The Voice of the Manufacturing Industry in AI Regulation

A Sectoral Analysis of Bill no. 2,338/2023

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Executive Summary

This study examined how industrial stakeholders perceive and assess Bill No. 2,338/2023 (PL 2,338/2023), which proposes a regulatory framework for Artificial Intelligence (AI) in Brazil. Through a focus group with legal executives from large manufacturing companies and a documentary analysis of the public hearings held in the National Congress, the study combined qualitative listening with empirical analysis to identify gaps in representation, regulatory challenges, and potential pathways toward a more balanced regulatory approach.

Among the main findings, we highlight:

- **The industrial sector not only feels underrepresented but is in fact largely absent from the regulatory debate,** despite its economic relevance. Only 2.9% of participants in congressional public hearings represented the industrial sector, in contrast to its 24.7% contribution to national GDP;

- **Civil liability is the primary source of uncertainty.** The study identified widespread concern regarding the joint and several liability regime provided for in the bill, which reflects Brazil's strong consumer protection tradition but fails to distinguish AI applications used at intermediate stages of production chains—many of which are internal and have no direct interaction with the public. According to executives, this may encourage predatory litigation and increase compliance costs;

- **Executives criticized the transposition of the European risk-classification model,** arguing that it overlooks the realities of an innovation ecosystem characterized by resource scarcity, creativity, and productive diversity. For study participants, a "copy-and-paste" regulatory approach is likely to **discourage experimentation and exacerbate legal uncertainty;**

- **The bill's language is technical but insufficiently accessible.** Focus group participants emphasized that the text is **difficult to understand even for specialized professionals.** There is a perception that the law is already **obsolete at inception, lacking instruments capable of adapting to the pace of technological innovation;**

- **Regulation may affect industrial competitiveness** by imposing potentially redundant obligations across different sectoral authorities, leading to regulatory **fragmentation and excessive burdens** on production chains.

1. Introduction

1.1. Artificial Intelligence and the Manufacturing Sector

In the early 2010s, German engineers and scientists began exploring new approaches to industrial policy, identifying the initial movements of what would later be described as a new industrial revolution. These ideas moved beyond the factory floor in 2015, when Klaus Schwab, one of the founders of the World Economic Forum (WEF), introduced the term "Fourth Industrial Revolution" in an article published in Foreign Affairs. Critics questioned the legitimacy of the concept, characterizing Industry 4.0 as little more than a marketing strategy. Their main argument was that, although significant transformations were occurring in specific sectors, there was still no evidence of a systemic shift in the global industrial landscape comparable to the impact that late-1990s digitalization had on the sector.

In recent years, however, such criticisms have largely faded, **as advances in machine learning and artificial intelligence technologies have demonstrated not only substantial transformative power but have also become the central engine of Industry 4.0.**

The adoption of AI in manufacturing,[1] particularly in the Brazilian manufacturing sector, is currently experiencing accelerated growth. **Between 2022 and 2024, AI usage in the sector increased from 17% to 42%,** according to the Semiannual Innovation Survey conducted by the Brazilian Institute of Geography and Statistics (IBGE). In 2024, 41.9% of industrial firms with more than 100 employees had implemented AI solutions, representing a 163% increase compared to 2022, when only 16.9% used this technology. **This expansion places Brazil above the global average level of AI adoption in the manufacturing industry,** which stands at 35% (Artsmart AI, 2024).

Despite this growth, Brazilian manufacturing still faces significant challenges in the full adoption of advanced digital technologies. According to the 2024 edition of the PINTEC Semestral, the high cost of technological solutions remains the primary obstacle, cited by 78.6% of firms. The lack of qualified personnel ranks second (54.2%), followed by security and privacy risks (47.2%). These challenges mean that artificial intelligence is no longer solely an issue for industrial parks but has also become a matter of concern in the federal policymaking arena.

It is within this context that this study seeks to capture the perspectives of the industrial sector regarding Bill No. 2,338/2023, currently under consideration in the National Congress, which aims to regulate AI applications in Brazil. The objective is to generate insights that contribute to a regulatory design capable of treating industrial policy and the regulation of emerging technologies as inseparable and mutually reinforcing elements of socioeconomic development.

[1] For the purposes of this study, we adopt the definition of the manufacturing industry and the sectoral classifications used by the National Confederation of Industry (CNI), which encompass activities aimed at the physical, chemical, or biological transformation of raw materials into new products. This definition includes both basic industries—such as metallurgy and chemicals—and high-technology segments, such as electronic equipment and pharmaceuticals. This conceptual framework guides the empirical scope of the analysis and reflects the strategic importance of the manufacturing industry within the national productive structure.

For the purposes of this study, **artificial intelligence (AI) technologies** are understood as software systems capable of processing and analyzing data through algorithms and mathematical models, employing statistical and computational techniques to identify patterns, make predictions, or generate new content. In other studies published by Reglab, a distinction is made between **Analytical AI systems,** which are designed to address well-defined problems, such as fraud detection or demand forecasting, and Generative AI systems, which are capable of producing text, images, or code based on large volumes of data. Unless otherwise expressly indicated, this research considers both types jointly, under the broad concept of AI technologies.

1.2. The Bill No. 2338/23

In December 2024, the Plenary of the Federal Senate approved Bill No. 2,338/2023, which establishes a regulatory framework for artificial intelligence in Brazil (Senate News Agency, 2024). The approved text was a substitute bill introduced by Senator Eduardo Gomes (PL–TO), based on the proposal originally submitted in 2023 by the then President of the Senate, Rodrigo Pacheco (PSD–MG). The bill originated from a draft prepared in 2022 by the Commission of Jurists on Artificial Intelligence (CJUSBIA) and was subsequently reviewed by the Temporary Internal Commission on AI in Brazil (CTIA) before being voted on in plenary session (Federal Senate, 2024).

Bill No. 2,338/2023 establishes a comprehensive set of measures to regulate the development, promotion, and ethical and responsible use of AI, presenting itself as a regulatory framework for the entire AI ecosystem in Brazil. With the aim of protecting fundamental rights and ensuring the centrality of the human person in the context of the rise of AI in Brazil, the bill provides an extensive list of rights for users affected by these technologies. These include the right to information regarding interactions with AI systems, the right to explainability, and the right to contest automated decisions and request human review.

Inspired by the European Union's AI Act (ITS, 2025), the text **proposes a risk-based approach, assigning obligations according to the level of criticality of the system and distinguishing between AI systems deemed to pose unacceptable risk and those classified as high risk** (Sagawa; Gonçalves, 2025). Unacceptable-risk technologies—such as autonomous weapons systems or real-time remote biometric identification in public spaces—are prohibited. By contrast, high-risk systems, due to their potential adverse impact on fundamental rights, including autonomous vehicles in public spaces, diagnostic applications and medical procedures in the health sector, and immigration management and border control mechanisms, are subject to specific regulatory obligations.

The legislative proposal also establishes the National System for the Regulation and Governance of Artificial Intelligence (SIA), coordinated by the National Data Protection Authority (ANPD) and composed of sectoral authorities, the Permanent Council for Regulatory Cooperation on AI (CRIA), and the Committee of AI Experts and Scientists (CECIA). This regulatory ecosystem is intended to promote and ensure cooperation in the implementation of and compliance with the rules proposed under Bill No. 2,338/2023, through oversight by the ANPD and by strengthening the regulatory, sanctioning, and normative competencies of sectoral authorities.

