use cases analysed in this report can be organised into the following categories according to their function within the parliamentary context.
Indeed, while AI applications are usually categorised based on their technological features, a functional distinction can be useful for assessing the specific constitutional risks associated with each use.

Assisting Members of Parliaments	**Assisting Administrative Staff of Parliaments**	**Enhancing Public Participation in Parliamentary Works**
Legislative process	- Information retrieval chatbot for internal use - Acts summarization - Analysis of large corpora of archives documents - Automatic speech recognition for records - Automatic and massive classification of parliamentary acts	- Acts summarization - Analysis of large corpora of archived documents - Analysis of archived video content - Automatic translation of institutional websites - Automatic subtitling of parliamentary sessions on streaming - Automatic managing of feedback from citizens on bills - Connecting citizens to MPs for complaints and feedback
- Information retrieval chatbot for internal use - Experimental hearing with AI as expert - Amendments attribution, similarity, and summarization - Automatic managing of feedback from citizens on bills - Facial recognition for identity verification of MPs - Predictive modelling for assessing potential financial impact of proposed bills		

[66] POPVOX Foundation, 'Representative bodies in the AI era – insights for legislatures', vol. 1, January 2024 <https://www.popvox.org/ai-vol1>.

Non-legislative functions		
- Information retrieval chatbot for internal use - Media monitoring for MPs - Facial recognition for identity verification of MPs		- Speech selection of most relevant moments during parliamentary debates - Automatic visualization of results of public consultation

Table 1 – *Constitutional Classification of Use Cases on a functional basis*

As shown in the table, the use cases analysed in this report are all purely assistive in nature. This means that AI technologies are currently not intended to replace the law as we know it or to make decisions on behalf of humans, but only to support those involved in the parliamentary process.

Even if current uses of AI by parliaments do not seem substantial enough to disrupt the nature of law as conceived by legal theory underlying democracy and rule of law, they still pose risks for the constitutional principles we have identified.

When AI is used to assist members of Parliament or administrative staff, risks related to state sovereignty, parliamentary autonomy, separation of powers, and continuity of power must be considered. To mitigate these risks, it is essential to establish sufficient levels of technological sovereignty (from foreign or private actors) and autonomy (from other internal constitutional actors). This requires substantial involvement of parliaments in, or at least oversight over, decisions concerning the development, use, and modification of AI systems and their underlying datasets intended for parliamentary processes.

As for the principle of continuity of power, the implementation of AI-based technologies within parliamentary processes must aim to limit technological dependence to an acceptable level of risk. This can be achieved by ensuring that humans remain actively involved, even when AI technologies are employed. It is crucial to avoid full automation of parliamentary processes and to maintain significant human oversight in all decision-making cycles involving AI systems.

Moreover, when AI is used to assist elected representatives, the principle of the free mandate must also be specifically considered. To uphold this principle, it is crucial to ensure that every member of Parliament has an effective opportunity to participate in parliamentary processes–such as drafting and amending legislation, expressing opinions in debates, and voting. This requires making AI technologies fully accessible to all Members of Parliament through thoughtful design and appropriate organizational measures.

Finally, if AI is used to enhance public participation in parliamentary work, parliaments should establish clear protocols to verify the authenticity and accuracy of feedback received

through AI systems, ensuring that it genuinely reflects public opinion without undue influence or distortion. Implementing explainable AI, which is always advisable, becomes especially important in such a sensitive context.

<table>
<tr><th>Assisting Members of Parliaments</th><th>Assisting Administrative Staff of Parliaments</th><th>Enhancing Public Participation in Parliamentary Works</th></tr>
<tr><td colspan="2">State Sovereignty, Parliamentary Autonomy, and Separation of Power</td><td rowspan="3"></td></tr>
<tr><td colspan="2">Continuity of Power</td></tr>
<tr><td>Free Mandate</td><td></td></tr>
<tr><td colspan="2"></td><td>Integrity of democratic processes</td></tr>
</table>

Table 2 – *Constitutional Principles for Risk Analysis*

No information is currently available on the specific measures parliaments have adopted to mitigate these risks.

While the risks posed to state sovereignty, parliamentary autonomy, the separation of powers, and continuity of power seem limited, given that AI is currently used for specific, secondary tasks within parliamentary processes and humans remain in the loop, use cases related to enhancing public participation already have far-reaching implications. Parliaments should therefore consider conducting a thorough risk analysis and share its results in line with the principle of transparency, allowing independent third parties to evaluate them.

