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Master Degree in Computational Social Science

Academic Year 2023-2024

Master Thesis

"Assessing Stakeholders' Influence on the AI Act: A Text Mining Approach for Legislative Analysis"

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Madrid, June 2024

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ABSTRACT

This study examines the influence of interest groups on the legislative process of the AI Act, from initial proposals to the final version. Using data from the "Have Your Say" initiative, we applied the Smith-Waterman algorithm to detect text reuse between the recommendations of interest groups and the amendments of the MEPs. We found instances of direct copying, indicating explicit influence from these groups.

The final version of the AI Act emphasizes a risk-based approach, aligned with the interests of tech companies. This approach allows for differentiation between low-risk and high-risk AI applications. Influential interest groups, particularly tech companies practicing safe AI, successfully included their demands in the parliamentary amendments.

This study highlights the dynamics of interest group influence, underscoring the need for transparency and accountability in the legislative process. Future research should address these limitations to gain a deeper understanding of the impact of interest groups on policy-making.

Key words: *AI Act, Stakeholder, Text Mining, High-Risk, Policy-Making, Transparency*

RESUMEN

Este estudio examina la influencia de los grupos de interés en el proceso legislativo de la “AI Act”, desde las propuestas iniciales hasta la versión final. Utilizando datos de la iniciativa "Have Your Say", aplicamos el algoritmo de Smith-Waterman para detectar la reutilización de textos entre las recomendaciones de los grupos de interés y las enmiendas de los eurodiputados. Encontramos casos de copia directa, lo que indica una influencia explícita de estos grupos.

La versión final de la “AI Act” enfatiza un enfoque basado en el riesgo, alineado con los intereses de las empresas tecnológicas. Este enfoque permite diferenciar entre aplicaciones de IA de bajo riesgo y alto riesgo. Grupos de interés con capacidad de influencia, particularmente empresas tecnológicas que hace uso de la IA de bajo riesgo, lograron incluir con éxito sus demandas en las enmiendas parlamentarias.

Este estudio resalta las dinámicas de influencia de los grupos de interés, subrayando la necesidad de transparencia y rendición de cuentas en el proceso legislativo. La investigación futura debería abordar estas limitaciones para obtener una comprensión más profunda del impacto de los grupos de interés en la formulación de políticas públicas.

Palabras clave: *AI Act, Grupo de Interés, Minería de Texto, Alto Riesgo, Formulación de Políticas Públicas, Transparencia*

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1. INTRODUCTION

1.1 Background and Context

Over the past twenty years, the development and adoption of Natural Language Processing (NLP) has emerged as a crucial methodology within the political science community (Glavas et al., 2019). In the last decade, the use of computational methods for text analysis has significantly expanded in scope and has become the focal point of numerous social science studies, fostering the sustained growth of the text-as-data community (Grimmer and Stewart, 2013). As some authors have indicated, political scientists have always been interested in words, but a recent revolution has occurred, creating unprecedented research opportunities (Cardie & Wilkerson, 2008; Monroe & Schrodt, 2008; Alvarez, 2016). In this context, NLP is gaining prominence in political science, contrasting with traditional reliance on votes or polls, as texts enable authors to express more nuanced opinions. In this sense, internet text data offers new ways to observe and measure behavior, while computational methods provide the access and capabilities necessary to process these vast amounts of data (Németh, 2022).

Understanding the current state of the art and the different lines of research in political science studies in relation to NLP is crucial for making an insightful contribution. In this context, Wilkerson and Casas (2017) explain the main four applications currently being developed in the field. These are:

1. Classification Methods, that apply supervised and unsupervised machine learning methods, and sentiment analysis to classify and study, for example, senate speeches by policy topic.

2. Scaling: This involves methods used to locate European political parties within a continuous ideological space (Laver et al., 2003; Lowe, 2008; Slapin & Proksch, 2008).

3. Social Network Analysis, which often employs text to investigate relationships among actors (Ward et al., 2011). In this sense, even though this is not a social network analysis paper, we will be using social networks to represent our final results.

4. Text Reuse: This is the text-as-data approach selected for our research. Text reuse involves discovering instances of similar language usage. The distinctive feature of text reuse algorithms is that they explicitly value word sequencing in judging document similarity.

In this context, political scientists have recently employed this technique to trace the origins of policy proposals in legislation (Wilkerson et al., 2015), to explore how partisanship influences the level of text reuse in state legislative bills (Linderto et al., 2018), and examine party messaging strategies (Jansa et al., 2015).

In 2023, the European Commission proposed 184 legislative acts (EUR-Lex, 2024). However, there is a lack of clear understanding regarding who is actually writing these bills and the political implications of the extra parliamentary actors involved in this process. Legislators often lack the time and staff to draft each bill, leading them to frequently copy text written by other legal codes or provided by interest groups. In this context, research conducted by Burgess et al. (2016) highlights the influence of such external contributors on legislative drafting.

In the current research we want to focus on studying influence groups or stakeholders, and how they affect the legislative process. For this purpose, we chose the European AI Act legislation due to its relevance in terms of economic and social implications, which has made many actors to mobilize resources in order to affect its development.

1.2 Research Objectives

This study employs a text-as-data approach to examine the evolution of the AI Act from its initial proposal by the European Commission in 2021 to its final version adopted by the European Parliament on March 13, 2024. The research has three primary objectives:

1. **Understanding the differences between the first draft published by the EU Commission in 2021 and the final version adopted by the European Parliament in 2024**. For the interpretation we will focus on identifying and discussing elements of political significance rather than interpreting all legal modifications. This part seeks to clear out the ideological underpinnings and specific interests that these changes represent for various groups.