While Brazil continues to debate the creation of its own regulatory framework for AI systems, other countries have already advanced in the implementation of specific norms in this area. In the European Union, the EU AI Act—proposed in 2021 and approved in 2024—entered into force in August of that year (European Commission, 2024). The regulation establishes a risk-based regulatory model, with graduated obligations according to the potential impact of each AI system. In February 2025, the first provisions became applicable, including the prohibition of systems classified as presenting "unacceptable risk," such as cognitive manipulation technologies, government-run social scoring systems, and real-time remote biometric identification in public spaces (Harvard University Information Technology, 2025). The remaining obligations will be implemented on a phased basis, according to the risk category of the activity (Haikal; Becker; Sotomayer, 2024).

In Peru, Law No. 31,814 was approved in 2023 to promote the use of AI; however, its implementing regulation was only approved in September 2025, establishing a risk classification model and principles intended to guide the collective and socially beneficial use of AI (Panez, 2025). Other countries, such as the United Kingdom and the United States, have thus far adopted flexible, principles-based regulatory approaches, relying on strategies and guidelines rather than enacting comprehensive national AI legislation (White & Case, 2025). This option seeks to ensure greater adaptability considering the rapid pace of AI innovation, while guiding the actions of public and private actors involved across the AI development and deployment chain.

Currently, **Bill No. 2,338/2023** is under consideration in the Chamber of Deputies. Given its cross-cutting nature, involving matters within the jurisdiction of more than four standing committees, the bill is being reviewed by a Special Committee established in May 2025, chaired by Deputy Luisa Canziani (PSD–PR) and reported by Deputy Aguinaldo Ribeiro (PP–PB) (Chamber of Deputies, 2025; Haje, 2025). Once deliberations in the Special Committee are concluded and the rapporteur's report is published, the bill is expected to be voted on in the plenary of the Chamber of Deputies (Kaufman, 2025), before returning to the Federal Senate, which will assess the proposed amendments in its role as the reviewing body. Bill No. 2,338/2023 must therefore still pass through several stages before its potential approval by the National Congress.

1.3. Research Methodology: Focus Group

Why listen to those affected by regulation? The question may seem obvious, yet it is rarely meaningfully addressed when it comes to the regulation of emerging technologies (Ribeiro; Ramos, 2025). Understanding how manufacturing perceives AI regulation requires more than mapping institutional positions or reviewing technical documents; it also requires **creating a space in which perspectives not only are expressed but engage in dialogue with one another.** It is in this exchange that nuances, tensions, and points of convergence emerge—elements that would be unlikely to surface in isolated conversations.

The **focus group is a qualitative research methodology aimed at the structured elicitation of perceptions and experiences through interaction among participants who share similar backgrounds with respect to a common topic.** This technique seeks to understand how meanings are collectively constructed, enabling the identification of practices, perceptions, and behaviors that arise from dialogue and interaction among participants (Oliveira et al., 2020).

In practice, a focus group functions as a collective interview in which **the moderator introduces the topic, stimulates discussion, and ensures balanced participation without imposing personal opinions.** The statements are analyzed qualitatively, considering both their content and the dynamics of interaction, which makes it possible to capture nuances and meanings that would be difficult to elicit through individual interviews.

In the context of this study, we chose to engage representatives from the legal and regulatory departments of companies in the manufacturing sector. Our objective was not to endorse these positions, but rather to understand their concerns, areas of convergence and divergence regarding the impacts of Bill No. 2,338/23 on Brazil's regulatory and productive environment, as well as their perceptions of the productive sector's participation in legislative debates on the subject.

The statements were treated as qualitative evidence of sectoral perceptions and were analyzed critically and contextually. The analysis sought to identify how the productive sector interprets its role and influence in legislative debates on AI regulation, while acknowledging the limitations and biases inherent to this empirical scope.

Participant	Gender	Manufacturing sector
A	Man	Metallurgy
B	Woman	Consumer Goods
C	Woman	Metallurgy
D	Woman	Active Pharmaceutical Ingredients and Pharmaceutical Products
E	Man	Active Pharmaceutical Ingredients and Pharmaceutical Products
F	Man	Metallurgy
G	Woman	Consumer Goods
H	Woman	Metallurgy
I	Woman	Motor Vehicles

The relevance of the Manufacturing perspective on the Regulatory Debate

Manufacturing is a central stakeholder in the debate on AI regulation in Brazil. The National Confederation of Industry (CNI) acknowledged this importance by including Bill No. 2,338/2023 among the 14 legislative proposals identified as priorities for 2025. While the public debate surrounding this bill has already incorporated perspectives from technology companies (Conselho Digital, 2024), the healthcare industry (Bezerra, 2025), the financial sector (FEBRABAN, 2024), agribusiness (ABAG, 2024), government authorities (ANPD, 2023), academia (IAEDU; NEES/UFAL, 2025), and civil society (Direitos na Rede, 2024), the manufacturing industry had not yet been heard with comparable depth—even within the legislative process itself (as discussed in Section 3.1 below).

In other words, this segment was intentionally selected. It represents 14.4% of total GDP (58% of industrial GDP—CNI, 2025), is directly affected by the proposed regulatory framework, and its participation is indispensable for understanding the broader regulatory and economic impacts of the bill.

By bringing the voice of the manufacturing industry into the analysis through a focus group, the study does not seek to privilege them over other legitimate perspectives, nor to generalize its findings. Rather, it aims to broaden the spectrum of the regulatory debate, recognizing that the formulation of balanced public policies depends on listening to all actors affected by regulation. The objective is to understand a specific segment of the regulatory debate, expanding the range of evidence available to support evidence-based and plural decision-making. Listening does not imply endorsement.

2. Results

2.1. Evaluation of the Bill No. 2,338/2023

Participants in the focus group expressed critical perceptions regarding both the legislative process and the content of Bill No. 2,338/2023, which proposes the regulation of AI in Brazil. Overall, they conveyed skepticism about the substantive quality and breadth of the public debate conducted thus far. The observations below detail the main perceptions concerning the bill, its shortcomings, and its potential impacts on manufacturing.

Rushed Legislation and Obsolescence: Participants shared the perception that Bill No. 2,338/2023 is being advanced hastily and without the proper convening of the committees necessary to foster an in-depth understanding among members of the Chamber of Deputies and the Federal Senate, characterizing what they described as "rushed legislative process".

> *"In my view, this is rushed legislation. They didn't set up the commissions that should have been set up—they did set them up, but they didn't call society to understand whether this makes sense. For me, that didn't happen."* **[Participant E]**[2]

Although the bill has not yet been approved, participants argued that the regulation would already be "obsolete at birth." Participant I emphasized that Brazil's positivist legal tradition, combined with the rapid pace of AI development, tends to produce a permanent regulatory lag, in which regulation is always reacting to a changing reality without being able to fully reflect the state of the technology or its social and economic impacts.

> *"Basically, we started dealing with artificial intelligence more openly about a year and a half ago... and look how far we've already come. So, unfortunately, within Brazilian law, because it is positivist, we will be eternally chasing a situation that will never reflect reality. So, especially given the way regulation is being proposed [...] how are we going to create something that is both safe and broad enough so that we don't fall behind"* **[Participant I]**

Lack of National Contextualization: A central criticism raised by participants is that the text of Bill No. 2,338/202, particularly its adoption of a risk-classification-based structure, replicates the EU AI Act model without adequately considering the specificities of the Brazilian context.