A significant exception to this general conclusion is the use of predictive modelling to assess the potential impact of proposed bills. This type of AI application could have a more substantial influence on parliamentary decisions compared to the other use cases analysed in this report. Before employing similar technologies in their processes, parliaments should carefully evaluate the implications for technological sovereignty and ensure their involvement in its development. It is also crucial to guarantee, through a sufficient level of explainability, that all members of Parliament have the opportunity to debate the AI-generated output.

Given these risks, binding regulations for parliaments are notably lacking, even in the form of internal rules (such as Rules of Procedure). In this respect, the European context presents a slight difference, though it offers no true exception. Although the EU AI Act was not specifically designed to govern AI use in parliamentary settings, the activities of national parliaments, like those of other public bodies within EU Member States, reasonably fall

within its scope.[67] Still, in terms of the nature and extent of obligations, national parliaments appear to face relatively minimal requirements. Namely, as users of AI systems, parliaments must ensure adequate AI literacy [68] and avoid prohibited practices, especially social scoring. [69] They are also obligated to disclose the use of AI systems when employed to interact with the public or to automatically generate content on matters of public interest.[70] However, while the use of AI in parliaments poses substantial risks to the rule of law and democracy, as outlined in this Report, it has not been explicitly classified as high-risk (unlike its applications in areas such as the administration of justice). [71] As a result, the stricter provisions of the regulation, including the obligation to conduct periodic fundamental rights impact assessments, do not apply for the moment. The same holds for obligations concerning general-purpose AI systems, including large language models (LLMs), which apply only to providers and are generally insufficient to mitigate the specific risks posed by their use in political decision-making.[72]

7. Conclusions

AI is rapidly making its way into parliaments. The report shows that at least 14 countries (plus the European Union) are already using AI in their parliamentary activities, and it is likely that this number will grow quickly. There is, in fact, a growing interest in the topic, as evidenced by the activities of both individual parliaments[73] and international organizations like the Inter-Parliamentary Union.[74]

Most of the uses we mapped are currently purely assistive and relate to specific, secondary tasks. However, it is likely that AI technology will see more substantial use, especially following the rapid advancement of large language models.

Despite the likely future scenarios, legal research on these issues remains very limited. The technological transformation of parliaments does not seem to be guided by principles derived from legal theory underlying democracy and the rule of law, or general constitutional principles. In this context, there is a risk that the adoption of AI will be driven by practical

[67] Art. 2, EU AI Act.
[68] Art. 4, EU AI Act.
[69] Art. 5, EU AI Act.
[70] Art. 50, EU AI Act.
[71] Cf. Art. 6 and Annex III EU AI Act.
[72] Artt. 51 ff. EU AI Act.
[73] The Italian Chamber of Deputies, e.g., launched a call for project for the use of artificial intelligence in supporting parliamentary work. Cf. Chamber of Deputies' Supervisory Committee on Documentation Activities, 'Using Artificial Intelligence to support parliamentary work', February 2024 <https://comunicazione.camera.it/archivio-prima-pagina/19-37666>.
[74] See IPU Brief 'Using Generative AI in Parliaments', April 2024, <https://www.ipu.org/resources/publications/issue-briefs/2024-04/using-generative-ai-in-parliaments>.

and efficiency considerations from administrative staff or even private actors in the AI industry, without sufficient regard for the related legal and constitutional implications.
Parliaments need to have a roadmap for deciding which methodology is best for them in view of the legal tradition and the type of scenario they are dealing with. Additionally, they need to have clean technical frameworks (e.g., hybrid AI) for mitigating several risks of interference with foundational concepts of theory of law. Finally, in carrying out different projects, compliance with general constitutional principles should also be ensured.
Overall, Parliaments should be cautious about implementing AI in their activities and adopt risk-based approaches, carefully assessing its impact on the general principles that govern their functioning. To this end, they should consider enacting specific regulations, even if only within their Rules of Procedure. In any case, deeper analysis of the risks, along with the adoption of appropriate countermeasures, should already be undertaken for more significant uses, such as employing predictive models to assess the costs of bills or the use of AI to enhance public participation in parliamentary work.

8. References

'Argentina: First steps towards an AI driven Chamber of Deputies' (IPU Innovation Tracker, Issue 16, 21 October 2023) <https://www.ipu.org/innovation-tracker/story/argentina-first-steps-towards-ai-driven-chamber-deputies> accessed October 2024

Albanesi, E. (2022). The Equilibrium Point Between the Autonomy of Parliament and Other Constitutional Principles, as Viewed Through The Theoretical Framework of a System of Constitutional Justice. *International Journal of Parliamentary Studies*, 2, 122-140.