2. **Identifying the main extra institutional drivers that influenced the legal changes between the two versions of the regulation.** This objective is linked to our hypothesis, based on the idea that stakeholders were influencial on the regulatory amendments made by different Members of the European Parliament (MEPs). This influence can be empirically observed and causally justified by examining the public recommendations published by different stakeholders and comparing them to the parlamentary amendments. As such, the study aims to determine whether some of the amendments proposed by Euro parliamentarians explicitly align with stakeholders' recommendations. Additional questions extracted in this part will be drawn regarding how stakeholders' supported narratives in relation to their interests, aligning discursively with the changes observed in the final regulation. As such, even if the study will not explicitly measure the impact of these texts on the final adopted AI Act, we will identify common features that provide insights into the overall narrative process present in both EU institutions and interest groups during the legislative process.

3. **Understanding and illustrating the relationships between stakeholders, Euro parliamentarians, and political groups**. This analysis will enable us to represent the data comprehensively, providing a better understanding of the network of connections among different actors and the intensity of these connections. We aim to identify which stakeholders are effectively introducing their demands, explore whether Euro parliamentarians from the same political group focus on the same interest groups or exhibit fragmentation, and assess whether each stakeholder is associated with a single political group or disseminated among multiple groups.

Thus, the analytical sections of the study are structured to address each specific research objective individually.

2. RESEARCH DESIGN

2.1 Key Concepts and Definitions

In order to characterize stakeholders for our analysis, we begin by recognizing that influencing policy decisions is a primary objective for these groups (Dür, 2008a; Klüver, 2011). We define stakeholders or interest groups broadly to include all organizations with political objectives that aggregate political preferences, such as business associations, labor unions, civil society organizations, and social movements, while excluding individuals and academic institutions (Beyers et al., 2008). Following previous research, we will investigate the significance and impact of lobbies in advancing their agendas within institutions. This inquiry is particularly pertinent in the context of the European Union (EU) due to ongoing criticisms about its democratic deficit (Follesdal & Hix, 2006). Despite the EU's extensive regulatory authority, scholars have highlighted a disconnect between the public sphere and decision-making processes (Kohler-Koch, 2010).

Building on the framework of Dür and De Bièvre (2007b: 3), we conceptualize influence as control over political outputs rather than control over actors. Accordingly, we regard interest groups as influential if they succeed in shaping policy outcomes in a way that aligns with their objectives. This study focuses on the political actions of these groups and evaluates the degree to which their efforts result in alignment between their interests and policy outputs or MEPs propositions (Michalowitz, 2007).

2.2 Literature Review

Inspired by the work of Burgess et al. (2016), our research will use the Smith-Waterman local alignment algorithm to compare legal texts and identify instances of text reuse. Burgess et al. (2016) also employed this algorithm to detect how U.S. state legislation often replicates wording from other states or interest groups. Similarly, we will use the Smith-Waterman algorithm to detect sequences in legal texts, but signaling distinct objectives and scope. While Burgess et al. focused on developing a Legislative Influence Detector—a tool accessible to researchers, citizens, and journalists for comparing vast amounts of text and quantitatively measuring model accuracy—our research is tailored to address and respond to a more specific research question. We will

manage a smaller dataset and place emphasis on the interpretation of a more limited set of insights.

Additionally, we draw inspiration from the research by Pagliari and Young (2020), which uses the Smith-Waterman algorithm to study how different interest groups share information among themselves. They investigate information exchange among actors by detecting instances of text reuse in the comment letters submitted by various groups to the same policy proposal through EU consultative mechanisms. Differing from their approach, we focus on the relationship between extra and intra-parliamentary actors instead of stakeholders among themselves, and establishing a causal path is a crucial aspect of the study.

In relation to both studies, we can state that this approach does not incur into such a massive amount of text comparisons. Nevertheless, we have treated our data carefully to isolate matches from a possible confounding variable -the original draft for AI Act- so we can infer a causal relation instead of just mapping and collecting a subset of matches. As such, we included a longitudinal perspective through the analysis and handled three variables or types of texts instead of simply comparing them by pairs.

2.3 Methodological Framework: Isolating Stakeholder Influence

The primary goal of this study is to analyze how stakeholder recommendations influence MEPs' amendments using a text-as-data approach. To achieve this, the study aims to isolate the influence of interest groups' texts by treating the initial legal text proposed by the EU Commission as a baseline. This approach facilitates tracing pathways from stakeholders' recommendations to the amendments proposed by Members of the European Parliament (MEPs).

Establishing a causal relationship between stakeholder recommendations and MEPs' amendments presents challenges. Similarities between a parliamentary amendment and a stakeholder position text could result from both referencing the original draft regulation proposed by the Commission, even if the amendments or comments differ. To address this, we filter out amendments whose content is already present in the original draft.

To further explore these relationships, distinct time periods have been defined: a pre-treatment period (before stakeholders' public recommendations) and a post-

treatment period (after stakeholders' public recommendations). During the pre-treatment period, stakeholders provided feedback through the "Have Your Say" initiative following the publication of the initial draft of the law. All stakeholder position papers were published before 6 August 2021, preceding MEPs' amendments on 13 June 2022.

2. 4 Analytical Framework: Integrative Text Analysis Methods

This text-as-data research draws inspiration and adapts John Wilkerson and Andreu Casas' framework outlined in "Large-Scale Computerized Text Analysis in Political Science: Opportunities and Challenges" (Wilkerson & Casas, 2017). The analysis proceeds through several stages as follows:

1. **Obtaining Text**: All texts were obtained from several official EU databases, comprising the first draft of the AI Act, stakeholder recommendations in response to it, all amendment documents, and the final version of the law. You can access all the documents used for the analysis and the code through our GitHub repository.