According to the group, the proposal is grounded in a European regulatory logic that is more rigid and oriented toward abstract norms, whereas Brazil's innovation ecosystem is

2 With the aim of preserving the anonymity and confidentiality of the research participants, minor adjustments were made to the quotations presented in this study. In certain circumstances, specific linguistic adaptations were introduced to ensure that the original intent of the interviewees was accurately conveyed in the textual transcription. Whenever possible, the preservation of the original discursive register was maintained, in accordance with the established methodological principles.

characterized by creative informality and resource scarcity—**an environment in which experimentation and improvisation are integral to technological development dynamics.** By failing to recognize these structural differences, the bill would tend to impose a regulatory framework detached from the day-to-day practices of the national economy, thereby limiting the sector's capacity for innovation and responsiveness.

> *"I think the law focuses too much on the technical aspect of classification, what is high risk, what is low risk, again, a European copy-and-paste, without concern not only for the industries we represent, but also for end users. We were talking a bit about that, right? About it not being a clear project, easy to access, that people can actually read, or that aligns with other legislation."* **[Participant E]**

Inaccessibility and Language: Difficulty in understanding and interpreting the text of Bill No. 2,338/2023 was identified as one of the main concerns among manufacturing representatives. Participants emphasized that the proposed drafting is excessively complex while simultaneously insufficiently technical, rendering it inaccessible both to the general public and to IT and development teams. According to them, the bill attempts to regulate technical aspects of how AI systems function without employing appropriate terminology, undermining regulatory clarity, and increasing the risk of divergent interpretations in the application of the law.

> *"We have the unique challenge of Brazil, right? Because it's one thing to talk to the corporate population, lawyers and so on, but we also have to think about the use of AI by Brazil's population as a whole, from North to South. I think that kind of care is also missing in the legislation."* **[Participant C]**
>
> *"And for me, one of the flaws of this law is that, once again, it is incomprehensible. If you give it to anyone who is not trained in law or just has some curiosity about these topics, they read it and don't understand anything."* **[Participant I]**

Legal Uncertainty: Given the complexity and subjectivity of the proposed text, participants assessed that the difficulty of translating its concepts and technical terms into business practice represents a significant obstacle to the business environment. This lack of clarity regarding normative operability tends to generate legal uncertainty and to hinder the implementation of compliance measures by firms in the sector.

> *"When reading [Bill no. 2,338/2023], it feels like they pasted together parts of different legal texts that don't quite fit. So I think that has a big impact. I think having things clearer and more coherent helps a lot in creating an environment that encourages innovation. Without that, I think it becomes very difficult."* **[Participant D]**

2.2. Key priorities

Within the dynamics of the focus group, participants analyzed the most pressing issues raised during the discussion and acknowledged that Bill No. 2,338/2023 does, to some extent, address the main areas of concern. However, they assessed that these issues are managed inadequately, either failing to provide effective responses or, in certain cases, exacerbating the sector's practical concerns. The four priority themes identified by participants were as follows:

Civil Liability: This issue emerged as the area of greatest concern and the top priority for improvement in Bill No. 2,338/2023. It received particular emphasis during the prioritization exercise, reflecting the perception that there is an urgent need to promote greater clarity and balance in the allocation of responsibilities provided for in the text.

Participants associated with consumer goods industries observed that the bill places excessive emphasis on the liability of developers and suppliers of AI systems, while giving less attention to the **conduct of users**. For example, they mentioned the misuse of generative AI tools by consumers to create false content capable of harming the reputation of products or brands, highlighting gaps in the proposal's approach to shared responsibility.

> *"I have a consumer base that is already using AI to file claims against the brand, saying, for example—I'll just give an example here—that there are insects in the product. But the images were generated by AI."*
> **[Participant B]**

In this context, participants expressed concern about **the unbalanced nature of the liability regime** established under Bill No. 2,338/2023. They emphasized that, because AI systems undergo continuous cycles of improvement and evolution, it becomes difficult to identify the specific origin of each failure or behavior. This scenario would encourage excessive reliance on recourse actions, channeling liability primarily toward large firms within the production chain, even when they are not directly responsible for the observed harm.

> *"When a problem appears, no one knows exactly where it came from. And someone will have to be held responsible. Usually, it falls on those at the top of the chain—the larger companies. From there, the right of recourse is applied downward. The problem is that, in many cases, we cannot identify the true origin of the failure, because AI is designed to improve and evolve. If that improvement happens outside of our control, it becomes virtually impossible to map where the error arose—and even so, it continues to replicate itself across different points in the system."*
> **[Participant I]**

The lack of clarity regarding the operability of the proposed rules was also identified as a concern, particularly due to the difficulty of understanding how the provisions of Bill No. 2,338/2023 would be applied in practice.

> *"So, I understand that the concerns should focus on civil liability. There are many, many provisions in the law that deal with civil liability. But there is no clear explanation of how we are actually supposed to arrive at that liability."* **[Participant E]**

Risk Classification: The second most frequently discussed theme was the risk classification system. Participants interpreted the model proposed in Bill No. 2,338/2023 as a **transplantation of the European model,** disregarding the country's structural particularities, which could lead to counterproductive outcomes. They emphasized that, unlike more heavily regulated economies, **Brazil has an innovation ecosystem characterized by creativity in the face of resource scarcity and by the ability to adapt to less predictable contexts.** In this sense, overly rigid regulation could constrain precisely the inventive and experimental dynamics that drive national innovation.

> *"Brazil is [...] a society that is extremely resourceful, full of innovation. People find ways and innovate daily with very scarce and limited resources. The question is whether the legislation is designed for that society, or whether it is thinking about a European society that is more rigid, where people already have a culture of adhering to laws and abstract norms—where you can or cannot do something, and that's it. For me, that is the main problem, and within manufacturing we are suffering from it, because that's what everyone here has brought up."* **[Participant I]**

In this regard, participants expressed strong concern about **the breadth of the risk categories established under Bill No. 2,338/2023,** warning that their generic application could compromise the operation and economic activity of entire sectors. They also stressed the importance of distinguishing between levels of risk associated with different contexts of AI use, reinforcing a consensus that classification should be more granular and aligned with the type of application.

> *"If it's an AI developed solely for internal company use, something very specific, it should be one type of regulation, with some kind of, maybe not an exemption, but a differentiated approach, compared to an AI that is deployed by a company, perhaps in a B2C context, on a larger external scale and not just internally."* **[Participant C]**

In this context, **Participant F** drew attention to an operational issue directly linked to the breadth of risk classification: **the risk of regulatory overlap resulting from excessive autonomy granted to sectoral authorities.** According to him, allowing each authority to regulate technical and specific aspects of AI applications within its respective regulated market could create a scenario of regulatory fragmentation. In such a scenario, companies that develop or deploy AI solutions would face multiple and cumulative compliance procedures to launch a single product, increasing costs and discouraging innovation.

> *"A large company will have to monitor every stage of its process: 'Where is the approval from Anatel? And the Inmetro certificate? We're still missing authorization from Anvisa.' There are so many requirements that monitoring them becomes almost unfeasible."* **[Participant F]**

Responsible Innovation: Participants' perceptions of responsible innovation reflect the need to balance incentives for industrial innovation with the promotion of legal certainty and ethical standards. For the group, technological development should incorporate principles of sustainability and responsibility from its inception. This theme received six votes, ranking as the third-highest priority to be addressed by future regulation.