Ashley, K. (2017). Artificial Intelligence and Legal Analytics: New Tools for Law Practice in the Digital Age, Cambridge University Press.

Ashley, K., Atkinson, K., Branting, L. K., Francesconi E., Grabmair, M., Walker, V. R., Waltl, B., Wyner, A. Z. (2020). Proceedings of the Fourth Workshop on Automated Semantic Analysis of Information in Legal Text held online in conjunction with the 33rd International Conference on Legal Knowledge and Information Systems, ASAIL@JURIX 2020, December 9, 2020. CEUR Workshop Proceedings 2764

'Austria: EULE Media Monitor' (IPU Innovation Tracker, Issue 1, 31 March 2019) <https://www.ipu.org/innovation-tracker/story/austria-uses-ai-keep-mps-informed>, accessed October 2024

‘Bahrein News: Parliament and Shura Council start using AI’ (13 September 2023) <https://www.gdnonline.com/Details/1290889/Parliament-and-Shura-Council-start-using-AI#> accessed October 2024

‘Brazil: A digitally mature parliament’ (IPU, 1 June 2022) <https://www.ipu.org/news/case-studies/2022-06/brazil-digitally-mature-parliament> accessed October 2024

Bresciani, P.F., Palmirani, M. (2024). Constitutional Opportunities and Risks of AI in the law-making process. *Federalismi*, 2, 1-18 <https://www.federalismi.it/nv14/articolo-documento.cfm?Artid=50012>

Chamber of Deputies’ Supervisory Committee on Documentation Activities, ‘Using Artificial Intelligence to support parliamentary work’, February 2024 <https://comunicazione.camera.it/archivio-prima-pagina/19-37666> accessed October 2024

Christensen, H.S., Karjalainen, M., Nurminen, L. (2015). Does Crowdsourcing Legislation Increase Political Legitimacy? The Case of Avoin Ministeriö in Finland. Policy & Internet, 7 (1), 25-45

Deakin, S., Markou, C. (2020). Is law computable? Critical perspectives on law and artificial intelligence, Hart Publishing.

‘Estonia: Introducing HANS, the new AI support tool for Estonian lawmakers (December 2019) <https://e-estonia.com/hans-ai-support-tool-for-estonian-parliament/>, accessed October 2024.

‘European Commission: Need a quick translations? Use eTranslation’, <https://commission.europa.eu/document/download/bf4a8495-73dc-474d-958e-dff2414dcb62_en?filename=eTranslation-Flyer-en.pdf>, accessed October 2024

‘European Parliament: Historical Archives’ <https://historicalarchives.europarl.europa.eu/en/sites/historicalarchive/home/cultural-heritage-collections/news/ai-dashboard.html>

Filtz, E., Kirrane, S., Polleres, A. (2021) The linked legal data landscape: linking legal data across different countries. *Artificial Intelligence and Law*, 29, 485-539

Filtz, E., Navas-Loro, M., Santos, C., Polleres, A., Kirrane, S. (2020). Events Matter: Extraction of Events from Court Decisions. Jurix. <https://penni.wu.ac.at/papers/Jurix%202020%20Events%20Matter%20Extraction%20of%20Events%20from%20Court%20Decisions.pdf>

Fitsilis, F. (2021). Artificial Intelligence (AI) in parliaments – preliminary analysis of the Eduskunta experiment. *The Journal of Legislative Studies*, 27(4), 621–633. <https://doi.org/10.1080/13572334.2021.1976947>

Fitsilis, F., Gomes Rêgo de Almeida, P. (2024). Artificial intelligence and its regulation in representative institutions, in Charalabidis, Y., Medaglia, R., van Noordt, C., eds., Research Handbook on Public Management and Artificial Intelligence, Edward Elgar Publishing, 151-166

Fitislis, F., von Lucke, J., De Vrieze, F., eds., (2024). Guidelines for AI in Parliaments, <https://www.wfd.org/ai-guidelines-parliaments>, accessed October 2024

Floridi, L., Cowls, J., Beltrametti, M., Chatila, R., Chazerand, P., Dignum, V., Luetge, C., Madelin, R., Pagallo, U., Rossi, F., Schafer, B., Valcke, P., Vayena, E. (2018). AI4People—An Ethical Framework for a Good AI Society: Opportunities, Risks, Principles, and Recommendations. *Minds and Machines*, 28, 689-707