2. **Transforming Text to Data**: This stage involves converting the acquired texts into a format suitable for analysis. Techniques such as regex for text cleaning, splitting, applying stopwords to eliminate meaningless words, tokenizing texts to standardize them, and other preparatory methods are employed for subsequent analysis steps.

3. **Quantitative Analysis of Text**: Various techniques, including TF-IDF (Term Frequency-Inverse Document Frequency) and the Smith-Waterman algorithm, are utilized for quantitative text analysis.

4. **Qualitative Analysis and Interpretation**: This stage involves examining changes in the use of politically significant words, n-grams, or entire texts to extract conclusions about how stakeholders' recommendations and amendments evolve across different versions of the AI Act. This differs from the structure proposed by Wilkerson & Casas but is essential for understanding the political and ideological shifts in the legislative process.

3. LEVERAGING TEXT MINING TO VALIDATE THE HYPOTHESES

3.1 Preprocessing and Technical Implementation

It is hypothesized that stakeholders influence the modifications of EU regulations. However, what do these changes consist of? What possible narratives can be articulated by different stakeholders to align their interests with the regulatory changes?

TF-IDF (Term Frequency-Inverse Document Frequency) will help us in addressing this question. This algorithm compares each document based on term frequency (TF), giving a higher score to terms or n-grams that appear frequently within a document and less frequently in others (inverse document frequency). This approach allows us to identify individual words or n-grams that are most representative of the changes in the regulation throughout the legislative process.

As such, by applying TF-IDF, we aim to understand how the legislation has evolved, extracting the main differences between the first draft of the AI Act published by the European Commission on April 21, 2021, and the final text adopted on March 13, 2024. Regarding the first draft of the AI Act, we excluded the first 18 pages, as they consist of an explanatory memorandum about the context of the proposal, which is not included in the final text. This part was deleted as our primary interest lies in the changes within the regulation itself.

In the Text Preprocessing stage, we tokenized the text and filtered out certain words, numbers, dates, and characters. We applied stopwords to extract meaningful concepts or n-grams. This stage is vital for understanding the substantive changes in the legislation and the potential impact of stakeholder influence on these changes.

3.2 Analysis and Interpretation of TF-IDF Results in Legislative Texts

Based on the words and n-grams with higher TF-IDF scores, several concepts stand out, all of which share a common feature related to the risk-based approach adopted in this regulation. This approach was already present in the first draft, but the identified concepts indicate a deepening and more decisive development of it. Main examples include:

- “Systemic Risk” is the most clearly related, reflecting a preference for a risk-based approach over a prescriptive one. It emphasizes identifying and mitigating risks flexibly and contextually rather than punishing actions directly.

- “AI Office” suggests an institutional framework for overseeing the application of regulations based on specific risk levels. This office focuses regulatory efforts on high-risk applications while allowing more freedom for lower-risk uses.

- “Real-World Testing and Prospective Providers” alludes to testing high-risk AI systems in actual environments to provide accurate data for risk evaluation and management. It enables developers to demonstrate compliance with safety standards in practical settings rather than through overly stringent pre-market requirements.

- The “Scientific Panel of Independent Experts” ensures that AI regulation is informed by the latest scientific and technical knowledge, supporting the implementation and enforcement of the AI Act, particularly for high-risk AI models and systems.

In this context, some authors have noted that the main alternative to this risk-based approach would have been the 'blanket regulation of all AI systems' (Mahler, 2021). While blanket regulation sets uniform rules and focuses on regulating consequences of non-compliance, a risk-based approach emphasizes understanding and mitigating potential harm from regulated activities. The decision to adopt a risk-based approach can be interpreted in two ways. From a technical and legal perspective we might argue that the nature of AI technology may have led to a refinement of the law, considering the unpredictable behavior of AI, especially as it becomes more sophisticated and autonomous (Carabantes, 2020). A risk-based approach in AI regulation makes sense as it allows regulators to focus on assessing and mitigating specific risks associated with the technology.

From a political perspective these decisions should be understood in terms of the actors who benefit from promoting certain approaches. Regine (2023) explains that “the discursive differentiation of AI systems into three risk spheres helps constitute a seemingly clear-cut and objective regulatory structure, ranging from prohibitions, via risk mitigation, to laissez-faire”. Banning certain applications based on deep value

conflicts legitimizes AI applications outside this exceptional space as trustworthy and suitable for deployment in the common market. Mahler (2021) supports this idea, arguing that “the risk-based approach seems to have primarily emerged as a mechanism to exclude certain types of unproblematic AI systems from the AIA’s scope”.

Throughout this study, we will focus on the political aspect of the regulation, aiming to detect if stakeholders defend a narrative that legitimizes practices within a certain scope while excluding others. This perspective requires understanding stakeholders as a heterogeneous group with diverse and sometimes contradictory interests.

4. SMITH-WATERMAN ALGORITHM TO DETECT TEXT REUSE

4. 1 Introduction and Text Preprocessing

This section forms the central part of the study. For data collection, we included all legal recommendations submitted by 205 different stakeholders through the "Have Your Say" initiative. This platform, used by the European Commission, encourages public participation in the policy-making process following the publication of the first draft of the legislation and before parliamentary intervention. We excluded any stakeholder texts that were published later, not in English, not in PDF format, or published by individuals or academic institutions. The included stakeholders comprise non-governmental organizations, companies, business associations, EU citizen platforms, and trade unions. All the texts gathered are dated August 6, 2021 the latest, while MEPs' amendments began on June 13, 2022. As such, we aim to apply backdoor criteria to make sure causality is correctly framed. We included all amendments proposed during the legislative process by the Euro parliamentarians and publicly published by the European Union, which supposes an amount of 3,002 amendments.