In this context, **Participant G** emphasized the importance of incorporating **structured documentation and record-keeping stages for tests conducted throughout the AI systems' life cycle,** to ensure that technological development is safe and traceable from the earliest phases of the project.

Participants reinforced the importance of embedding controls from the initial stages of AI system development, particularly in companies that already have consolidated governance structures. The mechanisms cited include practices aimed **at mitigating bias and reducing hallucinations in models,** thereby ensuring greater technical reliability and adherence to ethical standards. For **Participant H,** this preventive approach should be accompanied by a long-term strategic perspective, in which the value of innovation is balanced with legal and operational security, preventing shortcomings in early development stages from resulting in regulatory, reputational, or financial losses in the future.

Explainability and Transparency: Although participants acknowledged the importance of explainability and transparency mechanisms, they observed that current technical and operational limitations make it difficult to reconcile these requirements with the proposed regulatory framework. They emphasized that while Bill No. 2,338/2023 guarantees users the right to an explanation of decisions, recommendations, or predictions made by AI applications, in practice it may not always be possible to fully understand or review the technology's decisions.

The issue of explainability is not new in the Brazilian legal debate. It was already introduced by **Article 20 of the Brazilian General Data Protection Law (LGPD),** which recognizes data subjects' right to request the **review of automated decisions and to obtain clear information about the criteria used.** However, even more than five years after its enactment, this provision still lacks, according to **Participant E,** in-depth discussion regarding its practical application. This gap highlights the complexity of the issue and reinforces the challenge of operationalizing the right to explainability within the broader context of AI regulation proposed by Bill No. 2,338/2023.

While explainability and transparency are desirable and addressed in Bill No. 2,338/2023, the lack of detail regarding how to achieve them in an environment where AI applications are autonomous and continuously evolving generates significant uncertainty and practical concern among participants.

Intellectual Property (IP): Intellectual property also received significant attention (four votes), particularly due to legal uncertainty surrounding copyright and the use of content by AI applications. **Participant H** drew attention to how IP and copyright issues are addressed in Bill No. 2,338/2023, characterizing the text as "highly dissonant." As Participant H summarized, "the bill **strongly encourages innovation,** but at the same time, when the stakeholder needs **legal certainty** to move forward, **it becomes impossible to proceed."**

2.3. Inclusion and Absence of Voices

There is a unanimous perception among the focus group participants that the legislative process surrounding Bill no. 2,338/2023 is not adequately listening either to society or to the industrial sector. This was one of the few issues on which there was not only agreement but also comments from virtually all participants.

It was noteworthy that some participants compared **Bill no. 2,338/2023** with **the legislative process that led to the approval of the LGPD in 2018,** stating that, at that time, **the level of listening and engagement with manufacturing industry was perceived to be substantially higher.** The political component was also mentioned as a factor shaping this perception, with participants expressing the view that "decisions end up being strongly influenced by political interests."

At different moments, participants also highlighted **the difficulty legislators face in understanding the importance of the topic for the industrial sector.** According to them, **there is a prioritization of the participation and consultation of technology companies in discussions** on AI regulation and governance, to the detriment of traditional manufacturing.

> *"In this case, we are talking about a point where there is also a bias on the part of the legislator toward other interests. So, for example, you manufacture cars, what is your interest in this? Does this affect you? And this is a problem industries face in general, because if you are not a technology company, why should I listen to you?"* **[Participant I]**

Some participants confirmed that they follow the legislative process of **Bill no. 2,338/2023** through their government relations teams and through sectoral associations and entities. They explicitly mentioned the Institute for Retail Development (IDV), the Brazilian Association of Credit Card and Services Companies (ABECs), the Brazilian Supermarket Association (ABRAS), and the National Association of Motor Vehicle Manufacturers (ANFAVEA).

For the participants, the absence of effective participation by the industrial sector in the legislative process may generate significant practical and macroeconomic consequences. They assessed that, if **Bill no. 2,338/2023** is approved without proper manufacturing involvement, there is a risk of undermining the transformative potential of AI for the sector.

> *"The greatest transformation of manufacturing will come from AI and digitalization—AI is the most powerful tool for this change. If the country does not ensure freedom and legal certainty for its use, instead of attracting investment, it will end up driving away innovation and competitiveness."* **[Participant F]**

In addition, participants warned that the lack of manufacturing consultation may result in the approval of legislation that is difficult to understand, opening space for judicial disputes and increasing legal uncertainty, as well as the possibility of strict sanctions being applied without sufficient legal clarity.

> *"If that's the case, given the content of the rule, if I have a regulation whose content I don´t understand, fine, I won't apply it, and then we'll deal with future problems: litigation, legal uncertainty."* **[Participant E]**
>
> *"Imagine the supervisory authority applying this and imposing multimillion fines on industries. We could face a future problem of multimillion fines being applied without a clear rule, without the necessary legal certainty, where no one knows exactly for what or why."* **[Participant B]**

Finally, participants also warned about the possible macroeconomic and operational effects that the approval of **Bill no. 2,338/2023** may have on business dynamics. They pointed out that, by imposing requirements that may slow down processes and restrict corporate agility, regulation can directly affect corporate targets, production flows, and delivery models currently consolidated in manufacturing. In the group's view, the impact goes beyond regulatory compliance: it represents a systemic effect, with potential repercussions for competitiveness and operational efficiency in companies' day-to-day activities.

> *"When we bring in an issue of speed, an issue of delivery levels, if we introduce legislation that really slows things down, we will have problems with company targets and with how the company operates today. So there will be a huge macro effect that, when you look at the law by itself, you think, 'wow, is that all?' But when you look at the macro effects in day-to-day practice, we will have very relevant impacts—competitive ones, but also on the company's everyday operations."* **[Participant C]**

2.4. Suggestions and Guidance

During the focus group dynamics, participants shared their perspectives on possible solutions and pathways to improve the text of **Bill No. 2,338/2023,** as well as to strengthen the effective and qualified participation of manufacturing in the legislative process.

Participants emphasized the importance that future AI regulation be guided by **structuring principles** capable of orienting the interpretation and application of the law in a manner

consistent with constitutional values. They highlighted that, in a rapidly evolving technological landscape, an overly detailed and prescriptive law, such as they perceive the current text of **Bill No. 2,338/2023** to be, tends to become quickly obsolete and restrictive. The incorporation of broad, guiding principles, by contrast, would allow regulation to remain relevant and balanced, keeping pace with transformations in the technological and industrial ecosystem.

> *"So, when you are drafting a law, I think, as my colleagues said, it really requires a more principles-based approach. You have to have principles very firmly grounded in what exists, for example, in the Federal Constitution—protection, privacy, and so on. Because if you do not have guiding principles in the construction and use of this, I think it becomes an extremely powerful tool for misuse."* **[Participant A]**

Given the complexity of the proposed text, participants also emphasized the importance of simplifying and making the language of the regulation more accessible, without sacrificing technical rigor. They argued that the use of terminology harmonized with already consolidated standards is essential to avoid anachronisms and to reduce the risk of regulatory rigidity over time.