Gesnouin, Joseph and Tannier, Yannis and Da Silva, Christophe Gomes and Tapory, Hatim and Brier, Camille and Simon, Hugo and Rozenberg, Raphael and Woehrel, Hermann and Yakaabi, Mehdi El and Binder, Thomas and others, (2024), LLaMandement: Large Language Models for Summarization of French Legislative Proposals, arXiv preprint arXiv:2401.16182

Governatori, G., Casanovas, P.R., de Koker, L. (2020). On the Formal Representation of the Australian Spent Conviction Scheme. In: Gutiérrez-Basulto, V., Kliegr, T., Soylu, A., Giese, M., Roman, D. (eds.) Rules and Reasoning. RuleML+RR 2020. Lecture Notes in Computer Science, vol 12173. Springer.

Hagan, M. (2020). Legal Design as a Thing: A Theory of Change and a Set of Methods to Craft a Human-Centered Legal System. *Design Issues*, 36(3), 3-15.

Hildebrandt, Mireille, Code Driven Law. Scaling the Past and Freezing the Future (January 19, 2020). Critical Perspectives on Law and Artificial Intelligence, eds. Markou, Deakin, Hart

Publishers (2020 Forthcoming), Available at SSRN: https://ssrn.com/abstract=3522079 or http://dx.doi.org/10.2139/ssrn.3522079

'Interoperable EU – Digital-ready policymaking' <https://joinup.ec.europa.eu/topic/digital-government/digital-ready-policymaking>

IPU Guidelines for AI in parliaments (December 2024) <https://www.ipu.org/resources/publications/reference/2024-12/guidelines-ai-in-parliaments>

IPU Brief 'Using Generative AI in Parliaments' (April 2024) <https://www.ipu.org/resources/publications/issue-briefs/2024-04/using-generative-ai-in-parliaments>

Jackiewicz, A., Olechno, M. (2017). Mandate. Max Planck Encyclopedia of Comparative Constitutional Law, Oxford University Press

Katz, D.M., Hartung, D., Gerlach, L., Jana, A., Bommarito, M.J. (2023). Natural Language Processing in the Legal Domain. Available at SSRN: <https://ssrn.com/abstract=4336224> or <http://dx.doi.org/10.2139/ssrn.4336224>

Kennedy, R. (2024). Rules as code and the rule of law: ensuring effective judicial review of administration by software. *Law, Innovation and Technology*, 1, 2024, 170-193

'LegisTech: AI in Parliaments - 2nd Edition' <https://news.bussola-tech.co/legistech-ai-in-parliaments>

Liga, D., Palmirani, M. (2019). Classifying argumentative stances of opposition using Tree Kernels. In ACAI 2019: Proceedings of the 2019 2nd International Conference on Algorithms, Computing and Artificial Intelligence, 17–22.

Liga, D., Palmirani, M. (2019a). Detecting "Slippery Slope" and Other Argumentative Stances of Opposition Using Tree Kernels in Monologic Discourse. In Rules and Reasoning. Third International Joint Conference, RuleML+RR 2019.

'LYNX Legal Knowledge Graph for Multilingual Compliance Services' <https://lynx-project.eu/>

Livermore, M. A., Rockmore, D. N. (2019). Law as Data: Computation, Text, and the Future of Legal Analysis, Santa Fe Institute Press.

McBride, P. and Diver, L., Research Study on Computational Law (Brussels 2024), funded by the ERC Advanced Grant 'Counting as a Human Being in the Era of Computational Law' (COHUBICOL) by the European Research Council (ERC) under the HORIZON2020 Excellence of Science program ERC- 2017-ADG No 788734 (2019-2024)

'MANY LAWS' <https://www.manylaws.eu/>

'MARCELL Multilingual Resources for CEF.AT in the legal domain' <https://marcell-project.eu/>

Micklitz, H-W., Pollicino, O., Reichman, A., Simoncini, A., Sartor, G., De Gregorio, G., eds (2021). Constitutional Challenges in the Algorithmic Society, Cambridge University Press

Mohun, J., Roberts, A. (2020), 'Cracking the Code: Rulemaking for Humans and Machines' OECD Working Papers on Public Governance No 42.