Regarding text preprocessing for stakeholder positions, we needed to split all texts into smaller segments to correctly apply the algorithm. We used a common pattern to break lines whenever we encountered an empty line. For amendments texts it was necessary to remove any irrelevant information or noise that could affect the similarity comparison. We applied regex not only for cleaning purposes but also to detect patterns that allowed us to extract amendment numbers, authors, and to differentiate between the original and amended text. In this sense, patterns varied depending on whether the amendments were correcting the original legal draft or if it represented a new addition, needing different functions for each case.

A significant challenge in this context was handling texts that spanned across two different pages in the PDF, which were not correctly parsed and divided. In these instances, phrases following the page break that belonged to the original text were erroneously included in the amended section. We had to develop a method to retrieve and correct these instances as well. Lastly, in order to run the algorithm texts from stakeholders and Euro parliamentarians were included in a directory where we tokenized each text before running the text reuse algorithm.

4.2 Application of Smith-Waterman Algorithm: LSH and MinHash

In this study, we applied the text reuse algorithm Smith-Waterman to identify similarities between texts. Specifically, we applied MinHash and Locality-Sensitive Hashing (LSH).

Locality-Sensitive Hashing (LSH) is used to group similar items into the same buckets, allowing efficient identification of candidate pairs of similar documents without needing to compare every pair directly. On the other hand, MinHash converts a set into a smaller representation of n-grams while preserving similarity. The key idea is that the same tokens will always be matched to the same hashes. For instance, hashing the word "the" will consistently yield the same integer. This is achieved by generating random integers and shifting the bits in the integers generated by our original hash function (Mullen, 2015).

An important advantage of this approach is that it allows us to identify similar passages of text between two documents that are ‘imperfect’ matches; that is, sequences of text that are similar but not completely overlapping. Locality-Sensitive Hashing (LSH) allows us to transform our minhashes into a different representation of bands and rows, which can be thought of as hashes. Unlike other hashing techniques, where the goal is to place different inputs into different buckets, LSH aims to place similar inputs into the same buckets. This technique offers several advantages. First, documents can be represented compactly as minhashes. Second, we can process documents and create minhash/LSH signatures once for each document, meaning the computational load grows linearly with the size of our corpus, rather than geometrically (Pagliari and Young, 2020).

After applying the algorithms, we obtained many comparisons that were not of interest. To extract useful information, we filtered comparisons between each stakeholder text with its best match in both the draft AI text and the amended text. Our goal was to isolate the independent and dependent variables from the confounding variable, only considering those texts whose scores did not rely on a common reference to the original text, allowing us to eliminate potential backdoor causality issues. This method ensures a more accurate identification of stakeholder influence on the amendments proposed by Euro parliamentarians, thereby providing robust support for our hypothesis.

4.3 Discussion: Interpreting Stakeholder Engagement and Legislative Evolution in the AI Act

Firstly, regarding our main hypothesis, we identified several instances where texts from stakeholders' recommendations were literally copied and pasted into amendments or presenting a very high degree of similarity. This suggests that these texts were directly taken from the initial source to the subsequent one, and indicates that these interest groups have had a direct and explicit impact on some MEPs' proposals. We successfully isolated amendments from possible backdoor influences originating from the draft AI Act proposal and detected text from interest groups being included in the amendment proposals. However, there remains the possibility of other backdoors where both texts share a common third source. This occur if both, the final AI Act and stakeholder recommendations, extracted information from common papers published by academic or expert groups (see Annex, nº3) such as the draft of Ethical Guidelines published by the High-Level Expert Group on Artificial Intelligence (HLEGAI, 2018).

Secondly, we observed that out of the 20 texts with the highest scores, 15 referred to the question of risk (see Annex) while the other 5 were definitions characterizing what AI consists of. As such, we can observe that tests conducted in parts 1 and 2 of this study yielded similar results, despite using different texts and algorithms following different logics. This consistency suggests that the issues addressed by stakeholders and the main changes observed between the first and final versions of the AI Act are aligned. Even though we cannot measure the impact or establish causality between stakeholders amendments and the final version of the AI Act, we can conclude that the interests of the most influential lobbies, those able to incorporate their recommendations into institutional amendments, coincide with the changes that prevailed throughout the legislative process. The focus on the risk-based approach among influential stakeholders aligns with the majority of MEP representatives who also supported delving into this matter.

Nevertheless, is this the extent of our findings—that there are cases of overlapping between TF-IDF and LSH results concerning the risk-based approach? A closer examination reveals that out of the 20 highest-scored matches, 14 cases refer to legislating high-risk AI (element 18 in the Annex mentions risk but was excluded). Many of these references aim to better conceptualize high risk AI systems or add new

potential threats that should be considered or included within this category. It seems like most tech companies, which often develop and train AI systems that fall outside the range of high-risk AI, seek to clearly differentiate themselves from the minority of companies engaged in these potentially hazardous practices that would require more stringent monitoring.

It can be deduced as well that we should not refer to stakeholders as a homogeneous group, as a specific subset of stakeholders, primarily tech companies or companies that engage with this technology and whose practices regarding AI can be considered of low risk, are successfully including its demands in the parliamentary amendments. As it was previously mentioned, this effort discursively differentiates them from a minority of companies whose uses pose potential threats. The n-grams detected in part 1, such as "AI Office" or "Scientific Panel of Independent Experts," are clearly established to monitor these potentially hazardous activities closely. In relation to what was argued by Regine (2023) our evidence suggests that both EU institutions and stakeholders are aligned in promoting a narrative that not only excludes certain types of problematic AI systems but also legitimizes and grants laissez-faire status to those within the AIA's scope. As Mahler (2021) argues, "risk-based approach is not, in fact, primarily an attempt to manage risks, but a solution to a specific challenge in the Proposal—namely, the very broad definition of AI systems" which "seems to have primarily emerged as a mechanism to exclude certain types of unproblematic AI systems from the AIA's scope".