> *"Technical standards are very underused. A technical standard is not regulation; it is a social consensus. It should be used much more. In the information security area, it is very common to follow technical standards. Regulation cannot enter that domain, it should not, otherwise it will become rigid and create this problem. So there has to be standardization, meaning everyone speaks the same language and moves in the same direction."* **[Participant F]**

Regarding ensuring effective and qualified manufacturing participation in the legislative process of Bill no. 2,338/2023, participants stressed **the importance of broadening consultation and inclusion of stakeholders who do not traditionally belong to the technology sector.** They highlighted that the active involvement of users, developers, and representatives from other economic sectors is essential to promote a more plural debate, capable of reflecting the diversity of realities and challenges associated with the application of AI in the country.

> *"So, invite people for conversations and roundtables, especially on something that will affect everyone—not only technology companies, but manufacturing as well. And you also need to call companies that at first might not seem relevant, but that are living this reality because they use AI in their processes. So let's involve developers, users, when we think about industries, businesses, and society as a whole."* **[Participant I]**

Participants also highlighted the importance of **defining clear premises for the role of manufacturing associations in their interaction with sectoral regulators,** to strengthen dialogue and promote more cohesive and aligned regulation across different

sectors. They assessed that the current text of Bill no. 2,338/2023 grants excessive autonomy to sectoral authorities, which may result in divergent interpretations and requirements, creating a fragmented regulatory environment.

> *"I think one thing the legislation is doing is leaving things too open for sectoral regulators to do whatever they want. That's why we could include the voice of manufacturing associations in the premises, make clearer what is intended..."* **[Participant F]**

In addition, participants mentioned the importance of conducting **Regulatory Impact Analyses (RIA)** as a preliminary step before implementing AI-related regulations. This instrument, commonly used by regulatory agencies, makes it possible to assess the economic and social relevance of proposals, comparing alternatives and measuring their potential effects (CNI, 2021). In the group's view, the systematic adoption of RIAs would help support more balanced, efficient, and sector-appropriate regulatory decisions.

> *"There also has to be a regulatory impact analysis when you are going to make a change or create legislation of this kind. There needs to be a culture of conducting regulatory impact analyses, including from an economic perspective, to see whether that actually makes sense for society."* **[Participant A]**

3. Analysis and Comments

In the face of widely shared perceptions, especially in qualitative research, it is necessary to adopt a critical perspective and to confront these accounts with other data and methods to assess their consistency and formulate exploratory hypotheses. This is because apparent consensus often emerges from imbalances in visibility rather than from a faithful representation of the facts.

In other words, **are the focus group's perceptions disconnected from reality, or are they supported by objective data?** We decided to analyze two specific points, precisely those where consensus was strongest: perceptions of listening and participation in the legislative process of Bill no. 2,338/2023, and the emphasis on concerns regarding civil liability. In both cases, our research showed that this convergence is directly grounded in evidence from the legislative process itself and from the text of Bill no. 2,338/2023.

3.1. Perceptions of Listening and Public Hearings

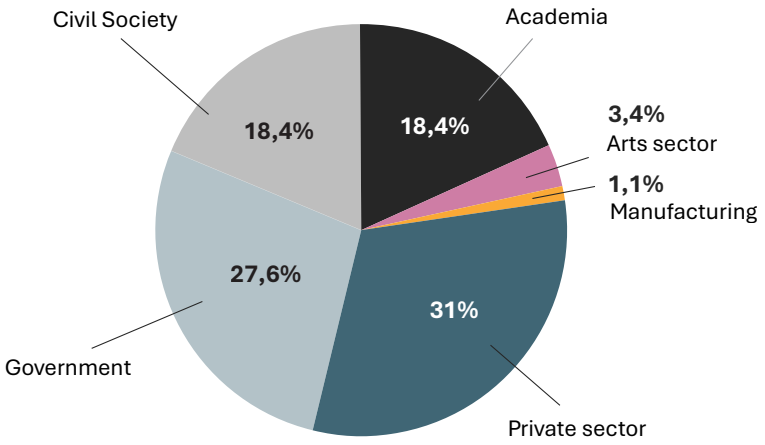
As shown in section 2.3, focus group participants perceive that the public debate on AI regulation has privileged the voices of technology companies and sectors already well established in the digital agenda, relegating manufacturing to a secondary position, despite being directly affected by the adoption and regulation of these technologies.

During the legislative process of Bill no. 2,338/2023 in the National Congress, several public hearings were held to gather different perspectives on the regulation of artificial intelligence in Brazil. In the Federal Senate, the Temporary Committee on Artificial Intelligence (CTIA) held 14 sessions between October 2023 and September 2024 (Federal Senate, 2024). In the Chamber of Deputies, the Special Committee responsible for examining the bill conducted 12 public hearings between June and September 2025 (Special Committee on AI, 2025).

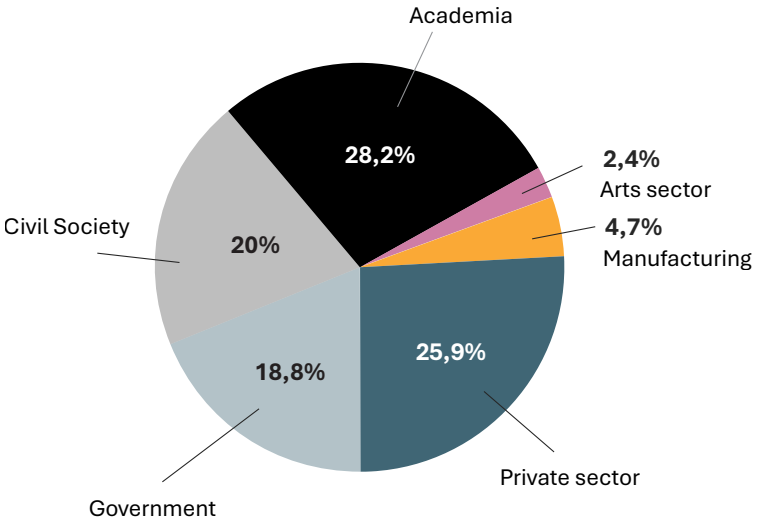
An analysis of the participants invited to the public hearings promoted by the National Congress indicates that only 1.1% of the invitees in the Chamber of Deputies and 4.7% in the Federal Senate directly represented manufacturing interests, corresponding to an average of approximately 2.9% across both chambers.

This figure contrasts sharply with the economic weight of the sector, which accounts for 24.7% of national GDP and 21% of formal employment (CNI, 2025). The contrast remains when considering the manufacturing specifically, which represents 14.4% of GDP and 14.3% of formal employment in the country (CNI, 2025).

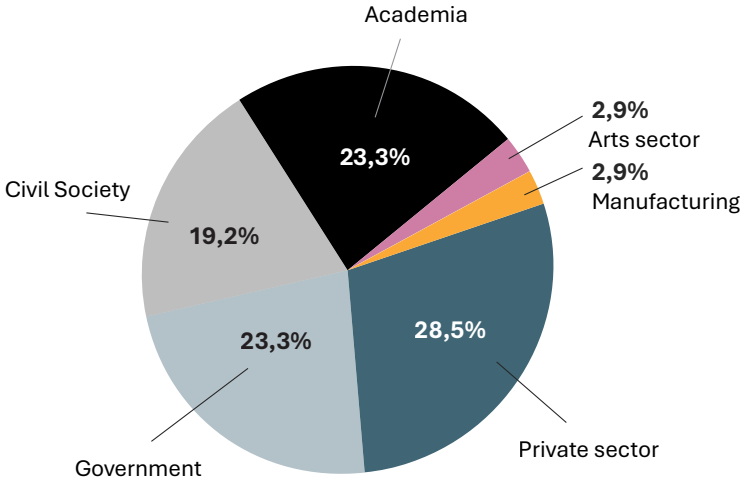
Distribution of participants in the Chamber of Deputies



Distribution of participants at the Senate



Total distribution of participants



The analysis of the full transcripts of the public hearings held in the Senate and the Chamber of Deputies shows that references to manufacturing were sporadic and, in most cases, anecdotal or generic. Even when mentioned by experts who did not directly represent the sector, the term was often used in an abstract manner or to refer to service sectors (e.g., "software industry" or "cultural industry"), without reference to manufacturing or to the industrial sector itself.