'Netherlands: Dutch Parliamentary Reporting Office' (IPU Innovation Tracker, Issue 10, 21 October 2021) <https://www.ipu.org/innovation-tracker/story/dutch-house-representatives-shares-its-experience-automatic-speech-recognition-asr>, accessed October 2024

'OPENFISCA' <https://openfisca.org/en/>

'Pair - A Helpful Assistant Powered by Large Language Models (LLMs) (Singapore Government Development Portal) <https://www.developer.tech.gov.sg/products/categories/productivity-tools/pair/overview> accessed October 2024

Palmirani, M., Martoni, M., Rossi, A., Bartolini, C., Robaldo, L. (2018). Pronto: privacy ontology for legal reasoning, in International conference on electronic government and the information systems perspective, Springer, 139–152.

Palmirani, M., Sperberg, R., Vergottini, G., Vitali, F. (2018a). Akoma ntoso version 1.0 part 1: Xml vocabulary. OASIS standard, August 2018

Palmirani, M., Bincoletto G., Leone, V., Sapienza, S., Sovrano, F. (2020). Hybrid Refining Approach of PrOnto Ontology. *Electronic Government and the Information Systems Perspective*, Springer

Palmirani, M., Sovrano F., Liga, D., Sapienza, S.,Vitali, F. (2021). Hybrid AI Framework for Legal Analysis of the EU Legislation Corrigenda, JURIX2021.

Palmirani, M. (2022). A Smart Legal Order for the Digital Era: A Hybrid AI and Dialogic Model. *Ragion pratica*, 2, 633-655.

Palmirani, M., Sapienza, S., Ashley, K. (2024). A Hybrid Artificial Intelligence Methodology for Legal Analysis. *Biolaw Journal*, 3, 389-409

POPVOX Foundation, 'Representative bodies in the AI era – insights for legislatures', vol. 1, January 2024 <https://www.popvox.org/ai-vol1> accessed October 2024

Rangone, N. (2023). Artificial Intelligence Challenging Core State Functions. A Focus on Law-Making and Rule-Making. *Revista de Derecho Publico: Teoria y Metodo*, 8, 95-121

'Revolutionizing Indian Parliament with the Digital Sansad App: AI-Powered Transcription and More' (IndianAI.in, 29 September 2023) <https://www.indianai.in/revolutionizing-indian-parliament-with-the-digital-sansad-app-ai-powered-transcription-and-more/> accessed October 2024

Savelka, J., Grabmair, M., Ashley, K. (2021). A Law School Course in Applied Legal Analytics and AI. *Law in Context*, 37 (1): 1-41

Taiwan: 'vTaiwan: rethinking democracy' <https://info.vtaiwan.tw/> accessed October 2024

'The Asimov AI Luiss business idea' <https://www.luiss.edu/news/La-Business-Idea-Asimov-AI-Luiss?category=&date=>

'The Comparative Print Suite' (Popvox Foundation) <https://www.popvox.org/legitech/comparative-print-suite> accessed October 2024

Verheij, B. (2020). Artificial intelligence as law. *Artificial Intelligence and Law* 28, 181–206

Von Lucke J., Etscheid J., Fitsilis F., ‘Using Artificial Intelligence for Legislation – Thinking About and Selecting Realistic Topics’ (Proceedings of EGOV-CeDEM-ePART 2022, Linköping University, Sweden, 6-8 September 2022) 32 <https://CEUR-WS.org/Vol-3399/paper3.pdf> accessed October 2024

Von Lucke j., Fitsilis F., Etscheid J., ‘Research and Development Agenda for the Use of AI in Parliaments’ (Proceedings of the 24th Annual International Conference on Digital Government Research, Gdańsk, Poland, July 11–14, 2023) 423 <https://dl.acm.org/doi/10.1145/3598469.3598517> accessed October 2024

Von Lucke J., Fitsilis F., ‘Using artificial Intelligence in parliament – The Hellenic Case’ (Proceedings of the 22nd IFIP WG 8.5 International Conference, EGOV 2023, Budapest, Hungary, September 5-7, 2023) 174 <https://link.springer.com/book/10.1007/978-3-031-41138-0> accessed October 2024

Waddington, M. (2023), ‘Jersey’s project on parsing drafts for if-then structures for “Rules as Code”’. *The Loophole – Commonwealth Association of Legislative Counsel* 2, 2–41 <https://www.calc.ngo/sites/default/files/loophole/Loophole%20-%202023-02%20%282023-09-06%29.pdf>