5. NETWORK ANALYSIS AND COMPREHENSIVE ASSESSMENT OF STAKEHOLDERS-MEP INTERACTIONS

5.1 Introduction and Data Preprocessing for Network Analysis

The third objective aims to provide an overall perspective on the results gathered, moving beyond the qualitative interpretation of the most significant matches. This objective utilizes all the data collected to understand the frequency and intensity of relationships between extra paliamentary actors and MEPs. We seek to identify any tendencies regarding political groups that frequently interact with certain lobbies and examine how these interactions vary based on the ideology of the groups.

To achieve this, we merged our results with the names and political groups of each MEP. It was necessary to retrieve LSH results and merge them with the amendments and the MEPs who proposed them. This allowed us to create a dataframe (DF) that sums all the resulting matches between each MEP and each stakeholder, along with their affiliation to a political group.

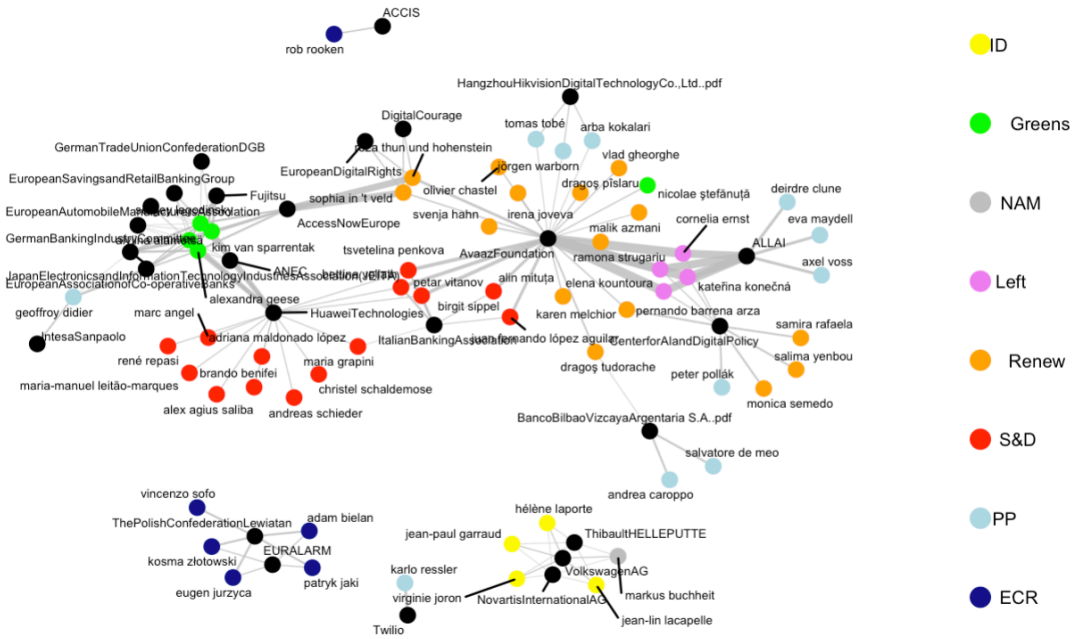
5.2 Interpretation of Network Graphs and Analysis of Interaction Patterns

The first feature we observe in the network is that MEPs tend to propose amendments alongside other parliamentarians from their same political group. Cross-group collaboration on amendments is not frequent, though there are exceptions, such as Peter Pollák from the EPP proposing an amendment in collaboration with a member of Renew Europe, which aligns with recommendations from the Center for AI and Digital Policy. Consequently, we can clearly distinguish political groups as their members as these tend to appear together. Notably, the EPP exhibits a higher degree of fragmentation and collaboration with members from other groups, suggesting that its members don’t tend to work uniformly and presents a broader range of political factions.

Additionally, smaller political groups with fewer representatives tend to exhibit more uniformity, consistently working with the same interest groups. This pattern is evident with the Greens, whose members frequently collaborate with the same stakeholders like the German Trade Union Confederation and the European Automobile Manufacturers Association. This is also observed for ECR, the Left, and ID, where all MEPs from the same group work collectively with the same stakeholders, presenting

amendments together. Conversely, larger groups, such as S&D, Renew, and particularly the EPP, display more fragmentation and terms different integrants engaging with a more diverse set of lobbies.

Another perspective for understanding the graph's structure is through ideological alignment. Moderate parties, understood as political centrism rather than conservatism, share common stakeholders and exhibit more integration among themselves. In this sense, center-right (EPP), center (Renew Europe), and center-left (S&D and Greens) parties are well connected. In contrast, there is a clear ideological divide separating these groups from the more radical ECR and ID, which appear completely isolated. Contrary to this tendency, the Left does not exhibit this high degree of isolation; instead, it appears highly integrated, surprisingly aligning with Renew and EPP. This indicates that extreme right parties present a more pronounced separation from other parliamentarians than the extreme left, lacking even integration dynamics between themselves. Regarding the question of euroscepticism, ID distinctly positions itself as an eurosceptic group, while ECR, though not entirely eurosceptic, maintains a critical stance towards EU integration. The Left again emerges in this context as an anomaly, showing an unexpected integration with other groups despite adopting sometimes soft eurosceptic narratives.