Among the substantive mentions of manufacturing, a small but coherent set of interventions can be identified. These statements acknowledged **both the sector's dependence on AI and the mismatch between the regulatory debate and the real conditions of Brazilian manufacturing.** They also highlighted the need for reskilling and adaptation of industrial value chains in the face of technological transition, emphasizing that regulation should "focus on high-risk uses and avoid obstacles to innovation" (CNI), while ensuring legal certainty and proportionality.

These statements also revealed a recurring argumentative pattern—also present in the focus group: **an effort to reposition manufacturing as an active and legitimate subject in the AI debate,** in contrast to the dominant narrative centered on digital platforms and personal data protection. The industrial discourse mobilized categories such as promotion, diffusion, and regulatory proportionality, structuring itself around the pursuit of regulatory symmetry and realism.

> *So, when thinking about a predictive manufacturing system within an industrial plant, the regulatory impact analysis burden and the self-explainability requirements imposed on that model obviously cannot be the same as those applied to a public system used to determine whether a given citizen is eligible to receive a benefit from the Brazilian government.* **(MDIC)**
>
> *What I want to bring up here is that technologies, or systems, are transversal. I can apply the same fatigue-detection technology in other situations, which may involve lower or higher risk. (...) These technologies permeate any type of sector and application. (...) This is essential for neo-industrialization. We want to modernize manufacturing.* **(CNI)**

3.2. Civil Liability and the Brazilian Context

As already highlighted in this study, focus group participants perceived civil liability as the issue of greatest concern in Bill no. 2,338/2023. At several points, this and other topics were contrasted with the European Union's AI Act, which served as both an explicit and implicit foreign regulatory reference throughout much of the focus group discussion.

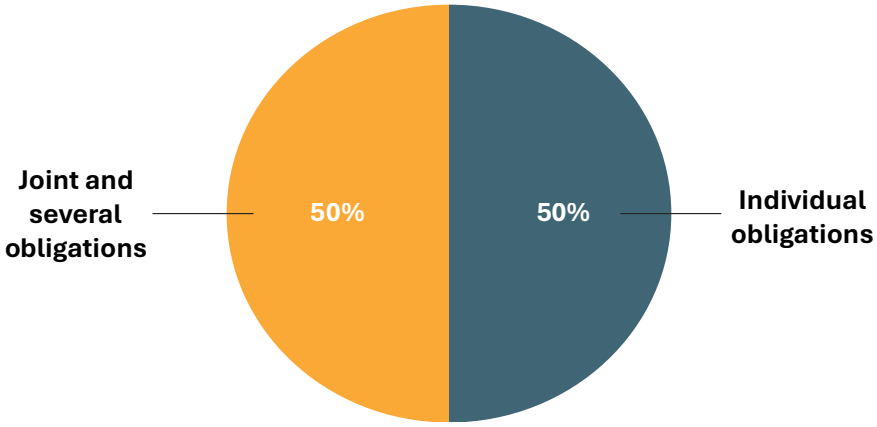
However, we believe there is a difference between the two frameworks that may help explain, at least partially, why civil liability stands out as a concern among different

manufacturing representatives. Evidence for this emerges from a study conducted by the Institute of Technology and Society of Rio de Janeiro (ITS/RJ), entitled **"Comparative Matrix of Obligations: Bill no. 2,338/2023 vs. the EU AI Act,"** updated in June 2025.

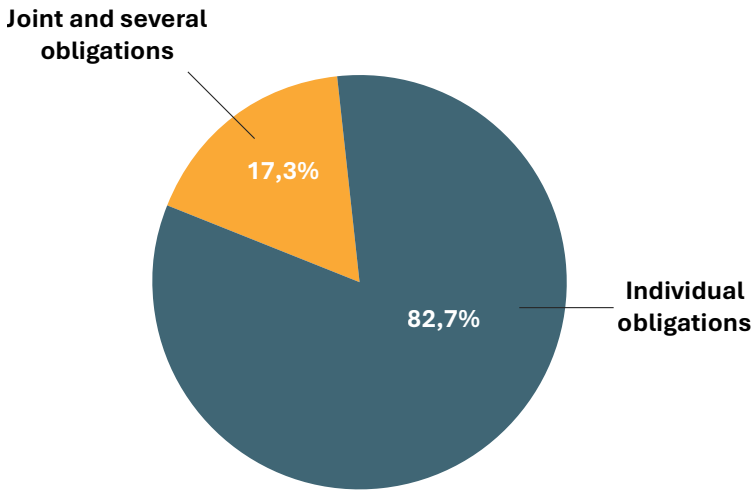
In this preliminary research, ITS/RJ concludes that **Bill No. 2,338/2023 is more extensive than the AI Act in terms of the number of obligations:** 68 obligations in the Brazilian proposal, compared to 43 in the European framework.

In addition, Bill no. 2,338/2023 adopts a more horizontal approach, establishing a greater number of shared obligations: **34 of the 68 total obligations involve joint and several liability among the three main agents** (provider, deployer, and distributor). By contrast, the European regulatory framework follows a more targeted strategy, assigning responsibilities to specific actors. Even so, of the 43 obligations in the AI Act, **only 9 are assigned in a shared manner to three or more actors in the supply chain.**

Obligations in Bill No. 2,338/2023



Obligations in the EU AI Act



Joint and several liability reflects a structural characteristic of Brazilian law: the historical emphasis on **consumer protection** as the central axis of regulation and civil liability. By adopting a model that prioritizes the protection of the end user, Bill no. 2,338/2023 appears to align with the tradition of the Consumer Protection Code, which helps explain the concern expressed by manufacturing representatives, who operate complex value chains and share technological inputs with multiple actors.

At the same time, it is important to recognize that this approach may **overlook the diversity of AI uses within manufacturing,** many of which are entirely distinct from a traditional consumer relationship. AI systems applied to manufacturing processes, quality control, energy monitoring, or logistics management do not involve direct interaction with the final consumer, yet they could be subject to liability regimes equivalent to those governing consumer-facing applications. This lack of differentiation increases the risk of **predatory litigation**, in which broad interpretations of the law are leveraged in opportunistic legal claims.

Both hypotheses, articulated in the focus group participants' perceptions, indicate that this concern constitutes a legitimate warning that warrants further, targeted studies to understand how the wording of the bill may inadvertently create uncertainty in compliance processes and incentives for excessive judicialization.

4. Conclusion

The results of this research reveal a gap between the advancement of the AI regulatory agenda and the effective participation of the industrial sector in this process. Although Bill no. 2,338/2023 represents an important milestone toward consolidating a legal environment oriented to responsible innovation, its current formulation reflects the predominance of foreign models and references that are insufficiently sensitive to Brazil's productive diversity and technological reality.