6. LIMITATIONS AND METHODOLOGICAL CONSIDERATIONS

The number of results obtained was insufficient to statistically infer tendencies throughout the analysis. Specifically, the data was inadequate to discern patterns regarding the impact of stakeholders segmented by political groups or among different types of interest groups, as private companies were overrepresented. To achieve more robust conclusions, it would be necessary to include more cases for comparison or to improve the pattern split process. The texts from the 200 stakeholder initiatives varied significantly in structure and length, resulting in split patterns that were sometimes either too brief or too extensive. For an optimal output, recommendations should be treated individually rather than applying a common split pattern to all of them. This is particularly important because Locality-Sensitive Hashing (LSH) is highly sensitive to these variations, and many potential matches were likely missed due to this issue.

Another limitation of this analysis is the inability to measure or consider instances where stakeholder influence was exerted through the elimination of certain texts rather than the addition of new extracts. This oversight means that our analysis may not fully capture the various ways stakeholders shape policy-making.

These limitations highlight areas for future research improvement. By addressing these constraints, subsequent studies can provide a more comprehensive understanding of stakeholder influence on the legislative process.

7. CONCLUSIONS

This study aimed to explore the influence of stakeholders on the legislative process of the AI Act from its initial proposal to its final version, focusing on understanding the ideological underpinnings and specific interests represented by various groups. Through a text-as-data approach, we analyzed the differences between the first draft published by the EU Commission in 2021 and the final version adopted by the European Parliament in 2024.

In this sense, we identified instances where text from stakeholder recommendations was directly copied into amendments, indicating explicit influence on some MEPs' proposals. This direct textual borrowing underscores the tangible impact stakeholders can have on the legislative process.

A significant portion of the changes from the initial to the final version of the AI Act emphasized a risk-based approach. This approach, as opposed to a blanket regulation, aligns with the interests of many tech companies that seek to differentiate low-risk AI applications from high-risk ones. The emphasis on terms like "systemic risk," "AI Office," and "Scientific Panel of Independent Experts" in the final version suggests a deepening commitment to this regulatory framework.

The study revealed that the interests of influential stakeholders, particularly tech companies involved in safe AI practices, align with the regulatory changes observed. This alignment reflects a mutual interest in promoting a narrative that legitimizes certain AI practices while excluding others deemed high-risk.

By arming citizens and journalists with this information, they can exercise more control over the government (Burgess et al., 2016). Understanding which actors have more power to introduce their demands and agenda into political institutions is crucial for transparency and accountability. This research sheds light on the dynamics of stakeholder influence, offering a foundation for future studies to build upon and further elucidate the complex interplay between regulatory bodies and external actors.

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10. ANNEX

Top 20 Matches between Stakeholder Recommendations and MEPs' Amendments with Highest Scores:

(1)

- **AvaazFoundation_line_184**

"(f) the placing on the market, putting into service or use of AI systems to infer emotions of a natural person, except for health or research purposes or other exceptional purposes, and subject to full regulatory review and with full and informed consent at all times."

- **cleaned_amendments_line_4452**

"(d b) the placing on the market, putting into service or use of AI systems to infer emotions of a natural person, except for health or research purposes or other exceptional purposes, and subject to full regulatory review and with full and informed consent at all times."

(2)

- **ALLAI_line_91**

" (c) the placing on the market, putting into service or use of AI systems by or on behalf of (semi-)public authorities or by private actors for the purpose of social scoring."

- **cleaned_amendments_line_2392**

"The placing on the market, putting into service or use of AI systems by or on behalf of public authorities or by private actors for the purpose of social scoring."

(3)

- **ALLAI_line_46**

"The Ethics Guidelines for Trustworthy AI state that “AI systems do not operate in a lawless world. A number of legally binding rules at European, national and international level already apply or are relevant to the development, deployment and use of AI systems today. Legal sources include, but are not limited to: EU primary law (the Treaties of the European Union and its Charter of Fundamental Rights), EU secondary law (such as the General Data Protection Regulation, the Product Liability Directive, the Regulation on the Free Flow of Non-Personal Data, anti- discrimination Directives, consumer law and Safety and Health at Work Directives), the UN Human Rights treaties and the Council of Europe conventions (such as the European Convention on Human Rights), and numerous EU Member State laws. Besides horizontally applicable rules, various domain-specific rules exist that apply to particular AI applications (such as for instance the Medical Device Regulation in the healthcare sector).” This is why the Ethics Guidelines for Trustworthy AI specifically mention “lawfulness” as the first pillar of trustworthy AI."

- **cleaned_amendments_line_3937**

"(41 a) AI systems do not operate in a lawless world. A number of legally binding rules at European, national and international level already apply or are relevant to AI systems today. Legal sources include, but are not limited to EU primary law (the Treaties of the European Union and its Charter of Fundamental Rights), EU secondary law (such as the General Data Protection Regulation, the Product Liability Directive, the Regulation on the Free Flow of Non- Personal Data, anti-discrimination Directives, consumer law and Safety and Health at Work Directives), the UN Human Rights treaties and the Council of Europe conventions (such as the European Convention on Human Rights), and numerous EU Member State laws."

(4)

- **AccessNowEurope_line_148**

"- the placing on the market, putting into service or use of AI systems that use physiological, behavioural or biometric data to infer attributes or characteristics of persons or groups which are not solely determined by such data or are not externally observable or whose complexity is not possible to fully capture in data, including but

not limited to: ● Gender & gender identity ● Race ● Ethnic origin ● Political orientation"

- **cleaned_amendments_line_4476**

"(d f) the placing on the market, putting into service or use of AI systems that use psysiological, behavioural or biometric data to infer attributes or characteristics of persons or groups which are not solely determined by such data or are not externally observable or whose complexity is not possible to fully capture in data, including but not limited to gender, race, colour, ethnic or social origin, as well as political or sexual orientation, or other grounds for discrimination prohibited under Article 21 of the Charter."

(5)

- **AvaazFoundation_line_170.txt"**

"(iv) AI systems that infer emotions of a natural person, except for health or research purposes or other exceptional purposes, and subject to full regulatory review and with full and informed consent at all times (Article 5,1 and 52,2)"

- **cleaned_amendments_line_4452**

"(d b) the placing on the market, putting into service or use of AI systems to infer emotions of a natural person, except for health or research purposes or other exceptional purposes, and subject to full regulatory review and with full and informed consent at all times."

(6)

- **CenterforAIandDigitalPolicy_line_21**.

"Use of ‘real-time’ remote biometric identification systems in publicly accessible spaces for the purpose of law enforcement""

- **cleaned_amendments_line_2415**

"the use of ‘real-time’ remote biometric identification systems in publicly accessible spaces for the purpose of law enforcement"

(7)

- **ThePolishConfederationLewiatan_line_6**

"Artificial intelligence (AI) refers to systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals”."

- **cleaned_amendments_line_2213**

"‘artificial intelligence system’ (AI system) means software that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve"

(8)

- **SOCIETEGENERALE_line_9**

"1 ‘Artificial intelligence system’ means software that is developed with one or more of the techniques and approaches listed"

- **cleaned_amendments_line_2223**

"‘artificial intelligence system’ (AI system) means software that is developed with one or more of the techniques and approaches listed in Annex I and can, for a"

(9)

- **ALLAI_line_88**

"(45) ‘social scoring’ means the evaluation or categorisation of EU citizens based on their behaviour or (personality) characteristics, where one or more of the following conditions apply: - the information is not reasonably relevant for the evaluation or

categorisation; - the information is generated or collected in another domain than that of the evaluation or categorisation; - the information is not necessary for or proportionate to the evaluation or categorisation; - the information contains special categories of personal data, including biometric data."

- **cleaned_amendments_line_4351**

"(44 b) ‘social scoring’ means the evaluation or categorisation of EU citizens based on their behavior or (personality) characteristics, where one or more of the following conditions apply: (i) the information is not reasonably relevant for the evaluation or categorisation; (ii) the information is generated or collected in another domain than that of the evaluation or categorisation; (iii) the information is not necessary for or proportionate to the evaluation or categorisation; (iv) the information contains or reveals special categories of personal data."

(10)

- **Twilio_line_21**

"“a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments. AI systems are designed to operate with varying levels of autonomy”. (OECD/LEGAL/0449 - Recommendation of the Council on Artificial Intelligence)."

- **cleaned_amendments_line_2224**

"‘artificial intelligence system’ (AI system) means a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments and is designed to operate with varying levels of autonomy;”

(11)

- **AccessNowEurope_line_139**

"- any deployment and use of AI for an automated recognition of human features in publicly accessible spaces - such as of faces but also of gait, fingerprints, DNA, voice, keystrokes and other biometric, physiological or behavioral signals - for any purposes, including law enforcement purposes."

- **cleaned_amendments_line_2411**

"The placing on the market, putting into service or use of of AI for an automated recognition of human features in publicly accessible spaces - such as of faces but also of gait, fingerprints, DNA, voice, keystrokes and other biometric or behavioral signals - for any purpose, including law enforcement."

(12)

- **EURALARM_line_21**

"Euralarm proposal: We propose to add a third paragraph to Article 6 writing: “The classification as high-risk as a consequence of Article 6(2) shall be disregarded for AI systems which intended use demonstrates that the generated output is a recommendation requiring a human intervention to convert this recommendation into a decision"

- **cleaned_amendments_line_4557**

"2 a. The classification as high-risk as a consequence of Article 6(1) and 6(2) shall be disregarded for AI systems whose intended purpose demonstrates that the generated output is a recommendation requiring a human intervention to convert this recommendation into a decision and for AI systems which do not lead to autonomous decisions or actions of the overall system."

(13)

- **VolkswagenAG_line_36**

"For high-risk AI systems that continue to learn after being placed on the market or put into service, changes to the high-risk AI system and its performance that have been pre-

determined by the provider at the moment of the initial conformity assessment … shall not constitute a substantial modification."

- **cleaned_amendments_line_5095.txt"**

"For high-risk AI systems that continue to learn after being placed on the market or put into service, changes to the high-risk AI system and its performance that have been pre-determined by the provider at the moment of the initial conformity assessment and are part of the information contained in the technical documentation referred to in point 2(f) of Annex IV, shall not constitute a substantial modification. For high-risk AI systems that continue to learn after being placed on the market or put into service, changes to the high-risk AI system and its performance that have been pre-determined by the provider at the moment of the initial conformity assessment and are part of the information contained in the technical documentation referred to in point 2(f) of Annex IV, shall not constitute a substantial modification. A new conformity assessment is always required whenever safety-related limits of continuing learning high-risk AI systems may be exceeded or have an impact on the health or safety."

(14)

- **VolkswagenAG_line_18**

"We suggest a wording along the following lines: “Training, validation and testing data sets shall be relevant and representative. Errors in the data set shall be statistically negligible for the models that use these data sets. The statistical properties of the AI methods trained with the data sets have the appropriate statistical properties, including, where applicable, as regards the persons or groups of persons on which the high-risk AI system is intended to be used."