The perceptions collected in the focus group indicate that the manufacturing industry recognizes the value of ethical, rights-oriented regulation, but expresses legitimate concerns regarding the clarity of obligations, the operationalization of the rules, and the compatibility between the new requirements and the dynamics of productive value chains. Issues such as civil liability, the broad risk-classification system, regulatory overlap among authorities, and the complexity of the legislative text emerge as central challenges for the implementation of the bill.

Rather than resistance to regulation, the voices heard in this study point to the need for a more dialogical, predictable, and risk-proportionate regulatory governance model, aligned with the actual risks of industrial AI applications. The absence of structured channels for listening to the productive sector not only weakens the legislative process and normative construction but also reduces the regulation's capacity to generate gains in competitiveness and legal certainty.

In this sense, the study reinforces that AI regulation and industrial policy should not be treated as separate agendas. Convergence between the two is an essential condition for Brazil to build a regulatory model that combines rights protection, innovation incentives, and the strengthening of the productive base. Ensuring qualified manufacturing participation in decision-making forums, incorporating regulatory impact assessment practices, and adopting accessible normative language are decisive steps toward this alignment.

By listening to representatives of the manufacturing industry, Reglab seeks to contribute to a more plural, technical, and evidence-based debate. AI regulation will be more effective to the extent that it reflects the complexity and diversity of AI uses across the national economic fabric. This policy brief is, therefore, an invitation to the continuation of this dialogue.

5. Direction for Future Studies

This study was based on a focus group methodology, bringing together senior legal representatives from companies in the manufacturing industry to understand their perceptions of Bill No. 2,338/2023 and the legislative process surrounding it. The central objective was to give prominence to a sector with low effective representation in discussions on AI regulation, by creating a space for qualified listening and collective reflection on the potential impacts of the proposed regulation.

While the focus group made it possible to identify trends, areas of consensus, and strategic concerns from a legal and regulatory perspective, the findings do not exhaust the debate. There is significant room for further research that can contribute to a more comprehensive understanding of the relationship between innovation, governance, and AI regulation in the Brazilian industrial context.

Among the possible directions for future studies, the following stand out:

- **Perspectives beyond legal departments:** This study focused on professionals from control functions, particularly legal and regulatory areas. Future research could include managers from innovation, marketing, operations, and technology, to understand how AI regulation is perceived and incorporated into business routines from different organizational perspectives.

- **Normative analysis and legal effects:** This study analyzed participants' perceptions and did not conduct an extensive examination of the legal content of Bill No. 2,338/2023. Future work may deepen the analysis of the proposal's normative provisions, investigating how each obligation may legally affect the manufacturing in areas such as civil liability, risk classification, and AI systems governance.

- **Regulatory impacts and sectoral competitiveness:** Future multidisciplinary research may conduct regulatory impact analyses specific to the manufacturing industry, estimating compliance costs, barriers to entry, and the effects on competitiveness and innovation resulting from the implementation of the future law.

- **Institutional capacities and regulatory coordination:** Considering the design of the National AI Regulation and Governance System (SIA) provided for in the bill, future studies may examine the regulatory capacity of sectoral authorities to operate within this new ecosystem, assessing gaps in coordination, technical expertise, and institutional resources.

- **Multisectoral expansion of perspectives:** This study focused on the perceptions of legal and regulatory professionals in the manufacturing industry. Future research may include representatives from government, civil society, business associations, startups, and research institutions in order to capture convergences and divergences among different sectors and actors within the AI regulatory ecosystem, thereby expanding the analytical and comparative plurality of the findings.

Taken together, these directions reinforce the need to **deepen dialogue among manufacturing, regulators, and academia,** consolidating an empirical and legal foundation capable of supporting the development of **an AI regulation that is ethical, adaptable, and conducive to competitiveness.**

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Reglab methodology Annex

Title	The Voice of the Manufacturing Industry in AI Regulation: A Sectoral Analysis of Bill no. 2,338/2023
Research question	How do legal executives from manufacturing assess Bill No. 2,338/2023 and the inclusion (or absence) of the sector's voices in the legislative process?
Methodology summary	This study adopts a qualitative and exploratory approach, grounded in the conduct of a focus group with senior legal representatives from the Manufacturing Industry. Data collection aimed to capture participants' perceptions and interpretations of Bill No. 2,338/2023 and its legislative process, based on their practical experience with issues related to artificial intelligence regulation and governance. Data analysis was conducted using reflexive thematic analysis, with initial manual coding performed by the research team and subsequent cross-checking supported by the NotebookLM software, which was used to verify the consistency of categories and identify potential interpretive gaps. The emergent categories were subsequently consolidated and validated against the full empirical corpus, ensuring analytical coherence and methodological transparency.
Data collection	The research employed the focus group methodology (Oliveira et al., 2020) through a qualitative session conducted on the basis of a previously structured guide. The choice of this method aimed to create a collective dialogue environment, fostering peer exchange and the shared construction of perceptions around a common theme: participants' views on Bill No. 2,338/2023 and its legislative process. This format enabled the emergence and interaction of different perspectives and more in-depth analyses that would be unlikely to arise in individual interviews with legal executives from the sector. The sample was composed according to criteria of diversity and representativeness, including the participation of women and representatives from different segments of the manufacturing industry. Participant selection combined active outreach on LinkedIn as the primary strategy, complemented by convenience sampling. Of the 34 individuals contacted, 9 agreed to participate in the study, 8 reported unavailability, and 16 did not respond to the invitation. The focus group was held on September 23, 2025, in an in-person format, with an approximate duration of two hours. The session was conducted by the Reglab research team and audio-recorded with the participants' express authorization. The recordings were fully transcribed and accompanied by analytical memos prepared by the researchers present, in order to capture contextual impressions and non-verbal elements of the interaction. All materials were subsequently stored and coded in the Atlas.ti software, with participants' names anonymized to ensure confidentiality. The focus group dynamics were guided by a semi-structured script, combining moments of open debate and structured collective prioritization exercises. The session began with broad engagement questions aimed at capturing participants' general perceptions of the topic, followed by visual systematizations using sticky notes to map the main impacts of Bill No. 2,338/2023 on the Manufacturing Industry. Subsequently, the moderation promoted rounds of discussion and collective reflection, encouraging dialogue among participants and the clarification of doubts. As part of the methodology, the Nominal Group Technique (NGT) was incorporated—a structured method for idea generation and prioritization that combines individual contribution with collective discussion and voting (Delbecq & Van de Ven, 1971). Widely used in applied research, this technique seeks to reduce biases such as dominance of speech or hierarchical influence, ensuring balanced participation and structured consensus around the issues discussed. Through this technique, it was possible to identify and rank the aspects of Bill No. 2,338/2023 considered most critical by manufacturing, while also capturing divergent perceptions and complementarities among participants, thereby strengthening the qualitative robustness of the analysis. After the NGT exercise, a simulated board-style voting process was conducted, inspired by corporate decision-making practices. At this stage, each participant received a fixed number of votes to distribute among the topics listed in the previous exercise, according to the degree of relevance attributed to each. The objective was to prioritize the issues perceived as most critical to the sector, allowing observation of the relative weight of concerns.

Data analysis	Data analysis followed the reflexive thematic analysis approach (Braun & Clarke, 2006), recognized for its suitability for exploratory qualitative studies in highly complex contexts. This approach prioritizes contextualized interpretation rather than exhaustive coding, allowing for open and iterative analytical strategies. Material from the focus group was fully transcribed and processed in the Atlas.ti software. Initial coding was performed manually by one researcher on the team and subsequently reviewed by two other researchers to ensure interpretive consistency and reliability. In the next stage, visual tools within the software—such as concept clouds, thematic maps, and correlation graphs—were used to identify co-occurrence patterns and relationships among codes. This process resulted in the emergence of central themes, which were tested, discussed, and collectively validated by the research team, ensuring their adherence to the original empirical corpus. The analysis phase was conducted between September 23 and October 3, 2025.
Classification of Participants in National Congress Public Hearings	To understand the diversity of voices present in the legislative debate on AI regulation, 26 public hearing sessions held in the Federal Senate and the Chamber of Deputies were analyzed. In the Federal Senate, the Temporary Committee on Artificial Intelligence (CTIA) held 14 sessions between October 2023 and September 2024. In the Chamber of Deputies, the Special Committee responsible for analyzing Bill No. 2,338/2023 conducted 12 public hearings between June and September 2025. Participants in these hearings were classified into six analytical categories, based on the institutional nature of the entity represented and the interests formally associated with their participation: • Civil Society – Includes representatives of non-governmental organizations, associations, and collectives representing the interests of society at large. • Academia – Encompasses researchers, faculty members, and representatives of educational and research institutions. • Sector – Manufacturing – Brings together representative entities of the manufacturing industry and strategic industrial segments, directly expressing the interests of the productive sector. • Sector – Artistic – Comprises artists and creators. • Business Sector – Includes companies, business associations, and sectoral federations focused on technology and services. • Government Sector – Encompasses public authorities and representatives of governmental bodies and entities. Each participant was counted only once, according to the predominant category of institutional representation, considering the entity indicated in the official invitation to participate in the public hearing. Thus, the same individual was not simultaneously classified into more than one category, even if they had multiple professional affiliations or hybrid career trajectories. This methodological choice aimed to ensure classificatory coherence and avoid overlapping records. To ensure consistency and minimize bias in classification, a double independent verification procedure was adopted, in which one researcher's work was fully reviewed by another team member. Any identified divergences were discussed and consolidated with the mediation of a third researcher, ensuring greater reliability of the assigned categories and reinforcing the study's methodological commitment to replicability and analytical credibility. As an additional bias-mitigation procedure, the stenographic records of the hearings in both the Chamber of Deputies and the Senate were analyzed using the Atlas.ti software, employing the tools of (i) text search (the term "manufacturing" and its morphological variations), (ii) concepts, and (iii) conversational AI. The objective was to identify any mentions of the industrial sector made by other actors that were relevant to the research object.

Bias-Reduction Procedures	**Established theoretical–methodological references:** The data collection and analysis techniques adopted in this study followed practices widely recognized in the academic literature. The methodological approach was discussed internally both before and after the focus group session, allowing the incorporation of critiques and suggestions into the final research design prior to the start of the analytical process. **Complementary verification tool:** Although the initial data coding was conducted and triangulated by the research team, a second analytical support software (NotebookLM) was used as a cross-checking tool. This resource was employed by researchers who participated directly in the focus group, with the objective of validating the consistency of the identified categories and detecting potential interpretive gaps that may have gone unnoticed during the initial coding. **Method triangulation:** In the analysis and commentary section, the empirical findings were contrasted with documentary analysis of secondary sources, with the aim of comparing, validating, and strengthening the consistency of interpretations derived from the interviews. When used, these references were explicitly cited throughout the text. **Independent double review:** Two researchers independently reviewed the full set of codes and themes in a cross-checking process, reducing individual biases. The final definition of themes resulted from a collective discussion between the two authors, ensuring multiple perspectives and control of individual interpretive biases. **Documentation and methodological transparency:** All stages of the analytical process were documented, including successive versions of drafting files. This practice enables traceability of the methodological pathway, in line with Reglab guidelines for transparency and replicability.
Other Methodological Limitations	**Dependence on external tools:** Part of the analytical process relied on the use and performance of proprietary software, which may limit replicability in different contexts. **Qualitative scope and exploratory nature:** The findings of this study derive from a single focus group conducted with legal representatives from the Manufacturing Industry. The discussions provide analytical depth and interpretive richness but do not claim statistical representativeness. **Sampling strategy and participant reach:** Participant selection was conducted through convenience sampling, which may reflect availability and professional network biases, despite the adoption of criteria aimed at sectoral diversity and firm size. Part of the sample was also composed of participants invited through direct outreach on professional networks, such as LinkedIn, which expanded the reach of invitations but maintained reliance on voluntary response and availability. These conditions limited the expansion of the number of invitees, ultimately enabling the realization of a single focus group session. **Temporal framework and legislative updates:** The conclusions of this study reflect the state of the legislative and regulatory debate at the time the focus group was conducted, taking as reference the version of Bill No. 2,338/2023 submitted to the Chamber of Deputies. Subsequent changes to the bill's wording or to the legislative process were not considered in the analyses and interpretations presented herein and may therefore affect the applicability or relevance of some findings and commentaries.

Software use

Software	Descrição
Suíte MS Office	Text editing, spreadsheets, and charts
Suíte Adobe C	Layout and finalization of charts and illustrations
Atlas.ti	Organization, coding, and analysis of qualitative data
Cockatoo	Transcription of focus group audio into text
ChatGPT 5o	Brainstorming; information systematization; grammatical review (spelling and grammar, synonym search); language adjustment; alignment with the Reglab Style Manual
Notion AI	Research organization and timeline structuring
Lex.page	Text review (brevity, clichés, readability, passive voice, unsupported claims, repetitions)
More UFSC	Generation of bibliographic references in ABNT format

Ethical guidelines

Research funding: This publication is part of a series of studies sponsored by Google, Meta, and b/luz. Although the study was commissioned, Reglab retained full editorial and methodological control over the project, including independent definition of the methodology, analysis of results, and drafting of this research report. The authors maintained full professional independence and assume sole responsibility for the content and conclusions presented.

Personal data processing: The research involved the processing of personal data only during the data collection and analysis stages, in a manner limited and proportionate to the study's objectives, in compliance with Law No. 13,709/2018 (Brazilian General Data Protection Law – LGPD).

Legal basis: All participants formally authorized their participation by signing an informed consent form, acknowledging the research objectives and the use of data.

Purpose limitation and adequacy: Data were used exclusively for the purposes of this research, in accordance with the consent obtained, and were not employed for any other purposes.

Data minimization and anonymization: Personally identifiable information that was not relevant to the study's objectives was anonymized in the transcripts and removed from the active dataset.

Confidentiality: In presenting the results, data were kept confidential, and quotations were adjusted when necessary to preserve the anonymity of sources. Access to personal data and original documents was restricted to a limited number of researchers directly involved in the project.

Information security and record-keeping: Files were stored under password-protected access controls and in accordance with Reglab's internal information security policies.

Data retention and disposal: Data will be retained for up to 12 months solely for methodological auditing and potential replication purposes and will be subsequently deleted.

Responsible use of public data: Although some of the analyzed data are publicly available, their use was conducted responsibly and ethically, exclusively for independent research purposes.

Methodological transparency: The research methodology was described in detail to ensure transparency and replicability, contributing to scientific integrity and enabling independent validation of the results.

Non-discrimination and respect for diversity: The research was conducted in a manner that respects diversity and avoids any form of discrimination.