- **cleaned_amendments_line_2670.txt"**

"Training, validation and testing data sets shall be relevant and representative. They shall have the appropriate statistical properties, including, where applicable, as regards the persons or groups of persons on which the high-risk AI system is intended to be used. These characteristics of the data sets may be met at the level of individual data sets or a combination thereof."

(15)

- **AccessNowEurope_line_135**

" With all this in mind, we therefore support the EDPS-EDPB Joint Opinion's "call for a general ban on any use of AI for an automated recognition of human features in publicly accessible spaces - such as of faces but also of gait, fingerprints, DNA, voice, keystrokes and other biometric or behavioral signals - in any context" and for a ban on the use of "AI systems for large-scale remote identification in online spaces.""

- **cleaned_amendments_line_2411**

"The placing on the market, putting into service or use of of AI for an automated recognition of human features in publicly accessible spaces - such as of faces but also of gait, fingerprints, DNA, voice, keystrokes and other biometric or behavioral signals - for any purpose, including law enforcement."

(16)

- **Twilio_line_23**

"a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments. AI systems necessarily operate with some degree of autonomy in making the prediction, recommendation or decision, though the level of that autonomy may vary from system to system. "

- **cleaned_amendments_line_2224.txt"**

"'artificial intelligence system' (AI system) means a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments and is designed to operate with varying levels of autonomy;"

(17)

- **Google_line_67**

" ● Article 64(2) says that “where necessary to assess the conformity of the high-risk AI system… upon a reasoned request, the market surveillance authorities shall be granted access to the source code of the AI system.” But there will always be better methods for verifying the performance of an AI system (ex: input/output auditing) than direct access to source code, rendering this provision superfluous. Furthermore, source code is protected by the EU trade secrets directive, and the confidentiality provisions of Article 70 are insufficient to protect providers’ intellectual property rights. A better alternative would be to replace Article 64(2) with something like “Where necessary to assess the conformity of the high-risk AI system with the requirements set out in Title III, Chapter 2 and upon a reasoned request, AI providers or deployers should support and equip market surveillance authorities with the necessary facilities to carry out robust testing (e.g., input/output auditing) to confirm compliance. "

- **cleaned_amendments_line_5531**

"2. Where necessary to assess the conformity of the high-risk AI system with the requirements set out in Title III, Chapter 2 and upon a reasoned request, the market surveillance authorities shall be granted access to the source code of the AI system. 2. Where necessary to assess the conformity of the high-risk AI system with the requirements set out in Title III, Chapter 2, after all other reasonable ways to verify conformity have been exhausted and have proven to be insufficient, and upon a reasoned request, the market surveillance authorities or, where applicable, the Commission, shall be granted access to the source code of the AI system. Such access shall be subject to existing Union law on the protection of intellectual property and trade secrets."

(18)

- **EuropeanAssociationofCo-operativeBanks**

"The EACB is pleased to see recognised in Recital 80 that EU legislation on financial services already includes internal governance and risk management rules and

requirements which are applicable to regulated financial institutions in the course of provision of those services, including when they make use of AI systems."

- **cleaned_amendments_line_2148**

"Union legislation on financial services includes internal governance and risk management rules and requirements which are applicable to regulated financial institutions in the course of provision of those services, including when they make use of AI systems. In order to ensure coherent application and enforcement of the obligations under this Regulation and relevant rules and requirements of the Union financial services legislation, the authorities responsible for the supervision and enforcement of the financial services legislation, including where applicable the "

(19)

- **AccessNowEurope_line_130**

" The fourth prohibition in Article 5 is, unfortunately, not the prohibition on remote biometric identification that it appears to be. In reality, it is severely limited in scope, and provides wide exceptions that render it all but ineffective in safeguarding fundamental rights from the grave threat posed by this application of AI. The current version of the prohibition is formulated as applying to “the use of ‘real-time’ remote biometric identification systems in publicly accessible spaces for the purpose of law enforcement.” It provides exceptions for three uses, which are (i) the targeted search for specific potential victims of crime, including missing children; (ii) the prevention of a specific, substantial and imminent threat to the life or physical safety of natural persons or of a terrorist attack; and (iii) the detection, localisation, identification or prosecution of a perpetrator or suspect of a criminal offence referred to in Article 2(2) of Council Framework Decision 2002/584/JHA62 and punishable in the Member State concerned by a custodial sentence or a detention order for a maximum period of at least three years, as determined by the law of that Member State. Let us begin with the general formulation of the prohibition, and then discuss the exceptions."

- **cleaned_amendments_line_4414**

"(d) the use of ‘real-time’ remote biometric identification systems in publicly accessible spaces for the purpose of law enforcement, unless and in as far as such use is strictly necessary for one of the following objectives: deleted (i) the targeted search for specific potential victims of crime, including missing children; (ii) the prevention of a specific, substantial and imminent threat to the life or physical safety of natural persons or of a terrorist attack; (iii) the detection, localisation, identification or prosecution of a perpetrator or suspect of a criminal offence referred to in Article 2(2) of"

(20)

- **DigitalCourage_line_161**

"b) Comprehensively prohibit the use of remote biometric identification in publicly-accessible spaces for any purpose, and implement “a general ban on any use of AI for an automated recognition of human features in publicly accessible spaces - such as of faces but also of gait, fingerprints, DNA, voice, keystrokes and other biometric or behavioral signals - in any context”, as per the EDPS- EDPB Joint Opinion.60 These prohibitions must apply for all purposes and in any context, including online spaces, and without exception:"

- **cleaned_amendments_line_2411**

"The placing on the market, putting into service or use of of AI for an automated recognition of human features in publicly accessible spaces - such as of faces but also of gait, fingerprints, DNA, voice, keystrokes and other biometric or behavioral signals - for any purpose, including law enforcement. "